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Preface

Over the past two years, Italy has made a tremendous effort to speed up long overdue structural reforms to put public finances on a sounder track, to revive and modernise its economy, and to restore growth and competitiveness.

This Environmental Performance Review of Italy, the third prepared by the OECD, provides analysis and policy recommendations on how to integrate environmental considerations in Italy's broader reform agenda and strengthen the country's environmental performance. Among other measures, the Review suggests that shifting the tax burden from labour and capital to pollution and resource use could make the tax system more efficient and provide better incentives for environmental protection.

The report also argues that further development of renewable energy sources in conjunction with smart grids, as well as expanding successful energy efficiency initiatives, could help create the new green markets and related employment opportunities that are needed for a transition to a low-carbon, resource-efficient economy. These initiatives should be embedded in a long-term energy strategy in order to provide a stable framework for investment.

In recent years, Italy has taken many positive environmental initiatives, particularly in some regions and business sectors. These have led to impressive achievements, including a reduction of air emissions and water pollution, an improvement in waste management, and enhanced protection of biodiversity. However, these achievements are often partial and exhibit significant regional variations, a feature of the Italian system that is reinforced by a major devolution of legislative and administrative responsibilities to the subnational governments. A concerted effort is now needed to make the environmental management system more coherent and effective, and to scale up positive environmental achievements.

The Environmental Performance Review of Italy places a special focus on climate change, water management and green growth promotion. Among its specific recommendations, the following ones can be underlined:

- prepare a green growth strategy that provides a clear, coherent and sufficiently long-term policy framework to spur investment in the green economy;
- strengthen the links between the disbursement of regional development funds and the achievement of targets for the provision of environmental services;
- continue to simplify environmental requirements for small and medium-sized enterprises to reduce administrative costs and barriers while reinforcing efforts to combat environmental crime, especially related to waste and land use;
- apply economic instruments more systematically and streamline institutional arrangements for managing water resources at the level of river basins;
- restructure the taxation of energy products to explicitly include a carbon tax component with a view to providing a consistent price for carbon across the economy;

- extend the use of price-based mechanisms, such as pollution and congestion charges, to reduce emissions from vehicle use in urban areas, and restructure vehicle taxation to include components reflecting CO_2 emissions and other environmental externalities.

This Review is the result of a co-operative policy dialogue between Italy and other members and observers of the OECD Working Party on Environmental Performance. We are confident that this collaborative effort will be useful to advance the policy debate on how to tackle the shared environmental challenges faced by OECD members and their partners.

Angel Gurría
OECD Secretary-General

Foreword

The principal aim of the OECD Environmental Performance Review programme is to help member and selected partner countries to improve their individual and collective performance in environmental management by:

- *helping individual governments to assess progress in achieving their environmental goals;*
- *promoting continuous policy dialogue and peer learning;*
- *stimulating greater accountability from governments towards each other and public opinion.*

This report reviews the environmental performance of Italy since the previous OECD Environmental Performance Review in 2002. Progress in achieving domestic objectives and international commitments provides the basis for assessing the country's environmental performance. Such objectives and commitments may be broad aims, qualitative goals, or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of Italy's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions, and demographic trends.

The OECD is indebted to the government of Italy for its co-operation in providing information, for the organisation of the review mission to Rome and Venice (6-10 February 2012), and for facilitating contacts both inside and outside governmental institutions.

Thanks are also due to all those who helped in the course of this review, to the representatives of member countries participating in the OECD Working Party on Environmental Performance, and especially to the examining countries: France, Mexico and Sweden. A representative of South Africa participated in the review mission as an observer.

The team that prepared this review comprised experts from reviewing countries: Mr. Christophe Poupard (France), Mr. César Chavez Ortiz (Mexico) and Ms. Katrin Zimmer (Sweden); members of the OECD Secretariat: Ms. Aziza Akhmouch, Ms. Ivana Capozza, Mr. Brendan Gillespie, Mr. Reo Kawamura, Mr. Krzysztof Michalak; and Mr. Joseph Curtin (consultant). Ms. Carla Bertuzzi and Mr. Shayne MacLachlan (OECD Secretariat) and Mr. John Smith (consultant) provided statistical and editorial support during the preparation of the report. Preparation of this report also benefitted from comments provided by Ms. Claire Charbit, Mr. Xavier Leflaive, Mr. Paul O'Brien and other members of the OECD Secretariat.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of Italy at its meeting on 11 October 2012 in Paris, and approved the assessment and recommendations.

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General notes

Signs

The following signs are used in figures and tables :

..: not available

– : nil or negligible

.: decimal point

Country aggregates

OECD Europe: This zone includes all European member countries of the OECD, i.e. Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all member countries of the OECD, i.e. the countries of OECD Europe plus Australia, Canada, Chile, Israel, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: Euro (EUR).

In 2011, USD 1.00 = EUR 0.716.

Cut-off date

This report is based on information and data available up to the end of June 2012.

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Executive summary

Italy's economy, the sixth largest in the OECD, is highly dependent on imports of energy and raw materials. It is also diverse, with a more economically advanced, richer North and a less developed, poorer South. Regional differences and disparities have been reinforced by a major devolution of legislative and administrative responsibilities. Italy's average annual growth between 2000 and 2007 was the lowest among OECD countries. From 2008, the economy was deeply affected by the global economic crisis. Economic policy has increasingly been driven by the need to promote growth while consolidating the public budget.

Italy's environmental performance has been shaped by some of the broader economic and institutional challenges it has faced. There have been many positive environmental initiatives, particularly in some regions and business sectors. However, the relatively low priority assigned to the environment by the national and some regional governments over much of the last decade, coupled with a highly decentralised governance system, has made it difficult to scale up positive environmental initiatives. Overall, the environmental policy framework has been fragmented and reactive and has not provided sufficient incentives to promote green growth. Further efforts are needed to make the environmental management system more coherent and effective, and to exploit potential synergies between policies to promote economic recovery and to protect the environment. Recent initiatives, for example to promote a green economy, are a step in the right direction.

Strengthening environmental performance

Italy's environmental performance in the last decade has been mixed, with marked regional variations:

- Reductions in emissions of local air pollutants were among the largest in any OECD country, but more than half the 30 most polluted cities in Europe are in Italy.
- Greenhouse gas (GHG) emissions were 6.2% below 1990 levels in 2010, compared to the Kyoto target of a 6.5% reduction in 2008-12, including GHG absorption by forests and reflecting the sharp decline in emissions due to the economic crisis.
- The overall quality of waterways has been stable, while river quality has improved. However, national averages mask significant regional differences, with regions in the South performing less well than those in the North.
- The share of municipal waste treated in landfills has fallen, while good progress has been made in reducing and managing landfills and illegal waste dumps. However, there are important regional variations (notably in Campania, Lazio and Sicily). Unlike in many

other OECD countries, municipal waste generation has increased more rapidly than GDP and private final consumption, at least up until the 2008 economic crisis.

- The share of land covered by Natura 2000 is higher than the EU average (with relatively greater coverage in the South) and the number of endangered vascular plants is low compared to that in other OECD countries. However, threats to mammals, freshwater fish and amphibians are higher than in many other OECD countries.
- Italy is subject to a range of natural hazards: earthquakes, floods, landslides and forest fires. Risks to the population, and associated costs, are aggravated by poor spatial planning and weak oversight of housing development.
- According to opinion polls, the Italians appear to be among the least satisfied of any Europeans with their country's environmental quality.

A strengthened technical information base has provided important support for the development and implementation of Italian environmental policy in the last decade. Communication with the public has been made more user-friendly. A solid framework for managing traditional pollutants is now in place, with streamlined administrative requirements for the small and medium-sized enterprises that make up a significant fraction of Italian industry. Measures to promote compliance with environmental requirements have been better targeted and strengthened.

Despite these advances, additional measures are needed to strengthen the coherence and effectiveness of Italy's environmental governance. National strategies are needed that, while not impinging on the prerogatives of regional and local governments, provide clear direction for issues that require common or consistent approaches (e.g. water and waste management, climate change, and environmental compliance assurance). Those strategies should be supported by more effective mechanisms for co-ordinating environmental policies vertically. However, these objectives will be difficult to achieve unless the capacity of the Ministry of the Environment, Land and Sea is strengthened: its budget was cut by 48% between 2006 and 2011. In particular, the Ministry's capacity for economic analysis should be strengthened. It also needs to further promote the constructive participation of social partners in decision making by engaging them at a sufficiently early stage, and by encouraging consideration of alternative options.

Towards green growth

While initiatives to mainstream the environment into decision making have not been very successful, some recent developments provide a basis for progress. The Economic and Finance Document (DEF), the core economic policy document endorsed each year by the Parliament, currently gives some indications of the government's strategic priorities in regard to the environment. However, the DEF provides only a limited and unstable basis for guiding Italy's environment-related priorities. A long-term green growth strategy is needed to spur the environment-related productivity improvements, investment and innovation needed for green growth. Such a strategy should be developed by a body with responsibility for economic policy, such as the Inter-Ministerial Committee for Economic Planning.

In 2010, revenue from environmentally related taxes as a share of GDP and of tax receipts was higher than in the OECD as a whole. While the role of environmentally related taxes declined during the last decade and the real tax burden on energy decreased, the tax burden on energy (including tax rates on petrol and diesel) is among the highest in Europe.

This makes increasing energy taxes politically difficult. However, restructuring energy taxes, expanding the use of other environmentally related taxes, and removing environmentally harmful tax concessions (estimated at 0.2% of GDP in 2010) could help achieve fiscal consolidation. It could also help make the tax system more growth-friendly by reducing taxes on labour and businesses. The recently announced comprehensive fiscal reform provides a good opportunity to pursue these goals.

Public and private expenditures on waste, wastewater and water resource management have remained virtually stable at around 2.2% of GDP. There are some indications that expenditures in these areas have been better targeted, and that provision of waste and water services has progressively become more market-oriented. While investment in the waste and water sector amounted to less than EUR 5 billion in 2010, investment in renewable energy was estimated at EUR 21 billion in 2011, largely driven by various support programmes. Italy is now reportedly among the leading countries in terms of investment, turnover and employment in the renewable energy sector. Energy efficiency schemes have also helped stimulate the emergence of a dynamic energy services market. However, most turnover and employment in "clean energy" is in the downstream segments (e.g. installation, operation and maintenance of renewable energy equipment). Despite some progress, Italy's performance in the more upstream segments of the environmental goods and services sector and in eco-innovation is weak. In part, this reflects its weak innovation capacity more generally.

Since 2007, Italy has assigned higher priority to environmental issues in the context of official development assistance (ODA). The average share of environment-focussed aid is high compared to that of many other members of the OECD Development Assistance Committee (DAC). Various other measures have been taken to mainstream environment into ODA and to promote policy coherence among aid-related policies. However, recent progress should be seen in the context of weak overall ODA performance: ODA as a share of gross national income (GNI) is well below the OECD-DAC average and the 2010 EU target of 0.51%.

Multi-level environmental governance: Water

Water management in Italy was subject to significant reform before 2000. This included the pioneering introduction of a river basin management approach, and consolidation of water supply and sanitation services. Despite these advances, water governance remains overly complex, emergency-driven, and oriented towards short-term problem solving. To address these challenges, there is an urgent need to formulate a strategic vision for the water sector.

In the 2000s, transposition of the EU Water Framework Directive (WFD) provided a further push to consolidate water-related legislation, streamline water-management institutions and increase water-use efficiency. However, the measures implemented have also complicated the water governance system. Proposals developed by the government have been subject to legal challenges on various grounds, sometimes including lack of appropriate consultation with regions. The arrangements put in place using emergency powers have made governance arrangements even more complex, with some river basins managed by multiple authorities. The river basin management plans subsequently produced to implement the WFD reflected the existing institutional uncertainty and provided little value-added compared to river basin management plans prepared by the regions.

The consolidation of water utilities has helped achieve economies of scale and improve planning. Some utilities are now operating on a more commercial basis, but many are not, while tariffs in many regions are below sustainable cost recovery levels. Overall, the quality of water service provision is weaker than in many other OECD countries. The amount of water unaccounted for is relatively high, and access to efficient wastewater treatment infrastructure is relatively low. Governance of the water supply and sanitation sector remains weak and is characterised by uncertainty and ambiguity. In particular, relations between water utilities and the bodies that oversee them (and between utilities and municipalities) are unclear. Further uncertainty has been created by the 2011 water referendum, which significantly reduced the role of the private sector. The recent designation of the Regulatory Authority for Electricity and Gas (AEEG) to regulate the water sector is a potentially positive step. Drawing on the experience of managing utilities in other sectors, the AEEG could strengthen the financial management of water utilities and help create a more stable investment framework.

Climate change

Italy's climate change policy has largely been developed in the framework of EU climate and energy policies. While climate change did not have high political priority during most of the last decade, it was given renewed impetus more recently. Since 2011, progress in meeting international GHG emission reduction commitments has been reported in the annual Economy and Finance Document. In 2012, the Ministry of the Environment, Land and Sea presented a comprehensive plan for achieving the 2020 target set within the EU, which entails integrating the measures foreseen in national plans for renewable energy and energy efficiency as well as regional actions supported by EU and national funds for regional development. A national climate adaptation strategy is also being developed.

The EU Emissions Trading System (EU ETS) covers about 40% of Italy's GHG emissions. This is a lower share of emissions than in other large EU economies, leaving most emission abatement to be achieved through domestic measures in non-ETS sectors. There is scope to complement the ETS with a carbon tax on energy products used in the non-trading sectors, so as to establish a consistent carbon price across the economy. While energy taxes are high and have recently been increased, the rates do not fully or consistently reflect CO_2 emissions and other environmental externalities across fuels and energy uses.

The transport sector, particularly road transport, should be a priority as this sector remains the main energy end-user and the second largest source of CO_2 emissions. Progress has been made in developing integrated urban transport systems and implementing low-emission zones in many of the larger cities. However, public transport systems in most cities, especially in the South, remain insufficiently developed to provide an adequate alternative to use of private vehicles. Similarly, further financing and regulatory efforts are needed to develop the infrastructure of medium- and long-distance rail and multi-modal transport, and improve service quality. Further investing in alternatives to road transport would reinforce the environmental effect of fuel taxes and of a future carbon tax.

Italy's strategy for achieving climate mitigation goals has relied heavily on increased use of renewable energies. Feed-in tariffs and tradable renewable energy certificates (green certificates) have driven a dramatic increase in electricity generation from renewable sources: 28% of electricity generation in 2011, up from nearly 19% in 2010, and above the

intermediate target set by the Renewable Energy Action Plan. Italy is on track to meet its 2020 target of 17% of renewables in gross final energy consumption. However, this progress has been achieved at a high cost. In a welcome move, recent policy changes have better aligned incentives rates with the decreasing costs of renewable technologies, especially solar energy, and with better control of electricity costs for consumers in the period to 2020.

A mix of regulatory and economic instruments has helped to achieve energy savings above the intermediate target set by the national Energy Efficiency Action Plan, mainly in terms of reduced electricity use in the residential sector. Progress in the transport and service sectors has not met expectations and additional measures should be applied. Analysis suggests that energy efficiency measures have been cost-effective, particularly the market for energy efficiency certificates (White Certificates). Italy is a front runner in the development of smart grids.

Despite progress and the achievement of national targets, Italy's renewables and energy efficiency policies have lacked a general long-term vision. Management of the incentive systems for these policies involves a number of different agencies and institutions, resulting in co-ordination difficulties and increasing transaction costs. There has been a multitude of overlapping measures, which have also changed several times within a few years. This has created unnecessary complexity and regulatory uncertainty. A long-awaited national energy strategy was released for consultation in 2012 and provides the opportunity to address all these issues in a comprehensive way.

PART I

Progress towards sustainable development

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PART I

Chapter 1

Key environmental trends

This chapter provides a snapshot of some key environmental trends in Italy between 2002 and 2012. It highlights some of the country's main environmental achievements, as well as the remaining challenges on the path towards a greener economy and sustainable development. The chapter describes Italy's progress in reducing the carbon, energy and material intensities of its economy; in managing its natural asset base, including water and biodiversity resources; and in improving the environmental quality of life.

1. Introduction

During the last decade, economic growth in Italy was among the lowest in OECD countries (Reference I.A). The economy was hit by the most severe recession of the last half century following the global economic and financial crisis. Weak growth has reduced many environmental pressures, but Italy should integrate environment into the strategy to re-launch its economy. The country's rich natural environment and cultural heritage are among its most important assets. Accordingly, its new growth strategy must ensure that natural assets continue to provide the resources and environmental services on which sustained economic growth depends.

This chapter provides a snapshot of some key environmental trends in Italy during the review period (2002-12). It highlights some of the country's main environmental achievements and the remaining challenges on the path towards green growth and sustainable development. The chapter is based on indicators from national and international sources, and broadly follows the OECD framework for monitoring progress towards green growth (OECD, 2011a). Accordingly, it describes Italy's progress in using energy and natural resources efficiently in managing its natural asset base, and in improving the environmental quality of life of its people. It provides a baseline for subsequent chapters, which assess how effective Italy's environmental policies have been in affecting these trends and in using environmental objectives to generate economic opportunities.

Box 1.1. **The economic and social context**

- Italy's economy is the sixth largest among OECD countries. Average annual growth was 1.6% between 2000 and 2007, the lowest among OECD countries. In 2008-09 the economy shrank by 6.8% due to the global economic crisis. It increased by 2% in 2010 and returned to the pre-crisis average in 2011. However, GDP declined after mid-2011 and is projected to decline further until late 2013.
- With average GDP per capita of USD 31 563 (current PPP), Italy ranks 19th among OECD countries (Reference I.A). It is one of the most economically diverse countries in Europe. In the more economically advanced North GDP per capita averages USD 59 000. In the less developed South (Mezzogiorno), it can be as low as USD 22 000 (70% of the EU average).
- Services account for 81% of gross value-added, while industry accounts for 17.3% and agriculture for 1.7% (Reference I.A). A large number of small and medium-sized enterprises, clustered in several industrial districts, mostly in the North, are the backbone of Italian industry. The Italian National Institute of Statistics (ISTAT) estimates that untaxed transactions in the informal economy are currently equivalent to about 18% of GDP per year.
- Tourism is one of the fastest growing and most profitable sectors of the national economy: with 43.6 million international tourist arrivals and total receipts estimated at USD 38.8 billion in 2010, Italy is the fifth most visited country and fifth highest tourism earner in the world.

Box 1.1. **The economic and social context** *(cont.)*

- Italy has a long history of high public debt. Gross government liabilities amounted to 126.5% of GDP in 2010. Although they have declined since the late 1990s, they remain among the highest in the OECD. The level of private sector indebtedness is low, however, while private savings are higher than in a number of other OECD countries.
- In 2010, total public expenditure accounted for 47% of GDP, just below the mean in the euro area of 48% but significantly above the OECD average of 42%. Revenues are high (43% of GDP in 2010), indicating that reduced public spending rather than higher taxes will be needed to tackle Italy's public debt burden. Local governments collect a fairly high share of revenue (14.5%, the fifth-highest level in the EU).
- The general government deficit stood at 4.6% of GDP in 2010 and 3.9% in 2011. Following the Save Italy austerity measures adopted in December 2011, the goal is to reduce the deficit to 1.7% in 2012 and 0.5% in 2013.
- Italy's exports account for 26.7% of total GDP, slightly below the OECD average of 27.1% (2010) (Reference I.A). The main exports are manufactured goods, fabric and textile goods, and transport equipment. Imports account for 28.6% of total GDP and include manufactured goods, metal ores and scraps, and chemical products. Italy's share of imports in GDP is higher than the OECD average of 27.2%.
- Both FDI inflows to, and outflows from, Italy increased from around 1% of total GDP in 2004 to 2.5% and 4.8%, respectively, in 2007. However, both inflows and outflows were below 1% in 2009. Although the government encourages foreign industrial investment through tax concessions, foreign ownership is limited by laws and regulations.
- Following the 2003 labour reform, unemployment fell to 6.2% in 2007, the lowest rate since the early 1980s, but it increased to 8.9% at the end of 2011 (Reference I.B). In the South, the average unemployment rate has been far higher than the national average.[a]
- Italy's population was about 60 million in 2011, the eighth largest among OECD countries. Population density is high by OECD standards (199 per km^2 compared with the OECD average of 34 per km^2, Reference I.B) although unevenly distributed. The urban population accounts for 52% of the total and is above the OECD average (47%).
- Italy's population is ageing: population growth rate has been low at less than 1% since 1960. While the population aged less than 15 has remained at around 14% of the total population (compared to the OECD average of 18%), the population aged 65 and over has exceeded 20% since 2007 (higher than the OECD average of 14%). These ageing trends are particularly pronounced in the South.
- Inequality in income distribution remains slightly higher than the OECD average (Reference I.B). The at-risk-of-poverty rate[b] is 18.2%, higher than the EU27 average of 16.4% in 2010.
- Life expectancy at birth has gradually improved. At 81.8 years, it was the third highest among OECD countries in 2008. The infant mortality rate, as in other OECD countries, has fallen significantly, to 3.7 deaths per 1 000 live births in 2009, which is below the OECD average (4.3 per 1 000).
- While the achievements of 15-year-old students, measured by the OECD Programme for International Student Assessment (PISA), moved closer to the OECD average, they remain below that average. A wide gap in school results is reported between the North and the South.
- More young people than ever before have a secondary school diploma (70% of 25- to 34-year-olds), but the share of young Italians with this level of education is well below the OECD average (82% for that age group, Reference I.B). Italy also has one of the lowest tertiary attainment rates (20% of 25- to 34-year-olds, compared with the OECD average of 37%). It spends 4.8% of its GDP on education, 1.3 percentage points less than the OECD average.

a) However, a significant underground economy, especially in the South, partially offsets the high official unemployment rate, absorbing substantial numbers of people who work for low wages without standard social benefits and protection.
b) The share of the population whose income is below 60% of the national median equivalised disposable income.

2. Transition to a low-carbon, energy- and resource-efficient economy

2.1. Carbon and energy intensities

Greenhouse gas emissions

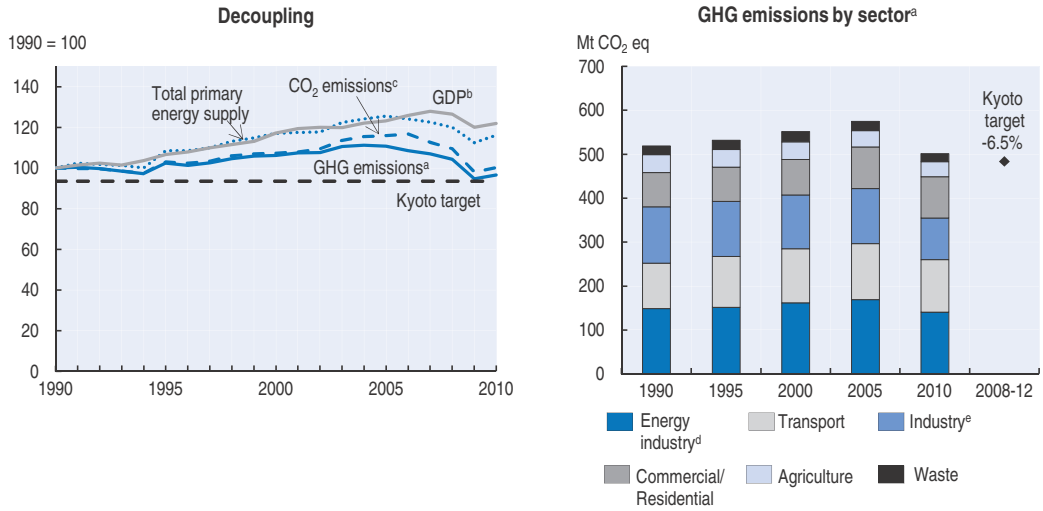
- Italy is the eighth largest emitter of greenhouse gases (GHG) in the OECD and the fourth largest in the EU. GHG emissions per capita (8 tonnes) are lower than the OECD Europe (9.5 tonnes) and OECD (14 tonnes) averages (Reference I.C).
- Gross GHG emissions increased continuously between 1990 and 2004. The increase, which was particularly marked in the 1990-2000 period (6%), slowed to 4.5% between 2000 and 2004. Emissions dropped subsequently, and the decrease accelerated dramatically in 2008 and 2009 due to the economic contraction, but also due a further switch from oil to natural gas in electricity generation and manufacturing and increased use of energy from renewable sources. A slight increase of 2% was recorded in 2010. Overall, gross GHG emissions declined by 9% in 2000-10 (Figure 1.1; Reference I.C).
- GHG emissions from manufacturing, energy generation and transport accounted for 71% of total emissions in 2010; they declined by 22%, 13% and 3% respectively compared with 2000 (Figure 1.1). Emissions from agriculture (-16%) and waste management (-22%) also declined. In contrast, emissions from the residential and service sectors, which account for 19% of the total, increased by 17%.
- On a production basis, CO_2 emissions from energy use increased between 2000 and 2008 but less than economic growth-related decoupling (Figure 1.1). While emissions from manufacturing declined steadily for most of the review period (absolute decoupling), the reduction of emissions from energy and transport occurred only in the second half of the 2000s. Contributing factors were the increased share of natural gas and renewables in electricity generation and the negative impact of the economic crisis on energy and transport demands.
- There was no decoupling of consumption-based emissions in the period 2000-08. Emissions increased at the same or at a higher rate than GDP. After 2008, emissions declined absolutely and more rapidly than GDP and total primary energy supply (TPES).
- Total GHG emissions in 2010 amounted to 501 million tonnes of carbon dioxide equivalent (Mt CO_2 eq), about 3.5% below the 1990 level. When emission removals from the so-called "Kyoto forests" are taken into account, emissions were 6.2% below the 1990 Kyoto Protocol base year emissions in 2010. This is slightly above Italy's Kyoto objective of reducing GHG emissions by 6.5%, or of reaching an annual average of 483 Mt CO_2 eq in the period 2008-12. (Figure 1.1).

Energy intensity and renewables

- Italy's TPES and total final energy consumption (TFC) increased consistently and remained steadily coupled with GDP between between 2000 and 2005. Energy demand started to decline in 2005, before the Italian economy entered recession, and then continued to decline at a higher rate than GDP (Figure 1.2).
- Italy's energy intensity has traditionally been low compared to that of other OECD countries (Reference I.A). This is due to its limited national energy endowment, high energy prices and taxes, and an industrial structure characterised by small firms which mainly operate in sectors that are not energy-intensive. Energy intensity fell by nearly 10% in 2005-11. However, in the OECD context the decline in energy intensity (from an already low starting point) has been slower than in other countries.

Figure 1.1. **CO_2 and GHG emissions**

1990-2010



a) Excluding emissions/removals from land use, land-use change and forestry.
b) GDP at 2005 prices and purchasing power parities.
c) CO_2 emissions from energy use only; sectoral approach. Excludes international marine and aviation bunkers.
d) Includes other energy-related and fugitive emissions.
e) Manufacturing and construction; includes solvent use.
Source: ISPRA (2012); OECD (2011), *OECD Economic Outlook No. 90;* OECD-IEA (2012), *CO_2 Emissions from Fuel Combustion;* OECD-IEA (2012), *Energy Balances of OECD Countries.*

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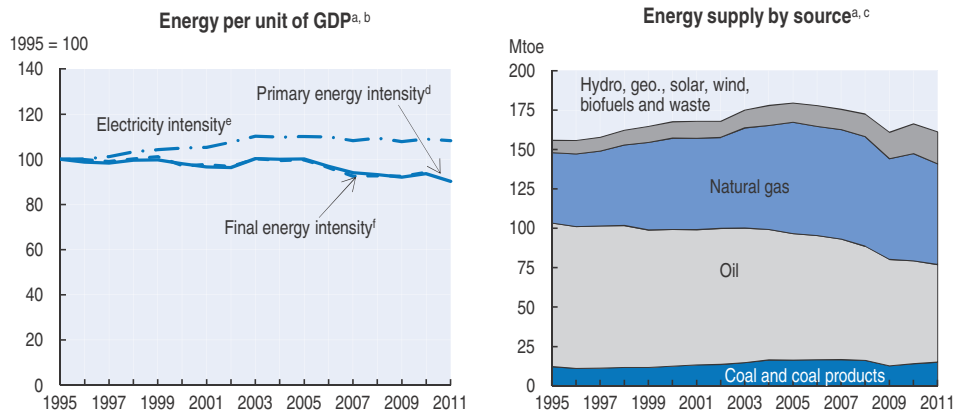
- An increase in the share of gas and renewables in electricity generation has led to a decrease in the carbon intensity of the economy and relative decoupling of GHG emissions from economic growth. At 0.3 t CO_2/USD 1 000, Italy's GHG emission intensity is well below the OECD average (Reference I.C). However, national averages may hide wide variations at regional level.
- Italy's dependency on fuel imports (86% in 2009) is higher than that of most other OECD countries. The share of natural gas in TPES has increased, but use of oil is still high (Figure 1.2). Contrary to many OECD countries, the share of coal in TPES has been low (9.4% in 2011, Reference I.A).
- Fossil fuel imports are supplemented by increasing local production of energy from renewable sources (Figure 1.3). Greater use of primary solid biofuels and waste, wind and solar power was the main factor in the increased share of renewables from 6% to 12% of TPES between 2000 and 2011. This share is well above the OECD average of 8%.
- A series of power outages that affected Italy in 2003 stimulated the government to take steps to increase the security of electricity supply and to attract additional investment to the sector. This has resulted in significant investment in new generation plants, especially gas-fired ones, which have replaced those fuelled by oil. Additional electricity generated between 2000 and 2010 came from renewables, which increased their share from 19% in 2000 to 28% in 2011 (Figure 1.3).
- In 2011, 55% of electricity generated from renewables came from hydro power. Wind power generation, which accounted for 12% of renewable electricity generation and was the seventh largest in the OECD, was 17 times as great as in 2000. Photovoltaic (PV) power production grew exponentially in the late 2000s, reaching 13% of electricity generated by

Figure 1.2. **Energy intensity and structure**[a]

1995-2011



a) Total primary energy supply.
b) GDP at 2005 prices and purchasing power parities.
c) Breakdown excludes electricity trade.
d) Total primary energy supply per unit of GDP.
e) Electricity consumption per unit of GDP.
f) Total final consumption of energy per unit of GDP.
Source: OECD (2011), *OECD Economic Outlook No. 90;* OECD-IEA (2012), *Energy Balances of OECD Countries.*

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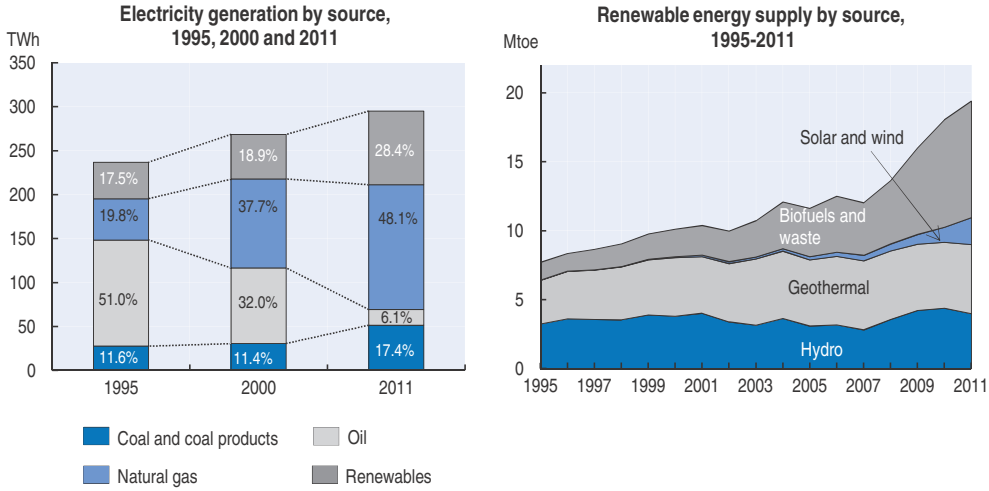
Figure 1.3. **Electricity generation and renewable energy structure**



Source: OECD (2011), *OECD Economic Outlook No. 90;* OECD-IEA (2012), *Energy Balances of OECD Countries.*

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renewables in 2011. By the end of the 2000s, Italy had the fourth largest installed solar energy capacity in the OECD. In 2011, Italy became the second largest PV market in the EU.

- Italy closed its last nuclear reactors in 1990. In 2008, government policy changed and a substantial new nuclear programme was planned. A referendum in 2011 failed to approve this decision.
- Total final energy consumption (TFC) grew in all sectors (industry, transport, residential, agriculture, non-energy use, international maritime and aviation bunkers) between 2000

and 2005, reaching 139 Mtoe in that year. Since then, TFC has shown a slow but steady decline except in 2009, when the decrease was more rapid.

- The transport sector is the main energy end-user. It accounted for about 30% of energy consumption in the last decade. The residential sector accounted for about 24% of TFC in 2010. Industry's share decreased from 30% in 2000 to 23% in 2010 (with the biggest decrease after 2008). The commercial sector's share increased from 9% to 13%.
- Passenger and freight transport activity broadly followed Italy's economic performance in the 2000s. Passenger and freight traffic flows by road (measured in vehicle-kilometres) grew between 2000 and 2007 and have remained closely coupled with the GDP trend. Freight transport by road remains dominant, accounting for more than 90% of the total, nearly 15 percentage points more than the EU average (Reference I.A).
- While there has been an increase in use of public transport, especially buses, passenger cars accounted for 82% of passenger inland travel in 2010 compared with some 84% on average in Europe. However, these figures exclude the relatively large share of journeys made by motorbike. Although passenger traffic by air accounts for a small fraction of total passenger transport, it increased by 40% during the review period.
- The increase in vehicle stock in 2000-10 was one of the smallest among the OECD countries (about +12%). However, Italy remains among the top five OECD countries in terms of the rate of private car ownership (Reference I.A).

2.2. Resource efficiency

Material productivity

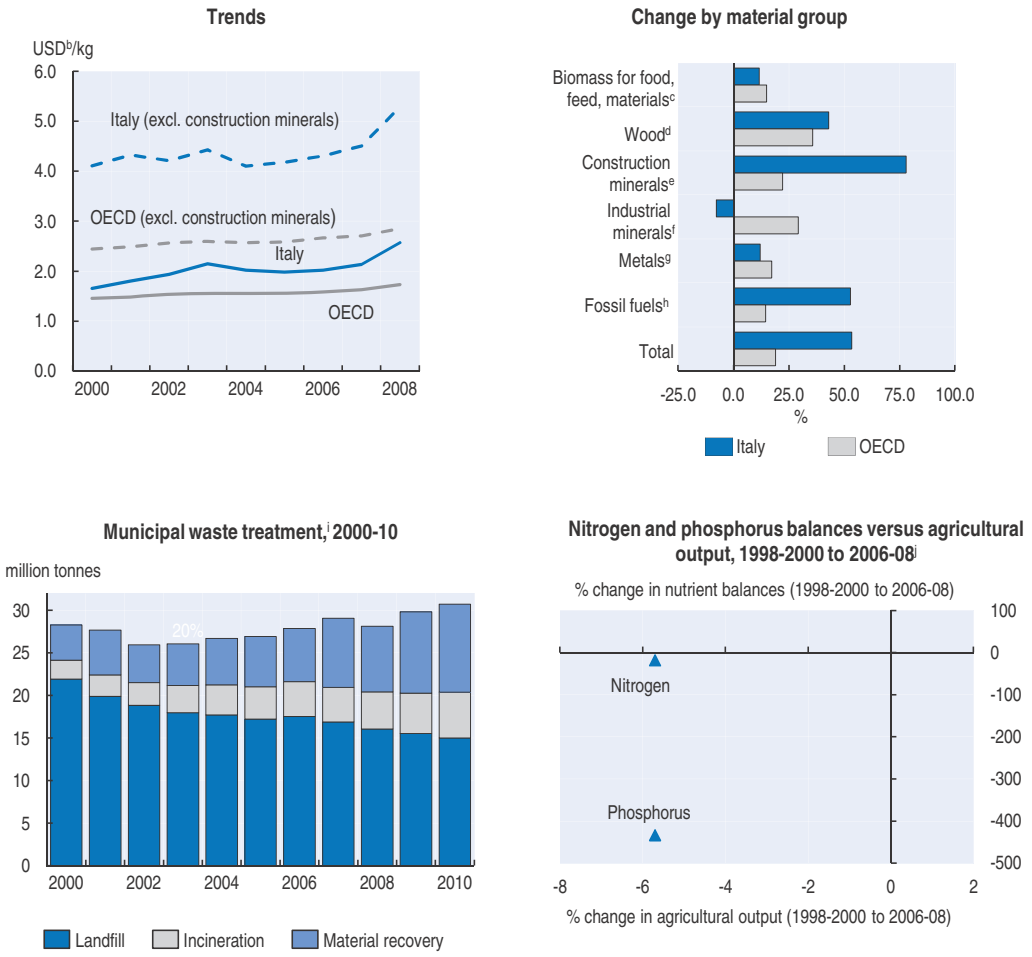
- Italy imports almost all its mineral resources and fossil fuels. Construction materials and small natural gas reserves, mainly in the Po River Valley and offshore in the Adriatic Sea, constitute the country's most important raw material resources.
- Italy (and Japan) achieved the highest rate of absolute decoupling of domestic material consumption (DMC)[1] from GDP growth between 2000 and 2008. Italy's 30% reduction rate was relatively high, although its GDP growth was much lower that the OECD average.
- Between 2000 and 2008, Italy's material productivity (GDP per unit of DMC) increased at a much faster rate (+50%) than the OECD average (+19%) (Figure 1.4). This places it among the OECD countries with the highest resource productivity (Reference I.C). In construction materials and fossil fuels, productivity gains were double the OECD average. The weakest productivity gains were in the use of biomass. The productivity of industrial minerals usage also declined (Figure 1.4).
- Italy's total DMC per capita decreased by 34%, which compares well with the OECD average reduction of 6%. The reduction is less if construction materials are excluded (-20%), but it is still deeper than the OECD average (-4%) (Figure 1.4).

Waste generation and recovery

- Between 2000 and 2010, annual waste generation grew by about 45%, significantly above the rate of GDP growth. This increase was mainly due to increased waste from manufacturing (+50%) and construction and demolition (C&D) (+100%). Manufacturing waste currently accounts for 50% of total waste generated in Italy and C&D waste for a further 32%.
- Hazardous waste from manufacturing grew three-fold during the review period and accounted for almost 7% of the total amount of waste generated.

Figure 1.4. **Resource productivity**

Material productivity,[a] 2000-08



a) Material productivity designates the amount of GDP generated per unit of materials used. It refers to the ratio of GDP to domestic material consumption (DMC), where DMC is the sum of domestic (raw material) extraction used by an economy and its physical trade balance. A rise in material productivity is equivalent to a decline in material intensity (i.e. DMC/GDP).
b) GDP at 2005 prices and purchasing power parities.
c) Domestic production from agriculture and fisheries, plus trade of raw and processed products from these sectors.
d) Domestic production from forestry, plus trade of raw and processed products from this sector.
e) Domestic extraction and trade of minerals used in construction (e.g. sand, gravel, stones).
f) Domestic extraction and trade of minerals used in industry (e.g. salts, potash, phosphate rocks).
g) Domestic extraction of metal ores, plus trade of metal ores (e.g. bauxite), metal concentrates (e.g. nickel matte), refined metals (e.g. steel, aluminium, copper), products mainly made of metals (e.g. vehicles, machinery, electronics and electrical equipment), and scrap.
h) Coal, crude oil, natural gas, peat and traded derived products (e.g. plastic and rubber).
i) Municipal waste is waste collected by or for municipalities and includes household, bulky and commercial waste, and similar waste handled at the same facilities.
j) Three-year moving averages of gross nutrient balances per hectare of agricultural land.
Source: OECD Environmental Data; OECD (2011), *OECD Pilot Material Flow Database.*

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- Contrary to trends in many other OECD countries, annual municipal waste generation has increased. The increase was faster than growth in GDP and private final consumption in the period before the 2008 crisis. In 2009-10, municipal waste generation decreased, but at a slower rate than GDP or private consumption. Municipal waste generated per capita increased from 498 kg to 536 kg between 2000 and 2010 and was above the OECD Europe, but below the OECD, average (Reference I.C).
- Although separate waste collection increased from 15% to 34% between 2000 and 2010, there are important differences between the North and the South: about 50% of municipal waste is separately collected in the North and 21% in the South. In 2000, separate waste collection in the South was only 5%.
- In 2010, 49% of municipal waste was landfilled, an important decrease from about 70% in the early 2000s (Figure 1.4). Progress in municipal waste recovery was due to improved separate collection and an increased share of waste undergoing mechanical biological treatment. The amount of waste incinerated doubled, with energy recovery by all but one incinerator.
- Following transposition of the 1999 EU Landfill Directive, the number of landfills decreased from 1 449 in 2000 to 640 in 2008 and sanitary standards improved.
- The number of known illegal dumps has fallen substantially in the last decade, while the number of prosecutions related to waste dumping has increased. However, inadequate and illegal waste disposal still occurs, as illustrated by the serious situation in Campania and the city of Naples.

Nutrient balance

- Concentrations of nitrates and phosphorus in the main Italian rivers decreased during the review period, in line with the reduced intensity of agricultural production (Reference I.C).
- Nitrogen and phosphorus surpluses per hectare remain lower than the OECD average. The nitrogen surplus, at 30 kg per hectare (2008), is well below the OECD average (65 kg per hectare). The phosphorus balance decreased by 433% from 1.0 to -3.3 kg/ha for Italy, much lower than the OECD average (8 kg per hectare) (Figure 1.4).

3. Managing the natural asset base

Water resources

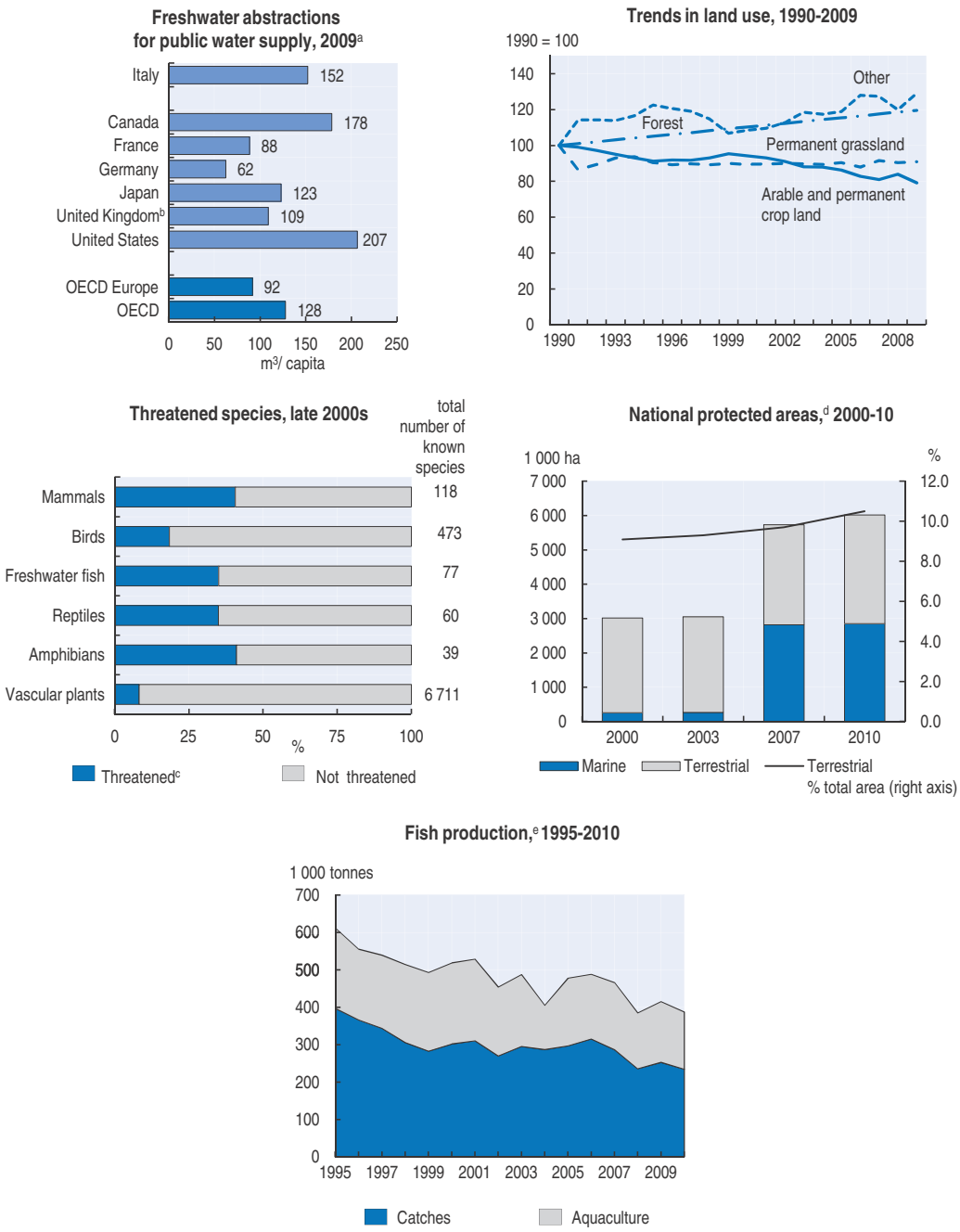
- Average rainfall in Italy (about 1 000 mm/year) is well above the European average, but it is not evenly distributed among seasons and regions. There have been several cases of water shortages, particularly in the South, where locally abstracted groundwater is used intensively to supplement the supply from water storage and water transfers. High evapotranspiration and limited storage capacity in coastal areas, due to the alluvial plains at sea level, significantly contribute to high water runoff.
- Despite important gaps in national data on water abstraction, Italy can be classified as a medium-high water-stressed country, i.e. abstracting about 30% of its total available renewable water resources.[2]
- Water transfers between regions help to alleviate water shortages, especially in southern Italy. Important volumes of water are transferred to Apulia, where 60% of water used comes from water transfers, and Campania, where 24% comes from outside the region.
- Irrigation accounts for the highest share of water used (50%). The share of irrigated land in total agricultural area (17.4%) is well above the OECD average (4.5%). The other major water users are households (19%), industry (17%) and energy production (for cooling) (14%).

- The intensity of water use in agriculture decreased in the last decade: total water use for irrigation fell by 20%, while total irrigated areas fell by 8% and agricultural production remained at a similar level as in 2000.
- Groundwater use for irrigation above recharge rates is undermining the economic viability of agriculture in affected areas. Signs of overexploitation have been recorded in the lower reaches of the Po River plain and around Venice due to industrial and agricultural uses and gas and oil extraction. In other regions – especially southern Apulia and the coastal plains of Campania, Calabria and Sardinia – groundwater withdrawal is the main cause of saline intrusion.
- Water withdrawals for domestic use, mostly from groundwater (86%), have increased only slightly (by 3%) since the late 1990s. Water losses in the supply infrastructure are high. The country-wide average is about 36%, but the rate can be as high as 47% in Apulia. Actual physical losses may be lower since the data do not account for water not properly metered or paid for. Some estimates suggest that illegal activities may account for 4%-20% of Italy's total water abstraction.
- Abstraction for industry has declined slightly, while water demand for energy production and domestic uses has increased. Water use reduction is most evident in more water-intensive sectors, such as pulp and paper and chemical industry.

Biodiversity and ecosystems

- While the share of agricultural land has fallen slightly since the 1990s, the share of forested and wooded land has increased over the last two decades and is now nearly 31%, close to the OECD average (Figure 1.5).[3] Despite the increase in forest cover, the forested area per inhabitant (0.3 ha) is much lower that the OECD average (0.9 ha). Forested areas are concentrated in the Alpine areas of northern Italy, and only a few extensive forests grow in central or southern Italy or on the islands.
- Italy's protected areas cover about 10.5% of the total land area, close to the OECD average (Reference I.C). This includes 24 national parks, which account for about half this share.[4] The size of nationally protected terrestrial areas increased by only 2% during the last decade, but marine protected areas expanded significantly, from 2 610 to 28 530 km^2 between 2000 and 2010 (Figure 1.5).[5]
- The EU Natura 2000 network covers 21% of the national territory, higher than the EU average of 17.5%. Coverage is higher (nearly one-quarter of the terrestrial area) in the South.[6]
- Approximately 21% of utilised agricultural area (UAA) is characterised by high nature values.[7] After an increase from close to 0% to 8% of farmland under organic farming between 1991 and 2000, this share increased only slightly (by 1%) in the next decade.
- The use of pesticides has remained at 0.6 t/km^2 of agricultural land, still much higher than in many other OECD countries (Reference I.C).
- The share of endangered vascular plants is relatively low compared to that in other OECD countries. In contrast, the threat to mammals, freshwater fish and amphibians is higher than in many other OECD countries (Figure 1.5; Reference I.C).
- Risks of erosion remain a concern, with 30% of agricultural land classified as being at risk of moderate to severe water erosion (2009). These risks are largely due to: continued cultivation of fragile and marginal soils; overgrazing of pasture, especially in hilly/

Figure 1.5. **Natural asset base**



a) Or latest available year.
b) England and Wales only.
c) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.
d) Official list of protected areas (EUAP) according to national legislation.
e) Fish catches and aquaculture in inland and marine waters, including freshwater fish, diadromous fish, marine fish, crustaceans, molluscs and miscellaneous aquatic animals. Catches exclude marine mammals, crocodiles, coral, pearls, sponges and aquatic plants.
Source: FAO (2011), *FAOSTAT Database;* FAO (2012), *Fisheries and Aquaculture Information and Statistics Service*; MATTM; OECD Environmental Data.

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mountainous areas; and poor uptake of soil conservation practices. Soil erosion is aggravated by the increasing incidence and severity of droughts and/or heavy rainfall.

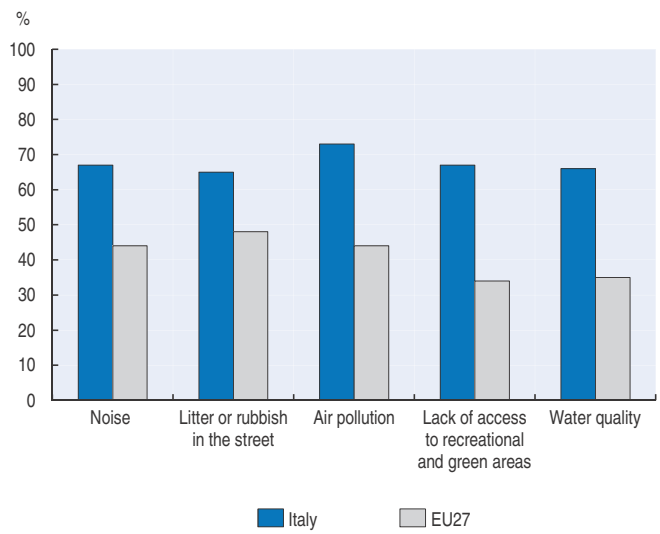
- Italy's 8 300 km coast is vulnerable to sea erosion and human activities (industry, urbanisation, tourism, fishing and aquaculture, transport), which continuously alter natural coastal features. About 30% of the population live in coastal municipalities, while commercial and leisure port activities take place along more than 300 km of coast.
- There has been a steady decline in fish production. In the period 2000-09, landings decreased by 40%. Persistent productive decline is mainly related to the reduction of fishing capacity.
- Aquaculture production remained stable for most of the review period. The largest segment includes shellfish, which accounted for 70% of volume and 46% of value in 2007; 61% of sites are located in the northern regions.

4. Improving the environmental quality of life

- Italians appear to be among the Europeans least satisfied by their country's environmental quality. According to the 2007 European Quality of Life Survey, Italian respondents made the highest level of complaints about nearly all the environmental problems in question compared to the EU27 average (Figure 1.6). About 83% of Italian respondents complained about two or more environmental problems in their area.

Figure 1.6. **Dissatisfaction with environmental quality**

2007[a]



a) Percentage of respondents who complained about environmental problems in their area.
Source: European Foundation for the Improvement of Living and Working Conditions (2009), *Second European Quality of Life Survey: Overview.*

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Air quality and health impacts

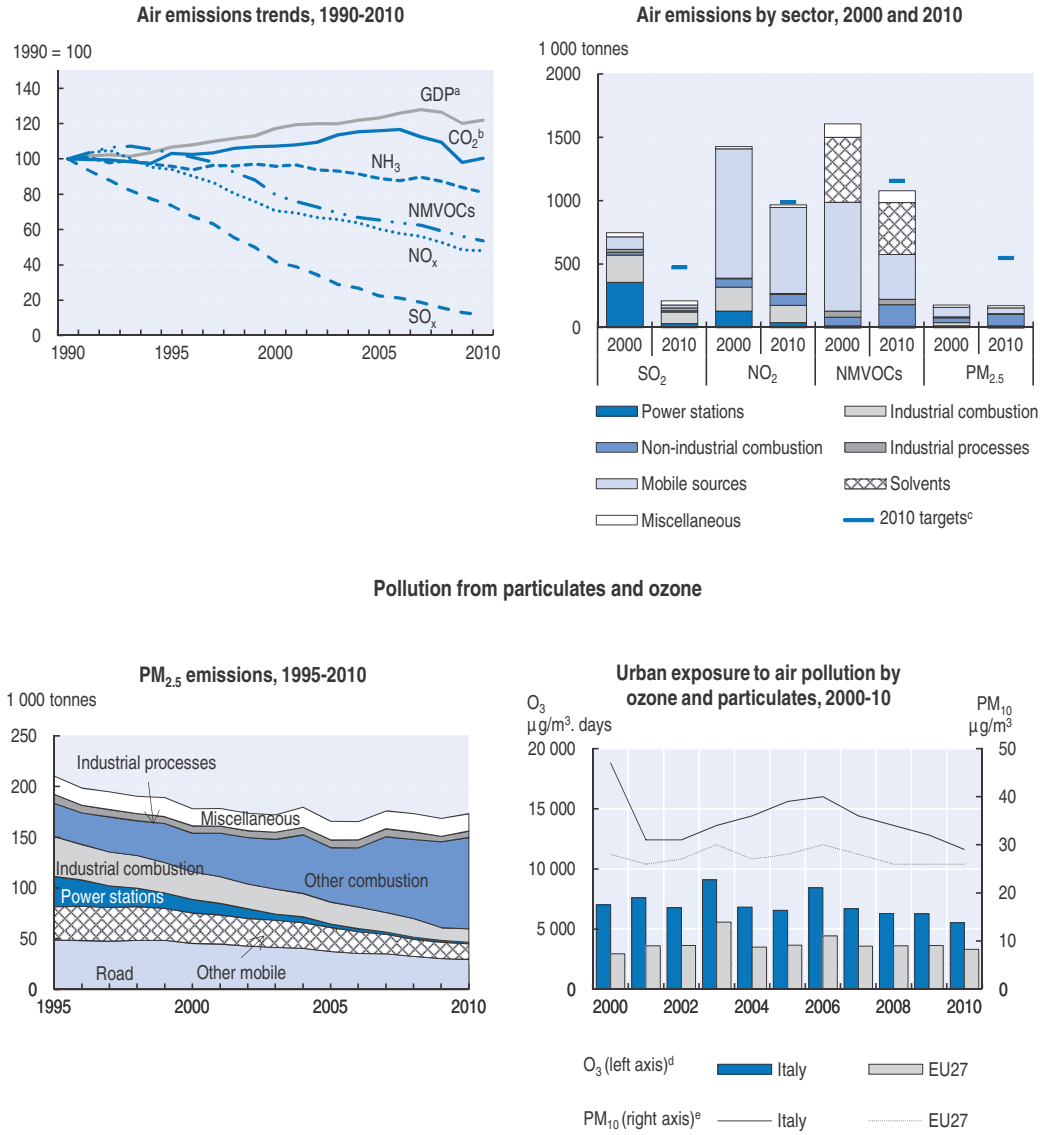
- The reduction in emissions of key local air pollutants was one of the largest among OECD countries during the review period (Reference I.C). Emissions of SO_2 were reduced by 72%, CO by 44%, NO_2 and NMVOCs by more than 30% and NH_3 by 16%. Italy met all the targets set under the EU NEC Directive (Figure 1.7).

- Total emissions of coarse particulates (PM_{10}) and small particulates ($PM_{2.5}$) decreased by 3% in the period 2000-10. However, emissions from small combustion sources (e.g. small factories and residential heating) have increased considerably and account for 45% of total emissions of PM_{10} and 52% of those of $PM_{2.5}$ (Figure 1.7).
- Emission intensities have also declined, showing absolute decoupling of all air pollutant emissions from GDP growth during most of the review period. In 2009, Italy's levels of emissions per capita and per unit of GDP were among the lowest among OECD countries (Reference I.C).
- Despite emission reductions, more than half the 30 most polluted cities in Europe are in Italy, with Turin, Brescia and Milan among the most polluted. The population weighted annual mean concentrations of PM_{10} and ozone (O_3) were higher that the EU27 average during the whole review period (Figure 1.7).[8] In 2008, population exposure to urban air pollution (ozone and particulates) was the second highest in the EU27.
- Modelling results indicate that $PM_{2.5}$ levels in northern Italy reduce statistical life expectancy by approximately one year. An epidemiological assessment of 13 Italian cities estimates that each year about 8 000 deaths can be attributed to high concentrations of PM_{10} and ozone precursors (NO_x and NMVOCs).

Water quality, drinking water supply and sanitation

- On average, 46% of Italian waterways can be classified as high or good quality with the highest percentage of these two classes recorded in northern Italy (70%) and the lowest in the South (35%); 19% of rivers (5% in the North and 20% in the South) are classified as poor or of bad quality. Assessment of the ecological status of 140 lakes showed that 37% had good or high, 35% moderate, and 28% poor or bad water quality (Figure 4.1).
- A large number of "hot spots" contribute to poor surface water quality. These occur, in particular, when medium or small streams drain areas where large urban or industrial centres are located. They are associated with concentrations of industrial sectors that have heavy environmental impacts (e.g. tanning and textiles in the North, food processing in the South).
- The rate of compliance of coastal waters with mandatory and guidance values was relatively stable at above 90% for much of the last decade. The number of bathing sites closed (i.e. sites where swimming was banned) in summer increased from 125 (2.6%) in 2002 to 310 (6.3%) in 2009, but fell to 33 (0.7%) in 2010. Closing of these sites has been linked to toxic microalgae blooms, which occur in many coastal regions.
- The share of the urban population with access to improved drinking water (piped into the premises) has been close to 100% in urban and rural areas. However, there are areas with highly irregular water supply, especially in the South. Most public supply operators are small and use spring or groundwater as the main water supply sources.
- Although the quality of drinking water is generally good, there are outbreaks of waterborne diseases. In 2000-07, there were three to four outbreaks per year, with 50-500 people affected in each outbreak. About 45% of water-related diseases due to contaminated drinking water were reported in the North and 22% and 33%, respectively, in the Centre and the South. In around 70% of cases, contaminated water distributed by municipal waterworks was the main factor.

Figure 1.7. **Environmental quality of life**



a) At 2005 prices and exchange rates
b) CO_2 emissions from energy use only; sectoral approach. Excludes international marine and aviation bunkers.
c) Targets set by EU Directive 2001/81/EC (NEC Directive) on national emission ceilings for certain atmospheric pollutants.
d) Population weighted sum of maximum daily 8-hour average ozone concentrations greater than 70 µg/m^3 calculated over a year at urban background stations in agglomerations.
e) Population weighted annual mean concentrations of particulate matter at urban background stations in agglomerations.
Source: EEA; OECD Environmental Data; OECD (2011), *OECD Economic Outlook No. 90.*

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- In 2008, 82% of the Italian population was connected to public wastewater treatment plants. Around 60% of wastewater was subject to tertiary treatment. However, rates vary among the regions. They are as low as 28% in Sicily and close to 80% in eight other regions.

Urbanisation and urban green spaces

- Italy's urban population, which exceeds 50% of the total, lives in high-density cities: there are 50 cities whose population is over 100 000 and about 100 with a population of between 50 000 and 100 000.

- The share of artificial surfaces in total surface area amounts to 5% and the share of sealed surfaces to 2.8%, both slightly above the EU average. However, the average index of artificial and sealed surfaces per capita are among the lowest in the EU, at 255 m^2 (compared with the EU27 average of 390 m^2) and 144 m^2(compared with the EU27 average of 200 m^2), respectively.[9]
- Despite efforts to enlarge the share of green space in total municipal area, green space covers 5% or less in 28 out of 48 large Italian cities. Public urban green space covers more than 20% of the municipal area in only 8 cities.[10]

Contaminated sites

- There are around 5 000 officially registered contaminated sites. This includes 57 contaminated sites of national interest, which cover around 3% of the Italian territory.[11] In about 34% of these, water bodies are contaminated. In addition, 10 000 potentially contaminated sites fall under regional responsibility.

Natural risks

- Large parts of Italy are prone to earthquakes. Nearly 3 000 municipalities (out of 8 100) are subject to seismic events, including 368 with high risk.[12] In addition, the area between Campania and Sicily is particularly exposed to volcanic eruptions (by Mount Vesuvius and Mount Etna), geothermal activities, and other geological risks such as sinkholes. Risks to the population are aggravated by poor spatial planning and by housing development that has not been subject to proper evaluation and permitting procedures.
- Italy is prone to floods and landslides, with more than two-thirds of municipalities categorised as at high or very high risk. These disasters result in injuries and fatalities, as well as economic loss and damage to infrastructure.[13] In an average year, losses caused by hydrogeological events amount to EUR 3.6 billion.
- On average, 7 000 forest fires are recorded per year. Although the number of large fire incidents has fallen since 2008, they are still a danger to human health, ecosystems and the economy. Some incidents have been linked to land clearance for housing, as building permission was often easier to obtain when woodland had been destroyed.
- Italy appears to be particularly vulnerable to the impacts of climate change, as it is characterised by complex climate patterns due to the presence of high mountain ranges (the Alps and Apennines) and the Mediterranean Sea. These impacts include: water scarcity and desertification; erosion and flooding of coastal areas; glacier and snow cover loss; intensification of hydrogeological risk (particularly in the Po River basin); and health effects associated with heat waves.

Notes

1. Domestic material consumption is the sum of domestic (raw material) extraction used by the economy and its physical trade balance (imports minus exports of raw materials and manufactured products).
2. Water stress is defined as the intensity of use of freshwater resources, expressed in terms of gross abstractions as a percentage of total available renewable freshwater resources (including inflows from neighbouring countries) or as a percentage of internal resources (i.e. precipitation-evapotranspiration). Medium-high water stress (20-40%) implies the management of both supply and demand, and conflicts among competing uses need to be resolved. It should be noted,

however, that national water-stress levels may hide important variations at subnational (e.g. river basin) level, particularly in countries with extensive arid and semi-arid regions. In the last decades estimates of Italy's water resources availability, abstraction and use have not been carried out on a regular basis. This has been due to legislative delays, uncertainty in the distribution of competence among administrative levels, and the large number of institutions involved.

3. In most cases expansion of forests occurs on abandoned farmland.
4. This percentage is expected to increase further, as procedures for establishing five national parks (four in Sicily) and five marine protected areas are currently under way.
5. Expansion was mostly due to the establishment of the Pelagos Sanctuary for Mediterranean Marine Mammals in 2002 as a special marine protected area. It covers about 90 000 km^2 of territiorial and international waters in the north-western Mediterranean Sea between France and Italy, encompassing the island of Corsica and the Toscano Archipelago. The Pelagos Sanctuary contains habitat suitable for the breeding and feeding needs of the cetacean species regularly found in the Mediterranean Sea, especially fin whales and striped dolphins.
6. The Natura 2000 network includes 601 Special Protected Areas (SPAs) under the EU Birds Directive (14.5% of the land area), 2 287 Sites of Community Importance (SCIs) under the EU Habitats Directive (16% of the national territory), and 210 marine protected areas covering nearly 5 000 km^2 of coastal waters.
7. High nature value farmland area indicates an area where farming systems maintain a high level of biodiversity. These areas are often characterised by extensive farming practices, associated with high species and habitat diversity or the presence of species of European conservation concern.
8. In 62 out of the 110 Italian provincial capitals, the daily concentration of airborne particulates (PM_{10}) exceeded the allowed threshold of 50 $\mu g/m^3$ on more than the 35 days imposed by the law. In 10 provincial capitals (including Naples, Milan and Turin) the limit was exceeded on more than 100 days.
9. The highest sealing rates occur in hot spot areas, which include the "industrial triangle" between Milan, Turin and Genoa, the Po River basin, and the coastal regions.
10. This includes: Palermo (31.9%), Ravenna (29.9%), Brescia (29.1%), Ancona (28.1%), Rome (27.5%), Monza (25.9%), Naples (24.2%) and Terni (21.8%). The largest increases in urban green space in 2000-09 were recorded in Palermo (+4.6%), Pescara (+4.4%), Turin (+3.4%), Verona (+2.4%) and Modena (+2.1%).
11. Several sites are extensive, such as the 1 500 km^2 Domizio-Flegrea Littoral and Agro Aversano area along the northern coastal zone of the Campania region, which contain high levels of heavy metals potentially dangerous for human health and are known for illegal dumping of industrial and other waste, the Sullcis-Iglesiente-Guspinese site in south-western Sardinia contaminated by metallurgical industry operations, and Porto Marghera near Venice, a site contaminated by the petrochemical industry and industrial waste disposal.
12. During the decade, several parts of Italy were affected by 11 earthquakes with a magnitude of over 4.0 on the Richter scale. The largest seismic event affected central Italy in 2009. This 6.3 magnitude earthquake, whose epicentre was near the city of L'Aquila, resulted in the deaths of 308 people and serious damage to the city's infrastructure.
13. For example, in 2009 floods and mudslides in Messina in north-eastern Sicily killed at least 31 people. In 2011, the government declared a state of emergency in the north-western Liguria region and Tuscany after storms affected the coastal regions, killing at least 10 people and causing widespread flooding and mudslides.

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PART I

Chapter 2

Policy-making environment

This chapter reviews the main strategies and initiatives launched in the areas of sustainable development and environmental management during the period 2002-12. It examines Italy's environmental governance, the regulatory framework for environmental protection, and programmes to ensure compliance with environmental requirements. The chapter also reviews the application of mechanisms in place to improve horizontal and vertical co-ordination, as well as the instruments used to systematically evaluate the environmental impacts of economic and sectoral policies. Progress in promoting environmental democracy, through open access to information and improved public participation in decision making, is also discussed, along with a programme promoting environmental education.

Assessment and recommendations

Over the last decade, Italy has continued to develop its environmental legislation and policies, largely within the framework of the EU and other international commitments. In some cases, Italian environmental policies anticipated EU requirements. Multilateral environmental agreements have also influenced policy and legal developments. The 2006 Environmental Code consolidated various environmental acts, transposed a number of outstanding EU Directives, established key principles of good environmental management, simplified many regulations, and specified procedures to strengthen implementation. However, efforts to develop a more coherent, efficient and effective framework for environmental policies have not been helped by the relatively low priority assigned to the environment over much of the last decade. Recent initiatives, for example to promote a green economy, indicate an increased emphasis on environmental issues by the government.

Italy's environmental management system has also evolved in the context of a major devolution of legislative and administrative responsibilities to subnational levels of government. This catalysed regional and local initiatives that helped to improve environmental performance in many locations. However, the devolution process also created ambiguities about the respective roles of national and regional levels of government, and tended to increase gaps and inconsistencies in the transposition of EU environmental Directives. A variety of different, sometimes inconsistent, approaches emerged, partly due to delays by the national authorities in formulating framework environmental policies. This has also undermined the efficiency and effectiveness of national policies in some areas; for example, waste management and climate-related policies. The net result is that environmental policy has remained fragmented, largely driven by emergencies, and with a short-term focus.

From an economic point of view, the current set of environmental policies does not create a stable and conducive framework for environment-related investments, generates unnecessary administrative compliance costs, and creates an unlevel playing field for business activities. There is now a pressing need to develop a clear, strategic national vision of environmental policy that links directly with overall economic and social objectives.

In 2006, the responsibilities of the Ministry of Environment were broadened to include marine issues, and the Ministry of the Environment, Land and Sea (MATTM) was created. Despite increased responsibilities, the Ministry's budget was cut by 48% between 2006 and 2011. Further cuts of about 20% are foreseen in the 2011-14 period. This would further erode the MATTM's capacity to establish and implement coherent policies throughout Italy. Other specialised environmental agencies provide support to the MATTM, including the Italian Environmental Agency (ISPRA). This Agency has recently been restructured and strengthened. A system of regional environmental agencies supports subnational governments, with significant variations in their human and financial capacities. A solid

technical information base has been established to support environmental decision making, and the communication of environmental information to the public has been made more user-friendly. However, gaps remain, including the capacity to conduct economic analysis of environmental issues which could be addressed to some extent by better co-operation between the administration and the research community.

Some efforts have been made to mainstream environment into government decision making, but they have not been very successful. A Commission on Sustainable Development (C6SS) was established in 2002 as part of the Committee for Economic Planning (CIPE), the main inter-ministerial body that defines national economic policy, outlines multi-year budgets and monitors their implementation. However, the C6SS has been largely inactive. The CIPE should be charged to more effectively mainstream environment and sustainable development into its work, and that of its advisory bodies. More robust and systematic use of Regulatory Impact Assessment and Strategic Environmental Assessment, as well as *ex post* evaluation of policies, would also help to mainstream environmental considerations into sectoral policies and programmes. These efforts should be grounded in the development of a more effective assessment culture.

At the turn of the century, there was considerable divergence in the environmental performance of regions, often linked to differences in wealth, capacities and political priorities. The devolution process reinforced these divergences and made the vertical co-ordination of environmental policies more difficult. A variety of mechanisms exist to vertically co-ordinate policies in general (such as the Unified State-Regions-Municipalities Conference), and environmental policies in particular (such as the Network of Environmental Agencies and the National Observatory of Organisation and Management of Environment Agencies). Despite various efforts, the potential of these bodies has not been fully exploited. Consideration should be given to reinvigorating the environmental bodies as part of the broader effort to establish a more coherent and consistent national environmental policy framework. Drawing on experience in the field of regional policy, the disbursement of funds for environment-related activities should be linked to performance. It should also be coupled with methodological and capacity-building support, for example from the Network of Environmental Agencies.

Italy has made progress in establishing a framework for managing traditional pollutants. Simplified environmental permitting procedures have helped to reduce administrative burdens on small and medium-sized enterprises, which constitute a significant fraction of Italian industry. However, about 600 large plants are still to be granted integrated permits, five years after the deadline established by the EU Integrated Pollution Prevention and Control Directive. Ensuring compliance with permit requirements has been strengthened by the introduction of risk-based inspections, streamlining of inspection procedures, and increasing the effectiveness of non-compliance responses. However, regional differences hamper the consistent enforcement of environmental requirements. While significant steps have been taken to clamp down on criminal activities, particularly by the Carabinieri Corps for Environmental Protection and the State Forestry Corps, further efforts are needed, especially to control the trafficking and disposal of illegal waste, as well as illegal construction and poaching. The development of consistent, country-wide strategies, developed in close co-operation with the regions, in areas such as waste management and enforcement, should reduce the scope for illegal activities. The public and mass media could be more actively engaged in efforts to promote compliance with environmental requirements.

Italy was among the first countries to ratify the Aarhus Convention in 2001. Since then, further measures were taken to improve access to information, public participation and access to justice, in line with the EU requirements. Local consultative referendums have played a role in environmental decision making, for example for the eco-pass in Milan. Despite the various mechanisms for sharing information and engaging the public in environmental decision making, dialogue with social partners is fragmented and polarised, and is often limited to emergencies or high-profile projects. Many conflicts have long histories, frequently because the public was not engaged early enough, and/or because appropriate consideration was not given to alternative solutions. All stakeholders should be actively and constructively engaged in the development of a strategic national vision for the environment.

Recommendations

- In consultation with all stakeholders, develop clear national strategies for issues that require common or consistent approaches at the regional and municipal level (e.g. water and waste management, and environmental compliance assurance).
- Reinforce efforts to establish more coherent and consistent environmental requirements across all regions, including by: reinvigorating the role of the Network of Environmental Agencies in providing guidance, support for capacity development, sharing good practices, and benchmarking performance.
- Complete issuing integrated environmental permits for enterprises with significant environmental impacts; continue to simplify and streamline environmental requirements for small and medium-sized enterprises to reduce administrative costs and barriers.
- Reinforce efforts to combat environment-related crime, especially concerning waste and land use.
- Strengthen capacity for conducting *ex ante* and *ex post* economic analysis of environmental policies; strengthen the government's collection of environment-related economic information and establish closer links between the administration and the research community to make better use of the latter's analytical capacities to support policy development.
- Continue to strengthen and harmonise regional approaches to SEA and EIA procedures; ensure that the public is involved at a sufficiently early stage of the procedures and that adequate consideration is given to alternatives.

1. Key environmental and sustainable development initiatives

Over the last decade, Italy's environmental policies have largely been shaped within the framework of the EU. In some cases, however, Italian environmental policy has anticipated EU requirements. Multilateral environmental agreements have also influenced policy and legal developments. These developments have taken place in the context of a changing governance framework that involves a major devolution of responsibilities to regions and lower levels of administration (provinces and municipalities) (Box 2.1).

Box 2.1. **Italy's multi-level governance**

Italy has three levels of subnational administration: 20 regions[a] with their own statutes, elected Regional Councils, and regional governments headed by elected presidents; 110 provinces with elected presidents and Provincial Councils, as well as prefects appointed by the central government;[b] and 8 100 municipalities headed by elected mayors and managed by Municipal Councils. Each of these entities decides on the form, organisation and functioning of its institutional and administrative system by means of regional statutes. These statues are adopted autonomously, apart from those of the five regions with special status (Friuli-Venezia Giulia, Sardinia, Sicily, Trentino-Alto Adige, and the Aosta Valley), which are adopted through a law of the Republic.

From the beginning of the 1970s, subsequent Italian governments pursued devolution of administrative competences from the central to the subnational level. The process accelerated in 1997 with the so-called Bassanini administrative reforms, which devolved competences to the regions and municipalities in line with existing constitutional provisions. This included all administrative responsibilities confined to their territories, but excluded key cross-cutting competences and major infrastructure projects. The legislation took the form of a series of laws and decrees, with actual transfers of personnel and resources negotiated individually. The reform increased the regions' administrative capacity for the design and allocation of public services. A new system of regional finance introduced in 2000 assigned certain tax revenues to the regions, including the proceeds of a new business tax. Yet the regions continued to rely on central transfers or proceeds from state income taxes for a majority of their operating income.

The reform was confirmed in a far-reaching reform of the Italian Constitution in 2001, which gave more policy competences to the Italian regions while retaining "horizontal" powers at the central level that cut across sectoral responsibilities devolved to the regions. The state also retained the power to intervene to assure essential levels of services needed to ensure civil and social rights throughout the country. Areas not explicitly listed as exclusively assigned to the national Parliament or concurrent legislation were exclusively assigned to the legislation of the regions.

The 1997-2001 reform has resulted in the integration of competences among levels of government rather than their strict separation. However, areas of concurrent competences were not well defined and it was not clear whether regions would be able to take over administration of central state services in their areas. Such an approach generated tensions regarding the competences of the state and the regions, especially in areas such as the environment where the central rather than the regional government established the regulatory framework. The silence of the Constitution as to which level should react in case of exceptional matters complicated the transition phase. Although the concurrent legal powers of the state and regions were delineated by subsequent laws (e.g. the La Loggia Law of 2003) and several judgements on specific cases were issued by the Constitutional Court, this unclear division of responsibilities continues to affect relations between the state and the regions (OECD, 2012).

In 2005, the Italian Parliament approved further changes to the Constitution aimed at strengthening the federal structure of the state, but also envisaged the re-centralisation of some powers, e.g. regarding industrial safety, energy production and distribution, and general norms for health protection. However, such a reform was rejected by a national referendum the same year (Keating and Wilson, 2010).

a) Five regions (Sardinia, Sicily, Trentino-Alto Adige/Südtirol, the Aosta Valley and Friuli-Venezia Giulia) are constitutionally given broader autonomy, which is granted under special statutes.

b) Two provinces (Trento and Bolzano) are autonomous, having the same legislative powers as regions. They are not subordinated to the region of Trentino-Alto Adige/Südtirol, of which they are a part.

Policies and initiatives at the national level

The Environmental Strategy for Sustainable Development (ESSD), adopted in 2002, was the key strategic document defining Italy's priority areas for the 2000s. These included: climate change and ozone layer protection; sustainable management of nature and biodiversity; improving the quality of the environment and life in cities and rural areas; and sustainable management of natural resources. The ESSD was approved by the Inter-Ministerial Committee for Economic Planning (Comitato Interministeriale per la Programmazione Economica, CIPE), Italy's main body responsible for co-ordination and horizontal integration of economic policies. The priorities reflected those of the EU's Sixth Environment Action Programme. In parallel with the ESSD, a national programme for curbing GHG emissions was approved in 2002. Although the ESSD included specific objectives, targets, indicators, and monitoring and participation procedures, its implementation lost momentum soon after it was approved. The decision to revise the ESSD and bring it in line with the EU Sustainable Development Strategy was taken by the government in 2007, but this decision has not been implemented.

Rapid development of new EU requirements has stimulated sector- and media-specific initiatives. The 2005 Water Use Plan was an important stimulus for improving water use efficiency, while the 2007 Energy Efficiency Strategy was critical in setting targets and identifying policies and instruments to reduce energy use. The 2010 Biodiversity Strategy was an important response to Italy's commitments under the EU Biodiversity Strategy and the UN Convention on Biological Diversity. However, a number of policy initiatives launched during the review period have not been completed, such as the development of comprehensive action plans for contaminated sites and a strategy for greening consumption and production patterns. Development of comprehensive policy documents has accelerated since 2011, including: preparation of the national plan to reduce CO_2 and other GHG emissions; the national strategy for climate change adaptation; the national plan for waste recovery; and the national plan for integrated management of water resources.

The European Union *acquis communautaire* has provided unifying guidance for strengthening Italy's environmental legislation. By 2000, a number of media-specific laws were adopted, bringing Italian environmental regulations closer to EU requirements. This did not mean Italian environmental law lacked originality. In fact, many requirements anticipated EU Directives, for example in the case of water management. Italy had already introduced requirements for planning based on river basins in 1989 and applied water quality objectives as the guiding principle in 1999.

Although further progress was made in the early 2000s on strengthening the legal framework, the transposition of EU Directives has often been late[1] and has not resulted in a coherent and comprehensive body of environmental legislation. This is linked to regions being responsible for issuing their own laws to implement relevant national laws. The use of legal decrees (*decreto legge*), which are interim legal measures adopted in the event of extraordinary events and emergencies, has also slowed transposition.[2] In many cases, decrees have not been followed by the implementation of regulations, which has contributed to a widening of the implementation gap.

In an attempt to address fragmented legislation and the backlog in transposing EU Directives, the Environmental Code (Legislative Decree 152/2006) was adopted in 2006.[3] It consolidated the numerous acts that regulated separate environmental domains (waste,

water, air), established a number of specific targets (such as 45% of municipal waste being subject to separate collection in 2008 and 65% in 2012), and provided specific procedures in regard to issues that had not previously been regulated, such as liability for contaminated sites.

While the Code brought more coherence to existing environmental requirements, it did not fully meet the goal of codifying environmental legislation. Some regions challenged the government in the Constitutional Court over how the Code dealt with some jurisdictional issues, but in most cases the Court ruled in favour of the government (Lugaresi, 2010). Although the shortcomings of the Code were rectified by amendments in 2008 and 2010 that added key principles and a range of pending issues, such as environmental impact assessment (EIA), strategic environmental assessment (SEA) and integrated environmental permitting, the environmental legal framework is in need of further development as many legal acts are not in full conformity with the EU *acquis*.[4] Reform of Italy's environmental legal system should move away from *ad hoc* legal fixes towards establishing a stable mechanism for regulatory improvement that allows wide consultations within the government and with other key stakeholders.

Policies and initiatives at the subnational level

The regions and the lower level of administration have played an important and proactive role in environmental policy development. A number of environment-related plans, such as those for land use, air quality and waste management as well as energy and transport, were developed by the regions. In some cases the initiatives preceded the requirements set at national level and anticipated developments at the EU level. Although preparation of some plans was delayed, hindering investments and the effective management of environmental services, especially in the South (Mezzogiorno), most regions developed and approved plans by the end of the decade. Subnational planning in the South accelerated in the period 2000-06 through financing by EU Structural Funds, which was made available depending upon a prior definition of relevant plans (Capozza and Garrona, 2007). The initial plans were revised and further implemented in the subsequent programming period under the National Strategic Reference Framework (NSRF) 2007-13. To promote better disbursement of funds, the NSRF set specific targets of reducing losses from water infrastructure, as well as increasing the share of the population connected to wastewater plants and the share of urban waste subject to separate collection (Chapter 3).

Several initiatives were launched by municipalities with responsibilities for the local environment, including air pollution, water and waste services, and green space management. City-oriented solutions to acute environmental problems include the efforts of the Milan metropolitan area to reduce urban traffic (Box 2.2). Over 900 authorities have joined the European Sustainable Cities and Towns Campaign and have promoted Local Agenda 21. The National Co-ordination Office for Local Agenda 21 in Ferrara has been transformed into an association which helps local authorities use Local Agenda 21 experience (MATTM, 2009).

Some environmental responsibilities were regrouped in ways that cut across administrative boundaries. For example, most river basin and hydrogeological risk plans designed by river basin authorities with inter-regional competencies were approved between 2001 and 2007. Management of water supply and sanitation was vested in an inter-municipal "optimal territorial area for managing services" (Ambito Territoriale Ottimale, ATO). By 2004, 87 out of 91 ATOs had been created and 66 had developed water

Box 2.2. **The Ecopass pollution charge system in Milan**

Milan is the second largest city in Italy, with a population of 1.3 million in 2010. It is also the capital of the province of Milan and of the region of Lombardy. With increasing traffic, which accounted for 72% of pollutant urban emissions in the early 2000s, the city suffered from serious air pollution. The environmental standard for PM_{10} was exceeded on 150 days in 2005, far above the EU and Italian limit of 35 days. The social impacts of air pollution from traffic, including health impacts, damage to buildings, traffic accidents and climate change, were estimated to exceed EUR 5 billion per year. In November 2006, the city government issued the Strategy for Sustainable Mobility for the period 2006-11, which defined strategic interventions in regard to the transport sector and included the introduction of congestion charges. Originally these charges were to be imposed in the 60 km^2 area where 60% of the city's residences were located. This was expected to reduce both traffic congestion and air pollution and provide funds for the implementation of environmental policy, including enhancement of public transportation.

The pollution charge system, called "Ecopass", was launched in January 2008. The actual charging zone, covering 8 km^2 of Milan's historical area, was surrounded by 43 entry points. Each vehicle entering the area between 7h30 and 19h30 was required to pay a daily charge. From 2008 to 2011, the charge was differentiated according to vehicle emission standards: between EUR 2 and EUR 10, depending on vehicle emissions. Low-emission vehicles (electric and hybrid, LPG and CNG fuelled) were exempted. Introduction of the charge was accompanied by major strengthening of public transport. The city government introduced various options for paying the charge: a daily ticket or Ecopass Card; use of credit cards by telephone; or through an Internet site. To monitor compliance, the municipal police were to check the number plates of vehicles in the Ecopass area using existing systems for checking parking and road traffic. Thus, the city of Milan avoided substantial investments in new system infrastructure.

The Ecopass contributed to the improvement of air quality. In the first 11 months a 12% reduction in traffic was registered in the charging zone and a 4% reduction in the external area. PM_{10} and NO_x emissions decreased by 23% and 17%, respectively. In 2010, the average concentration of PM_{10} was 40 $\mu g/m^3$, a 23% decrease from 2005, and that of $PM_{2.5}$ was 25 $\mu g/m^3$, a 32% decrease from 2007. Both concentration levels fell below upper environmental thresholds. The environmental standard for NO_x was exceeded on 12 days, one of the lowest totals in the last decade.

Following the results of a local referendum held in June 2011, the Ecopass was converted to the so-called "Area C" programme in January 2012, moving from a pollution charge to a daily congestion charge of EUR 5 for private vehicles entering the city centre in working hours during the week and EUR 10 for freight vehicles. Residents and those in other special categories benefit from fee reductions. Vehicles with emission levels above certain thresholds (based on the Euro classification) are banned. The new programme resulted in a further decrease in traffic of 35%.

Despite progress, episodes of acute pollution still affect Milan. As part of an emergency plan put into operation when air pollution exceeds 50 $\mu g/m^3$ of PM_{10} on 12 consecutive days, a total ban on circulation by all vehicles regardless of age or engine type was imposed on Sunday, 9 October 2011. Extra bus and metro services were provided to reinforce public transport.

supply and sanitation plans. In 2012, all but one of the ATOs were operational and most had completed their planning (Chapter 4). This model was also applied to urban waste management (Massarutto, 2012).

2. Institutional and co-ordination framework for environmental management

2.1. Key institutions

The Ministry of the Environment, Land and Sea (Ministero dell'Ambiente e della Tutela del Territorio e del Mare, MATTM) is the main governmental body in charge of regulations, co-ordination and control related to environmental management. In 2006, the Ministry acquired new responsibilities for the protection of marine waters, and in 2009 its structure was streamlined by establishing five core directorates.[5] Although the responsibilities of the MATTM had been extended, its annual budget decreased by 48% in the period 2006-11, from EUR 1.1 billion in 2006 to EUR 0.6 billion in 2011. Additional plans to reduce funding (by approximately 20% in 2011-14) are likely to erode further the MATTM's capacity to establish and implement coherent policies throughout Italy.

A number of specialised agencies provide support to the MATTM, including the Italian environmental agency (Istituto Superiore per la Protezione e la Ricerca Ambientale, ISPRA), the Department of the Marine Environment of the Italian Coast Guard (Reparto Ambientale Marino del Corpo delle Capitanerie di Porto, RAM),[6] the Carabinieri Corps for Environmental Protection (Comando Carabinieri per la Tutela dell'Ambiente, CCTA), an environmental unit of the national military police (Carabinieri) at the disposal of MATTM, and the State Forestry Corps (Corpo Forestale dello Stato, CFS), an autonomous unit of the Ministry of Agriculture, Food and Forestry.

ISPRA, in particular, has been subject to restructuring and strengthening.[7] Reorganisation and mergers resulted in an increase in ISPRA's staff from 400 in the early 2000s to nearly 1 200 in 2010. Its funding increased three-fold, to nearly EUR 100 million in 2010 and 2011. However, only around EUR 80 million per year has come from core government funding while the remainder has been generated by ISPRA's involvement in *ad hoc* projects or providing consulting services, including monitoring, research and development, and European and international co-operation.

Regional and local administrations play an important role in environmental management. Not only do these administrations issue permits that adapt (in a regional context) objectives determined through national legislation, as well as monitoring environmental performance, but they also define environmental priorities for environmental action, introduce specific policy instruments, carry out investment programmes, and respond to non-compliance. The provinces take part in all regional plans, such as those on waste, air and noise pollution. An elaborate system of regional environmental agencies supports subnational administration. This system includes 19 regional environmental protection agencies (agenzie regionali per la protezione dell'ambiente, ARPAs) and two provincial environmental agencies for the autonomous provinces of Trento and Bolzano (agenzie provinciali per l'ambiente, APPAs). All but one of these agencies were created in 1994-2001.[8] The number of staff varies, from fewer than 100 (60 in the Aosta Valley and 80 in Molise) to between 800 and 1 000 in Lombardia, Emilia-Romagna, Veneto and Piedmont. ARPAs/APPAs carry out planning and regulatory activities, as well as monitoring and inspections, on behalf of both levels of local administration (provinces, municipalities) and local offices of health authorities.

2.2. Horizontal and vertical co-ordination

Horizontal co-ordination at the national level

In 2000, the Commission for Sustainable Development (Commisssione 6 – Sviluppo sostenibile, C6SS) was established as part of the CIPE. Its association with the CIPE was potentially important, as the latter is the principal inter-governmental body that defines national economic policy, outlines multi-year budgets and monitors their implementation. The C6SS was instrumental in developing and adopting the Environmental Strategy for Sustainable Development and designing programmes to respond to Italy's commitments to multilateral environmental agreements, such as those on climate change and desertification. However, the Commission's activities slowed after 2002 and have remained virtually non-existent. The reconstructed C6CC could provide a useful mechanism for reinforcing co-ordination on environmental matters across ministries and stimulate the "greening" of the CIPE itself, as it gathers key ministries and holds all necessary decision-making powers. Although the MATTM's involvement was limited until recently, it now has a permanent seat on the CIPE, underlining the potentially important role this body could play in environmental policy integration.

The Inter-Ministerial Committee for European Community Affairs (Comitato interministeriale per gli affari comunitari europei, CIACE), a form of the "European Affairs Cabinet", as well as the National Council for Economy and Labour (Consiglio Nazionale dell'Economia e del Lavoro, CNEL), an advisory body to the government, Parliament and the regions, have become important fora for discussing environmental sustainability. In 2011, the CNEL initiated discussions to create a consultative body (Consulta) on sustainable development, but no action had been taken as of mid-2012 due to lack of funding.

Inter-departmental co-ordination is also carried out through task forces and steering committees, such as the Steering Committee for preparing the National Action Plan for Green Public Procurement and the Inter-Ministerial Technical Committee for Emissions of GHGs. However, most interaction takes place on a bilateral basis between the MATTM and sectoral ministries which address specific obstacles that cut across ministerial boundaries and can exploit policy synergies.[9]

Vertical and subnational co-ordination

Overall co-ordination of policies at the national and subnational levels is ensured through a system of "permanent conferences". The State-Regions Conference (La Conferenza Stato-Regioni) allows regional governments to discuss issues related to the transfer of functions from the centre, while the State-Local Authorities Conference (La Conferenza Stato-Città ed autonomie locali) discusses relations between state and metropolitan areas, municipalities and small communities.[10] The Unified Conference (La Conferenza Unificata) brings together the two conferences on issues pertinent to implementation of the 2001 reform of the Italian Constitution. A number of environmental projects have been undertaken within the conference system, such as a programme for co-financing regional environmental education, information and training programmes. In parallel, the horizontal Conference of the Regions and Autonomous Provinces (La Conferenza delle Regioni e delle Province Autonome) meets regularly and frequently discuss environment-related issues of mutual interest.

Despite this comprehensive system, state-regional relations have long suffered from an unclear division of responsibilities for environmental management and have led to a

number of constitutional disputes. A dispute settlement system introduced in 2004 has been successful so far, particularly as a tool for preventing disputes.[11] As a result, the level and number of constitutional disputes have decreased significantly in recent years (OECD, 2012).

Special Commissioners (*commissari straordinari*) appointed by the government have also been used to address the unclear division of responsibilities, especially in emergency situations at the subnational level. The Commissioners' special powers include the ability to bypass existing rules on decision making and allocation of funds. While the Commissioners have had some success, for example in addressing waste problems in Apulia, this has not always been the case. Indeed, their appointment may have contributed to a focus on short-term solutions and allowed local politicians to avoid taking responsibility for problem solving (OECD, 2011).

In the field of environment, the Italian Network of Environmental Agencies, which comprises ISPRA and all ARPAs/APPAs, promotes implementation of national objectives at the regional level and development of harmonised methodological and operational guidance.[12] A separate National Network of the Environmental Authorities and the Programming Authorities of the Community Structural Funds (Rete Ambientale) provides ongoing assistance to southern regions which benefit from the EU funding.[13] The National Observatory for Organisation and Management of ARPAs/APPAs (Osservatorio nazionale sull'organizzazione e sulla gestione delle ARPA-APPAa, ONOG) was established to prepare management and technical studies and guidelines on funding and management. These co-operation mechanisms were effective, but after an intensive period in the early 2000s their activities slowed down and the ONOG's work was discontinued. Reinvigorating the Italian Network of Environmental Agencies, and incorporating the Rete Ambientale in its structure, should re-establish a structured form of dialogue and co-operation between the two levels of government on key environmental challenges and best practices, and facilitate the benchmarking of regional environmental performance. The inclusion of representatives from the regional administration and the creation of a medium- and long-term work programme would strengthen the Network's capacities and impacts.

3. Environmental permitting, enforcement and compliance assurance

Environmental standards and permitting

The 2006 Environmental Code and subsequent amendments unified a vast number of emission thresholds and concentration limits for air, water and land pollution. They are applied uniformly throughout Italy, although it is possible for regional administrations to make requirements more stringent in order to adapt them to the local environmental context.

Between 1998 and 2005, Italy made significant efforts to reduce the number of licenses and permits with which environmental standards and limits are made operational. Steps were taken in the late 1990s and early 2000s to establish a one-stop shop authority (Sportello Unico per le Attività Produttive, SUAP) to unify permitting procedures and grant simplified permits. However, these authorities were only partially successful. SUAPs were operational in 40% of municipalities, covering 60% of the population, by 2009 (OECD, 2009). Additional measures were introduced in 2007 to consolidate one-stop shops as single electronic access points for disseminating information to businesses, and for issuance of all authorisations required to establish or modify production or commercial facilities. Despite these efforts, a survey carried out by the Ministry of Public Administration and Simplification estimated that

the annual burden of environmental regulations for small and medium-sized enterprises (SMEs) could be as high as EUR 3.4 billion and that reducing this administrative burden would result in industry savings of nearly EUR 1 billion (OECD, 2009).

An important direction and framework for administrative reform is provided by the Plan for Administrative Simplification 2010-12[14] and the government programme Semplifica Italia, adopted in January 2012. In 2011, important changes were made to environmental permitting for SMEs, which unified the way separate environmental permits for air emissions, waste management and disposal, and discharges of effluents to water are issued. The Semplifica Italia envisages further steps, including the introduction of a single environmental permit for SMEs (Autorizzazione Unica Ambientale, AUA) or even a notification procedure (Segnalazione Certificata di Inizio Attività, SCIA) which would allow the immediate start of an activity supported only by self-certifications and attestations by qualified bodies (OECD, 2012).[15] Such initiatives should be vigorously pursued, especially since the majority of Italian firms are in the SME category. However, appropriate safeguards should be applied, including spot checks for higher-risk operations and working with the local population and NGOs to reduce the likelihood of non-compliance.

Since 1996, EU legislation requires that integrated permits be issued for large installations with significant environmental impacts that fall within the scope of the EU IPPC (Integrated Pollution Prevention and Control) Directive (96/61/EC, superseded by the Industrial Emission Directive, 2010/75/EU).[16] The introduction of integrated permits started late, as the provisions of the IPPC Directive were finally transposed only in 2010. Initially, there were problems related to the identification of appropriate installations. Nearly 7 000 existing installations were originally selected, but the number was reduced to 5 525 in 2008 (still the third highest in the EU after Germany and France). Nearly half the installations were located in two regions: Lombardia and Emilia-Romagna. After a slow start, 2 230 integrated permits were issued in 2007 for existing installations, less than 50% of those required to be issued by the deadline. However, the number of permits increased to 3 989 in 2008 (Farmer, 2009). As of June 2012, 4 879 permits have been issued, including 141 issued by central authorities for the largest installations and 4 738 issued by the regions. Information about integrated permits is available on the MATTM web site, with details about inspections and their results.

Granting of IPPC permits is still incomplete (around 600 existing plants are awaiting an integrated permit), but the introduction of an integrated approach has had a very positive impact. It has helped to shorten permitting procedures, increase the competencies and knowledge of regional authorities in regard to industrial processes, and increase commitment to transparency and public access to information. Efforts are being made to improve their effectiveness even further in the context of administrative simplification. The Environmental Code introduced better co-ordination mechanisms between IPPC permitting and environmental impact assessment (EIA). For activities subject to both procedures (e.g. combustion plants generating 50 MW or more of electricity, industrial chemical plants, and waste disposal plants with a capacity of 3 tonnes/hour), the IPPC is granted as part of the EIA procedure and no separate procedure is required. However, the procedures should be made much more coherent across Italy to reduce costs to operators, especially those with installations in more than one region, and strengthen compliance.

Since 1999, industrial activities that fall within the scope of the EU Seveso Directive[17] are required to notify the MATTM, the Ministry of Health, and regional authorities when

production or storage exceed established thresholds. Currently 1 151 industrial plants are subject to this regulation, mainly including refineries and LPG and chemical storage sites. The permitting procedures also require 537 "upper tier" (high-risk) facilities to maintain safety management systems detailed in Major Accident Prevention Policy documents, and to develop internal emergency plans and safety reports.

Enforcement and non-compliance response

Permit holders are inspected periodically by ARPAs/APPAs in co-operation with the provincial authorities and municipalities. Large companies are inspected in co-operation with ISPRA. Controls can also result from reports and complaints from public authorities, the judiciary or citizens.

The central government regulations aimed at simplifying the regulatory framework resulted in a number of mechanisms that reduce the burden of environmental compliance monitoring. In 2007, a "risk-based inspection" approach was introduced. ISO 14000 certified enterprises can now be inspected by qualified private companies through certification auditing procedures, rather than by the administration (Burali, 2010). Most recently, guidelines were prepared for the assessment of uncertainty in compliance inspection. The five-year validity of IPPC permits was extended to six years for a plant certified under environmental management system standard ISO 14001, and eight years if the plant takes part in the EU Eco-Management and Audit Scheme (EMAS).

Italian laws contain a wide range of responses to non-compliance. Violations of environmental permits most often result in orders requiring the permit holder to ensure that they will comply within a designated period and, if necessary, carry out remedial work. Regional and provincial authorities also apply administrative penalties, prescribed for each environmental domain, in an amount which depends on the nature and degree of the violation. The revenue from fines is assigned to the provincial authorities where the violations occur and is used to strengthen the environmental compliance system. A part of the revenue is also allocated to help municipal authorities improve waste management systems (Burali, 2010). In cases of significant violations and serious risks to the environment or human health, the regulator may also suspend the permit for a certain period or, in case of repeated violations, revoke it and order the closure of the plant.

Italy has a long history of fighting environmental crimes. Typically, these crimes have been related to illegal handling, treatment and disposal of dangerous substances, illegal releases of pollution to waterways and air, noise, poaching, illegal construction and arson. Criminal offences are punishable by fines and/or imprisonment. In connection with the application of the penalty for the crime, the criminal court is entitled to order the seizure of goods used in a criminal activity. In 2010, recognising that waste-related crimes were frequently associated with organised crime, competence in this area was shifted to the Anti-Mafia Attorney's Offices.

Several of these types of crime are investigated by the Carabinieri Corps for Environmental Protection (Comando Carabinieri per la Tutela dell'Ambiente, CCTA). The core objective of this unit is to fight illegal traffic in waste, a growing phenomenon involving significant profits and attracting the interest of organised crime (Box 2.3). The CCTA co-operates with the National Forestry Corps and a number of authorities responsible for public security, including national or local police (Polizia) and customs and excise police (Guardia di Finanza).

Box 2.3. **Illegal trafficking and disposal of waste**

Waste handling and disposal is one of the main areas where illegal activities occur, generating high social and environmental costs. These activities, often carried out by organised criminal groups, evolved from the "traditional" large open air dumps characteristic of the late 1980s to a number of innovative methods such as: burying waste in cultivable areas, roads, construction sites and natural caves; sending industrial hazardous waste to non-hazardous urban waste treatment facilities or other non-adapted treatment sites; abandoning hazardous waste derived from shredded urban waste on land undergoing decontamination in the countryside and in natural areas such as the crater of Mount Vesuvius; spreading fake fertilisers and composts containing toxic substances; adding waste to cement, metals and asphalt; and diluting waste and disposing of it in sewerage systems, rivers and the sea.

Legambiente, an Italian NGO, estimated that annual revenue from trafficking toxic and radioactive waste reached EUR 3.4 billion in 2010 and yielded EUR 43 billion between 2000 and 2010. Illegal activities also have high costs for society. In 2004, the medical journal *Lancet Oncology* identified a "triangle of death" east of Naples, where toxic waste was linked to higher incidence of cancer, especially liver cancer (Senior and Mazza, 2004).

Criminals take advantage of the high costs of legal waste management and make substantial profits from illegal trafficking and disposal activities, circumventing environmental legislation. Operators of waste generation facilities frequently make false statements about the quantity or type of waste to be disposed of, or circumvent the law by giving disposal activities to dealers that, using illegal means, work below cost. Tampering with a classification-of-goods document allows a change of destination and makes it difficult to trace and inspect loads. The main north-south axis of waste flows is divided into an Adriatic route (to Apulia, Abruzzo and Emilia-Romagna) and a Tyrrhenian route (to Campania, Lazio and Calabria). However, waste traffic is continually spreading to other regions such as Basilicata and Umbria. More recently, waste has flowed from Campania to the North, across the regions of Emilia-Romagna and Lombardia and through the Milano Como axis, to arrive in Piedmont. It is estimated that in the last five years, 3 million tonnes of all types of waste have been illegally "treated" on the Tyrrhenian route, of which 1 million tonnes in the province of Caserta alone. Increased police control and the exhaustion of landfills have contributed to the emergence of these new routes (Legambiente, 2012).

Toxic waste is also trafficked to south-eastern Europe and the Western Balkans, as well as to other EU member states. Moreover, Italy has become a transit point for e-waste on its way to Africa and Asia. (EUROPOL, 2011).

Since its establishment in 1986 the CCTA has grown from the central office in Rome to 29 units (Nuclei Operativi Ecologici, NOE) at the regional level. CCTA operations have resulted in a high number of successful actions, especially against organised crime. The CCTA imposes between 2 000 and 6 000 fines annually, reaching EUR 2 million to EUR 40 million per year, while between 100 and 200 persons are arrested for environmental crimes. Most violations relate to illegal waste activities, followed by air pollution and illegal construction. About two-thirds of violations in 2010 were in the South. The CCTA is becoming more effective. Although the number of CCTA inspections decreased significantly, from 9 600 in 2003 to 3 700 in 2010, the number of violations fell at a much slower pace, from 2 800 in 2003 to 1 900 in 2010. Some estimates by NGOs show the "income" from illegal waste activities decreasing (Legambiente, 2012). This is largely due to the effectiveness of enforcement authorities' co-operative, preventive and repressive activities.

Italy's environmental compliance assurance system has been strengthened through the decentralisation of compliance monitoring and inspections, but has also been made more efficient by streamlining inspection procedures, reducing administrative burdens and increasing the effectiveness of non-compliance responses. Decentralised inspections have certain advantages, as regional and local authorities can better monitor compliance in their jurisdictions. However, lack of a unified country-wide compliance monitoring and enforcement policy means that different regimes are applied across Italy. The introduction of an explicit and well defined risk-based compliance assurance policy at the national level, and its application in the regions, could help reduce both the administrative burden and environmental risks. Better co-ordination of inspections among different agencies could also increase the system's efficiency. Further efforts should be devoted to fighting illegal activities, especially waste-related ones. The approaches used should combine designing a consolidated country-wide waste management policy (which would allow a more effective and efficient approach to waste treatment and disposal) with further support for enforcement efforts. Government efforts should be strengthened by participation of the public and the media.

4. Environmental policy and performance evaluation mechanisms

Environmental monitoring and reporting

Italy has further strengthened the collection and presentation of environmental data, which is managed under its comprehensive SINANet system (*www.mais.sinanet.isprambiente.it*). A number of topic-focused databases, registries and inventories which feed into SINANet have been upgraded or completed.[18] The system is supported by a network of national topic centres, reference institutions and regional focal points. Work has also been done to widen the collection and processing of missing information, such as data on environmental protection expenditures in specific sectors, on environmental taxes and on economy-wide material flows. SINANet itself has been upgraded and now contains an interactive geoportal based on GIS technology. It contributes to implementation of the 2007 EU INSPIRE Directive (2007/2/EC), which aims to establish an infrastructure for spatial information in Europe (ISPRA, 2009).

While these accomplishments are impressive, Italy's information system could be further strengthened, especially by ensuring that all ARPAs/APPAs contribute to data collection and that information provided at the regional level is harmonised and up-to-date. Differences in methodologies do not allow analysis of trends. More efforts are also needed to link environmental outcomes with policies. Although progress has been made in collecting information related to the economic aspects of environmental policies, data are still far from being complete, especially those on environmentally harmful subsidies. To address these challenges, ISPRA should work closely with regional agencies and provide them with more guidance in order to co-ordinate collection methods, data characteristics and data flows. More targeted capacity building is also needed for less advanced offices. The Network of Environmental Agencies should be actively used to transfer experience from more advanced regions and to co-ordinate activities across Italy.

Environmental information has been presented in regular state of the environment reports and a number of supporting reports that focus on individual aspects of the environment, such as waste, climate and biodiversity. To facilitate decision making and public access, reports are being presented in a concise and accessible format. Environmental indicators are now used routinely, and more environmental information is

accessible in a dynamic form on Internet. For example, ISPRA's latest "Environmental Data Yearbook – 2011" comprised six distinct products, such as the full version of the Yearbook with detailed treatment of the environmental topics and 251 specific indicators, a concise version containing information on priority environmental issues, a pocket "Key Topics" version of the Yearbook, and an online database including fact sheets and multimedia tools with film sequences and web application.

Several ARPAs/APPAs, such as those in Piedmont, Lombardy, Veneto, Tuscany, Emilia-Romagna, Umbria and Sicily, also produce annual or biannual yearbooks and focus reports. Reports and databases are available on Internet, where large municipalities present "near-to-real" time information concerning environmental problems, especially air quality. These products allow ARPAs/APPAs to disseminate regional and local data to the public. By reviewing and developing information, they contribute to policy planning and implementation at the local and state level.

Regulatory impact assessment, strategic environmental assessment and environmental impact assessment

Appropriate assessment of costs and benefits during the legislative process, known as the Regulatory Impact Assessment (RIA), can bring about significant improvements in the quality of new regulations. The application of RIA (Analisi di impatto della regolazione, AIR) is still in an early stage in Italy. Two trial phases of a comprehensive RIA between 2001 and 2005, which produced mixed results, was followed by the adoption of a simplified approach in 2008.[19] Italy also introduced an *ex post* regulatory impact evaluation (Verifica dell'impatto della regolamentazione, VIR) to be applied two years after the entry into force of the law being evaluated and to be carried out every two years subsequently. However, the VIR application has been limited so far despite its promising role in strengthening the decision making (OECD, 2012).

The MATTM, like all other governmental bodies, is required to carry out the RIA on proposed regulations, but progress has been limited by lack of capacity at the Ministry to carry out such analysis. Overall, the RIA has confronted serious challenges, as analysis is often prepared late in the legislative process after proposals have been drafted. The RIA therefore continues to be perceived largely as a procedural burden by the majority of regulators, limiting its added value. The Ministry of Public Administration and Simplification is making bold attempts to strengthen the capacity of public services, but further investment in staffing and RIA training will be necessary to enable ministries (including the MATTM) to conduct analysis sufficient to compare options and understand the consequences before they act (OECD, 2012).

Italy has made good progress in designing the regulatory framework for strategic environmental assessment (SEA) of government plans and programmes, which is a relatively new environmental policy instrument. Following a trial application for the use of EU Structural Funds in 2004, SEA was introduced in Italian legislation in 2006 as part of the Environmental Code. The provisions were revised several times in 2008 and 2010[20] to better harmonise procedures with the requirements of the EU SEA Directive (2001/42/EC). Changes included better definitions of the competences of the statutory authorities and clarification of relations between the SEA and other related procedures, such as the EIA and integrated environmental permitting.

After a slow start, SEA of national plans and programmes accelerated. Fifteen SEAs had been completed by 2011 in areas such as the national electricity transmission grid, research and development, land use, water management and tourism. Inclusion of SEA in the operations of the MATTM's Directorate for Environmental Assessment in 2006 was instrumental in developing administrative and technical documentation and co-ordinating SEA practices.

SEA has also been applied at the regional level. Some regions, such as Emilia-Romagna, had already introduced SEA legislation in 2000, anticipating EU requirements. Currently around 60% of the regions have introduced their own SEA legislation and all have adopted other instruments that enable SEA, such as special forms, guidance documents and trial procedures. The regions select criteria for the identification of the local and regional authorities concerned, identify plans and programmes subject to SEA, and arrange for participation by neighbouring regions. The number of SEAs conducted at the regional level increased from 537 in 2009 to 745 in 2010. Those conducted in Lombardia and Emilia-Romagna accounted for 50% of all SEAs in 2010.

The results of the first phase of SEA implementation (between 2004, when some regions implemented the SEA procedure, and 2007, when the SEA was more widely applied) showed some weaknesses, such as restricted participation during consultations (mostly due to the novelty of the participation process), superficial analysis of alternatives, lengthy procedures, and difficulties with integrating SEA results in plans and programmes. The 2010 legal changes made SEA results binding. This is expected to ensure incorporation of SEA results in revised plans and programmes. The MATTM's SEA unit and ISPRA have developed a set of indicators to facilitate monitoring of SEA implementation and methodologies, which should strengthen the coherence of regional approaches. These methodologies are now tested at the national and local levels. A working group of the Italian Network of Environmental Agencies carries out an analysis of the legal and procedural framework for SEA in the regions.

The requirements for environmental impact assessment of projects (Valutazione di Impatto Ambientale, VIA/EIA) were revised several times after they were introduced in 1986. The changes shifted the early, fully centralised EIA process carried out under the strict supervision and responsibility of the MATTM towards a decentralised system in which regional and provincial administrations carry out EIA procedures for a number of projects identified in legislation. This renders the EIA system more flexible and efficient. Several other changes introduced requirements for consideration of energy efficiency, promotion of renewable energy, and introduction of maintenance and emergency plans for industrial facilities. Most recently, IPPC permitting was combined with the EIA procedures, which should allow reducing duplication in investigative and evaluation activities. The new provisions for a so-called "super EIA", to be performed on projects with high strategic priority such as large infrastructure developments, are simplified and facilitate faster project implementation. However, as some consider these procedures as a way to bypass the full EIA, careful monitoring and periodic assessment of the results will be needed to ensure compliance with the EIA requirements.

The number of EIAs carried out for projects of national importance fluctuated between 15 and 65 between 2000 and 2011, following a steep increase from 3 in 1989 to 53 in 2000. Most EIAs relate to the construction of waste disposal and treatment facilities, roads and thermal power stations; 78% of projects are approved. Each year over 1 000 projects are subject to EIA at

the regional and provincial level. Important efforts have been made to reduce the duration of procedures, which have been shortened from 11 to 3 months on average.

However, due to numerous changes in EIA regulations, procedures remain complicated and are marred by problems. Discontinuity between the initial preliminary design, which often contains overall analyses of alternatives, and the definitive design, developed in parallel with the EIA, is a key problem as it hinders integrated appraisal of impacts, mitigation, costs and alternatives (Bassi, 2012). Other limitations include poor analysis of cumulative effects, the organisational and expertise deficiencies of responsible authorities (especially at the local and regional level) and the procedures' inherent complexity. Disjointed regional and provincial procedures result in long timeframes and a lack of simple and effective guidance. Many environmental statements, as well as non-technical summaries, tend to be voluminous, redundant and, in some parts, written in complex and overly technical language, impairing communication of the results of the EIA to the public and the responsible authority. Scarce public participation and lack of trust among stakeholders contribute to frustration with EIA procedures by the administration, investors and the public. Several cases demonstrate that ignoring stakeholders' views can delay investment. One of the most prominent examples is an EIA carried out in 2009 on a project to convert the Porto Tolle oil-fired plant near Rovigo, in northern Italy, to coal burning and to fit one of its units with carbon capture and storage technology for storing emissions under the sea. The overall project was delayed by appeals and public opposition, although it involved an investment of EUR 2.5 billion and was expected to create more than 3 000 jobs over a five-year construction period.[21]

Court of Auditors

An important function is carried out by the Italian Court of Auditors (Corte dei Conti) in evaluating public administration performance. According to Article 100 of the Italian Constitution, the Court is responsible for an *ex ante* assessment of the most significant government acts and *ex post* audits of the effectiveness and efficiency of the government programmes, including European Community funds used in Italy.

In the period 2000-11, the Court carried out 70 audits of national and regional programmes related to environmental and energy policies, 76 related to territorial management and 21 related to urban environmental management. A large number of audits were carried out on waste and energy programmes, but audits also covered activities such as the establishment of marine protected areas or Local Agenda 21 implementation. Audits by the Court result in judgments certifying (or not) the regularity of the accounts and whether the programme objectives have been met. Several of the Court's judgments have included evaluations of the way financial resources are managed, together with proposals for administrative or legal changes to improve performance and accountability, and have been discussed in Parliament. Examples are the waste crisis in Campania and government programmes related to the reclamation of contaminated sites and investments in irrigation systems in drought prone areas.

5. Promoting environmental democracy

Legal and administrative mechanisms that facilitate access to environmental information, public participation in environmental decision making and access to justice were well established in Italy by the turn of the century. This allowed it to be one of the first

two countries to ratify the UNECE Aarhus Convention in 2001. In the last decade, several other tools have also been used to strengthen environmental democracy.

Access to environmental information

Access to environmental information was further strengthened in 2005 (Box 2.4). This reform was followed by the creation of the Office for the Relationship with the Public (URP) at the MATTM in 2007. Responding to the findings of a permanent working group on improving URP operations, a call centre, front office, database and e-mail address were set up to facilitate responding to public enquiries. ISPRA has its own URP to co-ordinate environmental information collected by regional agencies. Revisions of EIA procedures and the introduction of SEA in 2006 were accompanied by a widening of the possibility for the public to access assessment results. Project proponents were also required to publish project information and the results of evaluations, including a non-technical synthesis, in national or local newspapers and on websites.

Box 2.4. **Legal framework for accessing environmental information**

Italy has a long history of providing access to environmental information and recognising the enforceability of this principle in the courts. The first reference to the right of individuals to be informed about the state of the environment was introduced in 1986. This law, which also created the Ministry of the Environment, required ensuring the widest dissemination of information concerning the environment. It gave every citizen the right to obtain available information on the state of the environment at public offices, free of charge or for the cost of reproduction according to public tariffs. Several subsequent laws introduced the requirement that public authorities comply with the criteria of transparency and impartiality and establish appropriate structures for informing the public (e.g. Legislative Decrees 29/1993 and 80/1998).

Legislative Decree 195/2005 adjusted the terms and conditions for accessing environmental information in light of the EU Directive on public access to environmental information (2003/4/CE). It broadened the definition of "environmental information" and required public administrations, including private bodies exercising public functions, to provide information to individuals or associations without the need to demonstrate an interest. The decree called for extensive use of public databases and information points (utilising URPs where available), but explicitly listed restrictions when releases of environmental information could be denied. The decree specified transparent and non-excessive tariffs, applied only to cover the costs of the release of the information, and required that the costs be determined in advance and displayed to the public.

The regulation also established specific deadlines for providing information to applicants (30 days as a general rule, or 60 days for complex information, with an obligation that the administration provide an explanation for any delay) and introduced the possibility of judicial or administrative reviews in case of denial of information provision.

Public participation in environmental decision making

Several consultative bodies to the MATTM work with representatives of other ministries, the regions, the private sector and NGOs in defining environmental policies.[22] Parliamentary hearings allow members of the public (and their associations) to participate in legislative activities. Commonly used, especially at the local level, are petitions, as well

as proposals for legislation or motions based on common interest, submitted directly to parliamentary or regional committees by at least 50 000 citizens. The regulatory framework for SEA, EIA and environmental permitting introduced a number of provisions that enhance the way the public can influence the final decisions, including extending the duration of consultations and accessing and commenting on documents electronically. Several regions have introduced specific criteria concerning public assistance and public participation in decision making.

Consultative referenda, applied in only a few OECD countries, have been used for environment-related matters at the national and local level. This instrument, which must be proposed by at least 500 000 citizens or by five regions, can abrogate legislative acts either partially or entirely.[23] The results of a country-wide referendum in June 2011 supported the repeal of regulations allowing the privatisation of water services and determining the rate of return applied to water service, as well as rejecting a return to use of nuclear energy, which was phased out in Italy as a result of a 1987 referendum (Box 4.5).[24] Referenda are also organised at the regional level. For example, a referendum in Milan organised in conjunction with the 2011 national referendum showed strong support for proposed measures to reduce traffic and related pollution, enlarge green areas, promote energy efficiency, reduce greenhouse gas emissions and restore historical canals. Expanding this type of consultative mechanism could be a useful tool for generating public support and commitments to environmental initiatives, especially at the regional level.

Although Italy has a range of instruments that facilitate public participation in environmental decision making, challenges still remain. Relations between the authorities and social partners are fragmented, polarised, and affected by strong "not in my backyard" (NIMBY) attitudes which can be stimulated by political motives. Disputes polarise the parties concerned and often occur only in the case of emergencies, such as the Naples waste crisis, or high-profile projects like the Porto Tolle power station's oil-to-coal conversion, the Turin-Lyon high-speed train link, and several waste incinerators or landfills. Many conflicts have a long history, but most result from the authorities having initially ignored public concerns and a lack of appropriate consideration of alternative solutions. Italy's dialogue on environmental policies could be strengthened by initiating wide-reaching public discussion on key priorities, profiting from experiences in other OECD countries such as France's "le Grenelle Environnement".[25] Further development of guidance for public participation and better oversight of the implementation of such guidance could also increase the coherence of different regional approaches.

Access to justice

The well-established framework for access to justice in the case of administrative acts has been widely used by citizens to challenge acts and omissions by the public administration that violate environmental law. The procedures used have included the administrative route through the so-called "administrative appeal" (*ricorso amministrativo*), which takes place within the public administration, or a judicial administrative proceeding before the Regional Administrative Courts (Tribunali Amministrativi Regionali, TARs) at first instance level and before the Council of State (Consiglio di Stato) at appeal/second instance level. Citizens can also appeal administrative decisions to the local Ombudsperson (Difensore Civico).[26]

Unlike in many other OECD countries, environmental associations (but not their local branches) have an autonomous legal standing before the administrative courts if the

association is officially recognised by a ministerial decree and fulfils specific requirements established by law.[27] Case law has increased the possibility for environmental NGOs to challenge public authorities' acts in the name of the protection of "collective interests" (e.g. irrespective of their legal standing or whether they represent local interests). Environmental associations may intervene in criminal proceedings, but only with the consent of (and exercising the same powers of) the case claimant (Milieu, 2009).

The number of judicial proceedings increased during the review period. The acts of the public administration challenged most often include: land-use planning and change, including in protected areas; building and location of general infrastructure and public works; location of waste sites; environmental impact assessments or evaluations; hunting issues and measures adopted in relation to the protection of fauna, flora and protected areas. The distribution of judicial challenges is not uniform: there are more cases in the North (especially Trentino, Veneto and Lombardia) and the Centre (Emilia-Romagna, Toscana, Marche and Lazio) than in the South. This trend is probably linked to higher environmental awareness in these regions, a stronger tradition of good governance, availability of funds, and the location of the headquarters of the principal NGOs (Nespor, 2002; Milieu, 2009).

The main obstacles to the public's access to justice include high costs and lengthy judicial administrative proceedings. In environment-specific cases, lack of standing by local branches of recognised associations limits opportunities for citizens to enter the court system. Costs, including various initial costs and lawyers' fees, can be quite high and can discourage or prevent smaller associations from initiating judicial proceedings.[28] However, many lawyers offer environmental organisations reduced fees for this type of case. The limited period (60 days) granted by the law to file a claim before the Administrative Court often makes it difficult for a local community to prepare its case (Milieu, 2009). Finally, administrative proceedings can take a very long time: a proceeding before the administrative court can easily take ten years or more, although administrative proceedings have a better standard of efficiency than civil and criminal proceedings. Legally the TARs should publish their ruling within seven days of a hearing. However, the judgment is generally published four to five months after the hearing in the case of building and town planning, and a judicial administrative appeal can even take ten years to be concluded.

Environmental education

In Italy, provision of environmental education initiatives and training courses, through both direct and distance learning, has been particularly extensive. Nineteen agreements with regions and autonomous provinces were signed in 2002-05, providing awareness raising activities that targeted schools, self-employed professionals and local administration. These activities were supported by the EUR 11 million National Environmental Information, Training and Education programme (INFEA) adopted by the State-Regions Conference in 2000. Since then, 150 centres across the country have been created to support environmental information, education and training. The Environmental Agency Network's Working Group on Education for Sustainability has promoted a number of initiatives, while ISPRA and regional agencies use their websites to diffuse expertise and know-how on environmental themes. The INFEA was an original example of harmonised policy implementation, which directly involved the state and regions in planning and financing environmental education measures (MATTM, 2009).

Awareness raising activities were reinforced by the United Nations initiative, the Decade of Education for Sustainable Development 2005-14. Related activities are co-ordinated by the UNESCO Italian National Commission, which includes the MATTM, the Ministry of Education, Universities and Research, environmental agency networks, regional education departments and NGOs. The 2007 National Forum for Education for Environment and Sustainability, organised by the MATTM and the Piedmont region, assisted in the development and approval by the State-Regions Conference of a new framework for the INFEA and new financing of EUR 10 million for 2007-09. More recently, the Commission focused on reinforcing collaboration and integration of competences and services among actors belonging to the network, and on increasing the effectiveness and visibility of the various activities proposed and contributing to their continuity in time.

The media has become an important influence on the public, especially young people. For a long time, presentation of environmental topics was limited to information about environmental emergencies such as landslides, floods and waste problems. In recent years, the approach has become more objective and structured. Segments of several television and radio broadcasts are dedicated to in-depth analysis of environmental problems. With the support of the MATTM and involvement of other stakeholders, including the private sector, several television campaigns have been launched, such as Free Beach (Spiaggia Libera) and Change a lightbulb (Cambia la lampadina), with short commercials promoting environmental protection and explain its benefits.

Notes

1. In 2005, the European Commission referred Italy to the Court of Justice in seven cases related to failure of the Italian law to respect requirements in regard to nature conservation, IPPC, water management, emissions trading and industrial accidents.
2. Although the decrees enter into force immediately after publication in the Official Gazette, they lose effect if Parliament fails to convert them into law within 60 days, which occurs very often.
3. The Third Simplification Act (Law 229/2003) called for recasting sectoral codes (*codici di settore*).
4. In 2010-12, the European Commission issued seven warnings concerning inadequate transposition of EU Directives, including those on: water environmental liability; bird protection; classification, labelling and packaging of chemical substances and mixtures; extractive mining waste; and criminal penalties for sea pollution and other environmental offences. In 2011, the Commission warned Italy that further non-compliance with the judgment of the European Court of Justice related to incomplete transposition of the Directive on recovery and recycling of end-of-life vehicles would result in financial penalties.
5. These include: Directorate-General for the Environment, Land and Water; Directorate-General for the Protection of Nature and the Sea; Directorate-General for Sustainable Development, Climate and Energy; Directorate General for Environmental Assessment; and Directorate-General for General Affairs and Personnel.
6. This unit was established in 2002 following an agreement between the then Ministries of Environment and Transport and Shipping. The department is based at the MATTM, where its purpose is to safeguard the coastal marine environment, including addressing significant pollution of marine and coastal waters.
7. In 2002, the then National Agency for Environmental Protection (ANPA) was merged with the national technical services for hydrography, oceanography and geology, creating the Agency for Environmental Protection and Technical Services (APAT). In 2009, the Institute for Environmental Protection and Research (ISPRA) was created by merging the APAT with two other institutions, the National Institute for Wildlife (INFS) and the Central Institute for Scientific and Technological Research Applied to the Sea (ICRAM).
8. The APRA in Sardinia was established in 2006.

9. Examples include the MATTM's co-operation with: the Ministry for Cultural Heritage on environmental impact assessment and landscape protection; the Ministry of Productive Activities on energy and CITES; the Ministry for Infrastructure and Transport on transport and environmental infrastructure; the Ministry for Agriculture and Forestry on organic farming, GMOs, fisheries and forests, and CITES; and the Ministry of the Interior on response to natural disasters.

10. Both conferences are chaired by the Minister for Regional Affairs and include a number of line ministers (finance, interior, public works, environment, health), 14 mayors of metropolitan areas and 6 presidents of provinces, as well as the president of the association of local authorities (Association of Italian Municipalities, ANCI), the president of the Association of the Italian Provinces (UPI) and the president of the Association of Italian Mountain Communities (UNCEM). The activities of the conferences have been supported by the Sustainable Development Board, which prepares the conference decisions.

11. It can be triggered either by the state or by a region before a legal act is adopted, but also once the law has been published and within a deadline of 60 days before a formal challenge is filed with the Constitutional Court. In addition, the procedure can be solicited by sectoral and professional associations.

12. The Network is managed by the Federal Council, which meets once a month. It is chaired by the president of ISPRA and composed of ISPRA general directors and legal representatives of ARPA/APPAs.

13. The Network is supported jointly by the MATTM and the Ministry of Economic Development and is served by the Technical Secretariat of the MATTM. It meets twice a year and operates through working groups, which currently cover implementation aspects and SEA in regard to EU Structural Funds and climate change. The Network promotes "twinning" to address capacity gaps and strengthen co-ordination among agencies through exchanges of regulatory and technical documents, training activities and workshops, and exchanges of visiting staff.

14. The Action Plan served as the central tool defining the main objectives of regulatory quality and simplification, the bodies responsible, actions to be taken, criteria to be used, and the time required to achieve strategic objectives. The measures included: reducing administrative burdens (setting a target of a 32% reduction by 2012); reducing procedural times (setting a 25% time reduction target); introducing e-government tools; a legal "guillotine"; facilitating use of RIA by central administrations; building a national system for regulatory quality indicators; improving co-ordination of better regulation policies between the central and local governments; and consultation with stakeholders.

15. The public administration could only intervene when there was a danger of serious and irreparable damage to the natural and cultural heritage, health, public security or national defence.

16. IPPC permits are based on sector-specific regulations that set emission and effluent limit values using the EU reference documents prescribing Best Available Techniques (BAT) as guidance.

17. The EU industrial safety regulations adopted in 1982. The Seveso Directive takes its name from the town of Seveso, 15 km north of Milan, where an accident in a small chemical manufacturing plant occurred on 10 July 1976. This accident resulted in the highest known exposure to 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) in a residential population, giving rise to numerous scientific studies and the standardisation of industrial safety regulations. Treatment of soil in the affected areas was so complete that its dioxin level is below what would normally be found. The site has been turned into the public Seveso Oak Forest Park. The Seveso Directive was updated in 1999, amended again in 2005, and is currently referred to as the Seveso III Directive.

18. The key databases and registers include: the BRACE on air quality; the SCIA on climate; the SINTAI on water; the INES national register of pollutant releases and transfers; the INES and the IFFI on landslides; the ARCHIMEDE on the quality of coastal and marine waters; the SIAS on soils; the National Noise Observation System, the National Register of Contaminated Sites, the National Waste Inventory System, and a number of inventories on nature protection and biodiversity conservation.

19. The new system requires the administration to outline: the context in which the new regulation is applied; the coherence of the initiative in relation to the government's programme objectives; and the information used. While only the "relevant options" need to be described, the regulation requires an analysis of the "zero option" and the option chosen. Particular emphasis is placed on assessing the likely administrative burdens implied by the chosen option. Information on the consultations carried out, as well as their results, needs to be provided, while lack of consultation needs to be justified. The law required the authorities to forward their AIR reports to Parliament, a relative novelty among OECD countries.

20. The SEA process includes: screening, verification of the fact that a plan or programme falls within the legal framework expected for SEA; scoping, defining the scope of the investigations necessary for the evaluation; assessment of the likely significant environmental effects, expressed through the use of environmental indicators; and monitoring the environmental effects of the plan or programmme, and informing and consulting the public and various stakeholders in decision making (including on the basis of all environmental assessments conducted). The SEA takes the form of "reasoned advice" or an "act of an advisory nature" on the sustainability of plans and programmes. Legislative Decree 128/2010 has thus recognised that the reasoned opinion is binding.
21. Porto Tolle was one of six carbon capture and storage demonstration projects that received a share of EUR 1 billion in funding under the European Commission's European Energy Programme for Recovery fund in 2009.
22. The main bodies include: the National Environmental Council (Consiglio Nazionale Ambientale); the Commission for the Assessment of Environmental Planning, Management and Investment (COVIS); the Commission on Environmental Impact Assessment; the Committee on Eco-labelling and Eco-audit; the Commission on Integrated Environmental Permitting; the National Observatory on Waste; and the CITES Scientific Commission.
23. The provisions subject to a referendum are automatically repealed if a simple majority of votes are in favour of repeal and at least half of all eligible citizens have participated.
24. The referendum also considered provisions on exempting the Prime Minister and the ministers from prosecution.
25. Since 2007 the open, multi-party debate "le Grenelle Environnement" has brought together representatives of the national government and other stakeholders (local governments, labour, professional associations, NGOs) on an equal footing, with the goal of unifying positions on specific environmental themes. Six working groups focus on the themes of climate change and energy, biodiversity and natural resources, health and the environment, democracy, development patterns, and environmental employment and competitiveness. Two groups on genetically modified organisms and waste have also been established. Wide consultations have led to the adoption of 268 commitments, whose implementation has been discussed by 34 operational committees. In 2012, a new government initiative, "la Conférence environnementale", was launched. The consultative process now includes Members of Parliament. The Conference is expected to be organised every year at the national and local levels to make new proposals and assess progress.
26. Unlike in many other countries, where the Ombudsperson has national jurisdiction, the "Difensore Civico" is elected by the municipal council. The Ombudsperson defends the rights and legitimate interests of citizens against actions of the public administration.
27. The association must operate in at least five regions, have democratic internal rules, pursue environmental protection objectives, and exercise continuity of action. Following such provisions, around 80 environmental organisations have been granted full public recognition (four times as many as in the early 2000s).
28. The initial cost is EUR 340, but total costs can vary between EUR 4 000 and 150 000.

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PART I

Chapter 3

Towards green growth

This chapter presents efforts to mainstream environment into Italy's economic policy. It examines the use of tax policy to pursue environmental objectives and progress in removing fiscal incentives that can encourage environmentally harmful activities. Opportunities for "green" tax reform are also assessed. The chapter includes a discussion of public and private investment in environmental protection and resource use, as well as environment-related infrastructure. Investment in "clean energy" and sustainable transport modes are also discussed. In addition, the chapter examines promotion of environmental technologies and eco-innovation along with the growth of an internationally competitive environmental goods and services sector as a source of economic growth and jobs. Finally, the international dimensions of Italy's environmental policy are reviewed, with a focus on mainstreaming the environment into development co-operation programmes, greening export credit systems, and promoting the corporate social responsibility of Italian multinational enterprises.

Assessment and recommendations

Italy's economy grew slowly for much of the 2000s, largely due to low productivity growth. In response to the 2008 economic downturn and deteriorating public finances, Italy implemented a number of measures to consolidate its fiscal position and stimulate economic growth. Some of these measures had an environmental dimension, such as increases in fuel taxes, energy efficiency incentives, and further liberalisation of energy, transport and environmental services. However, other measures could have a negative impact on the environment, such as the extension of the tax rebate on diesel for truck drivers. There is also a risk that positive steps taken to reduce administrative burdens could result in a weakening of environmental requirements. Overall, the environmental dimension of these measures was limited and lacked coherence.

Much remains to be done to mainstream environment into economic policy. The Economic and Finance Document (DEF), which is the core economic policy document endorsed each year by the Parliament, provides some indication of the government's strategic priorities in regard to the environment. However, it currently provides only a limited, short-term and unstable basis for establishing Italy's priorities for green growth. A long-term green growth strategy could provide a more stable policy framework, which is critically needed in order to spur investment in the green economy.

Revenue from environmentally related taxes accounted for 2.6% of GDP and 6.1% of total tax receipts in 2010, higher than the corresponding shares for the OECD as a whole. However, their role declined during the last decade, and the real tax burden on energy decreased. Nevertheless, the tax burden on energy, and the tax rates on petrol and diesel, are among the highest in Europe. From an environmental point of view, there is scope to restructure these taxes to better capture environmental externalities. For example, excise duties vary greatly among fuels and users and do not provide a consistent price for carbon. The excise duty on diesel was still 23% below that on petrol in 2011, a difference that is not environmentally justified. Vehicle taxes do not take full account of CO_2 and other emissions, especially for freight vehicles.

Several partial or total exemptions apply to different uses of fuel, which lower end-use prices and reduce incentives to use energy efficiently. For example, such exemptions apply to fuels used for electricity generation, in agriculture, in industrial facilities, and for road freight transport. Special tax provisions on energy and transport were estimated to result in revenue losses of 0.2% of GDP in 2010. In a welcome move, in 2010 the Ministry of Economy and Finance launched the first comprehensive review of tax expenditure. This provides a good basis for further efforts to identify and reform tax expenditure that is inefficient economically, socially and environmentally.

The high tax-to-GDP ratio limits the possibility of further raising tax revenue in Italy. Nonetheless, expanding and restructuring environmentally related taxes and removing environmentally harmful tax concessions could help fiscal consolidation. It could also help to make the tax system more growth-friendly by reducing taxes on labour and businesses.

The comprehensive fiscal reform proposal presented by the government in April 2012 explicitly includes an environmental component for the first time. To make the best of this opportunity, the environmental component of the reform proposal could be broadened.

Public and private expenditure on waste, wastewater and water resource management has remained virtually stable at around 2.2% of GDP. Investment in the water and waste sectors has been increasingly financed by utilities providing environmental services on a commercial basis. However, the role of utilities remains limited in most southern regions. Revenue from service tariffs is often insufficient to cover the costs of these services and guarantee necessary investments. Overall, the quality of local public services such as water, waste and urban transport varies widely across regions. In several cases, contracts for the provision of these services have been awarded without public tenders, and penalties have not been consistently applied in case of inadequate service quality. Competition and regulatory oversight have also been weak and often characterised by conflicts of interest at local level.

EU funds for regional development have been a major source of finance for public environment-related investment, complementing national allocations, particularly in southern regions. About 15% of available EU funds and national matching funds in the 2007-13 programming period were allocated to renewable energy sources, energy efficiency, and environmental infrastructure. Programmes for allocating EU funds have been increasingly based on sound analysis of investment needs and progress has been monitored by indicators. Italy has also implemented innovative, results-oriented procedures to disburse funds. However, the realisation of planned investments and the achievement of intended outcomes could be improved.

Some environment-related goods and services sectors have shown positive economic and employment trends, including water and waste management, organic farming and renewables. Medium- to high-skilled employment in these sectors has increased, supported by targeted education and training programmes. An increasing number of businesses, including small and medium-sized enterprises, have invested in environmental protection, energy and resource efficiency, and have introduced environmental innovations. Whereas investment in the waste and water sectors was less than EUR 5 billion in 2010, investment in renewable energy was estimated at EUR 21 billion in 2011, a 43% increase on the previous year. Italy is reportedly among the world and European leaders in renewable energy, in terms of investment, turnover and employment. Investment in renewables has been driven by various support programmes, notably feed-in tariffs and green certificates. The White Certificate and other energy efficiency schemes have stimulated the emergence of a dynamic energy services market. Most of these incentives' costs are ultimately financed by electricity consumers. However, most of the turnover and employment in "clean energy" is in the downstream segments; e.g. installation, operation and maintenance of renewable energy equipment.

Despite some progress, Italy's performance in the more upstream segments of the environmental goods and services sector and in eco-innovation is below its potential. In part, this reflects Italy's weak innovation capacity more generally. Environment- and energy-related R&D spending grew in the 2000s. The number of patent applications for renewable energy technologies increased faster than for any other technology. However, R&D spending and patent applications remain low compared to most other large countries. Italy's eco-innovation policy mix is skewed towards the supply side. Strengthening

implementation of environmental legislation and of green public procurement would help increase demand for environmental technologies and related market opportunities. Further efforts should be made to promote co-operation between sectors, different levels of government, and the public and private sectors and academia. Consideration should also be given to how best to support eco-innovation in small and medium-sized enterprises. The multi-stakeholder dialogue on the green economy (Stati Generali della Green Economy), launched in 2012, could positively contribute to developing an eco-innovation policy framework, which is currently lacking.

At the international level, Italy has actively supported implementation of the OECD Guidelines for Multinational Enterprises, and the OECD Recommendation on Common Approaches on Environment and Officially Supported Export Credits, in some cases going beyond their requirements. Since 2007, Italy has assigned a higher priority to environmental issues in the context of its Official Development Assistance (ODA) programme. The average share of environment-focused aid was 41% of total sector allocable aid in 2009, which is high compared to many other members of the OECD Development Assistance Committee (DAC). Issues and partner countries have been prioritised. An inter-ministerial group was established to promote policy coherence for development. In 2011, guidelines for integrating environment into development co-operation were issued belatedly. However, the recent progress in integrating environment into development co-operation should be seen in the context of weak overall ODA performance: in 2011, ODA reached 0.19% of gross national income. This is well below the OECD-DAC average of 0.31% and the 2010 EU target of 0.51%, as well as far from the international commitment of 0.7% by 2015.

Recommendations

- Mandate the Inter-Ministerial Committee for Economic Planning (CIPE) to prepare a green growth strategy that provides a clear, coherent and sufficiently long-term policy framework, amongst other things, to spur investment in the green economy; monitor and report on implementation of this strategy in conjunction with the annual Economic and Finance Document.
- Implement a comprehensive environmental fiscal reform as part of the proposed reform of the tax system that: i) removes special tax provisions that are environmentally harmful and economically inefficient; ii) restructures energy and vehicle taxes so that they better reflect environmental externalities including greenhouse gas emissions; and iii) considers reforming existing, or introducing new, environmental taxes on resource use and pollution (e.g. on water abstraction, wastewater discharges, pesticides, fertilisers and packaging materials).
- Continue to regularly survey tax expenditure; introduce a mechanism to systematically screen existing and proposed direct and indirect subsidies against their potential environmental impact.
- Further promote efficiency in the provision of environment-related local public services, including waste, water and local transport services, by: ensuring a stable regulatory framework, including for the financing of these services; applying user charges that allow sustainable cost recovery; enforcing competition rules (e.g. for public tendering procedures); and ensuring systematic monitoring by independent regulatory authorities of utilities' efficiency and service quality.

Recommendations *(cont.)*

- Improve the effectiveness of regional development funds for environment-related investment by tying their disbursement to the fulfillment of preliminary conditions (e.g. sound sectoral plans and regulatory frameworks, sufficient matching finance), and to the achievement of measurable quality targets for the provision of environmental services.
- Develop and implement a comprehensive framework for promoting eco-innovation that includes a balanced mix of increased public support for R&D and demand-side measures (e.g. innovation-oriented standards and economic incentives); improve co-ordination of industrial, innovation and eco-innovation policies across the government, between the central government and the regions, and between academic institutions and business sectors.
- Further strengthen environmental education and training with a view to ensuring the supply of suitably trained workers for the green economy, and facilitating the transition of workers from contracting conventional sectors to expanding "green" sectors.
- Further strengthen the environmental component of ODA in line with Italy's comparative advantages, while increasing the overall ODA budget in line with EU and international obligations.

1. Economic policy and the environment

The Italian economy was characterised by sluggish economic growth during much of the 2000s (Chapter 1; Reference I.A). This can largely be explained by low productivity growth. According to recent OECD Economic Surveys of Italy, several factors have contributed to low growth in productivity. These include: regulatory barriers to entrepreneurship and competition; low educational attainment and inadequacies in tertiary education; weak R&D and innovation performance; inefficient public administration; and a tax system skewed towards labour income. While several structural reforms have been undertaken, implementation has generally been slow and has not delivered the hoped-for results. Consequently, Italy's GDP per capita stagnated in the past decade and the gap relative to the highest income OECD economies widened (OECD, 2009a; OECD, 2011a; see also Chapter 1; Reference I.A). Long-standing income disparities across the regions also persisted.

Since the 2008-09 global economic and financial crisis, the Italian economy has experienced serious difficulties. Following a deep contraction (1.3% in 2008 and 5.2% in 2009) and slight recovery in 2010-11, GDP declined after mid-2011. It is projected to decline further until late 2013 (OECD, 2012a). The recession has had severe impacts on virtually all parts of the economy. In particular, unemployment has continued to rise, especially among the young.

Since Italy has one of the highest public debts in the OECD (126.5% of GDP in 2010), the government has had little scope for manoeuvre. It has prioritised fiscal consolidation over the use of fiscal policy to stimulate economic recovery. The first anti-crisis measures, launched in 2009, were small in scale and fiscally neutral, i.e. with spending increases and tax cuts in some areas compensated by spending cuts and tax rises elsewhere (OECD, 2009a). A few measures could be considered to be environment-related, such as acceleration of planned environmental infrastructure and railway projects, tax incentives for energy efficiency investment in industry, buildings and appliances, and incentives to buy cleaner vehicles (Chapter 5).

In late 2011, in response to the persistence of the economic recession and the worsening of Italy's position on financial markets, the government approved a significant supplementary budget package for the period 2012-14, the so-called "Salva Italia" (Save Italy) Decree. This decree mainly included urgent measures for fiscal consolidation.[1] It introduced or reformed a number of tax measures, with a view to shifting the tax burden from labour and businesses to consumption and property. Some of these tax measures were environment-related (Box 3.1). However, the decree has a potentially high regressive impact (Arachi et al., 2012) in the short term, and the opportunity to launch a comprehensive tax reform including a green tax component was not taken. This was principally due to the emergency situation facing the government and the need to act swiftly to restore confidence among financial investors. A proposal for a comprehensive tax reform, including a green component, was presented in April 2012. At the time of the finalisation of this report, it was under parliamentary discussion (Section 2).

The supplementary budget was accompanied by a package of structural reforms concerning regulation, competition, the labour market, pensions and public spending. If implementation is thorough and timely, these reforms could help restore the potential for economic growth and consolidate public finances (OECD, 2013, forthcoming). In particular, the government approved: the "Cresci Italia" (Grow Italy) Decree, which included liberalisation measures; the "Semplifica Italia" (Simplify Italy) Decree, which promoted administrative simplification; and the "Sviluppo" (Development) Decree, which included a wide array of initiatives to promote business activities, infrastructure investment and employment creation. Some measures included in these initiatives have an environmental component, as briefly described in Box 3.1. However, the environmental dimension of these packages has been rather limited and has lacked coherence. Some measures, such as those facilitating hydrocarbon extraction and exploration activities, can potentially have negative impacts on the environment unless they are accompanied by sufficient environmental safeguards. Other measures run counter to environmental objectives, such as the extension of the rebate on diesel excise duties paid by truck drivers (Section 2). There is also a risk that the very welcome reduction of red tape could result in laxer implementation of environmental regulations.

For much of the last decade, environment has not been mainstreamed effectively into economic policy. Italy still lacks a medium- or long-term framework for sustainable development and green growth. As indicated in Chapter 2, the 2002 Environmental Strategy for Sustainable Development is outdated and has not been followed up. The National Reform Programme (NRP), prepared in the framework of the Europe 2020 Strategy, is the only document providing some indications of the government's strategic priorities in regard to the environment (and to other pillars of the Strategy).[2] As part of the NRP, Italy has reported on actions taken and planned to reach the 2020 climate and energy targets (Chapter 5). Since 2011, the NRP has been part of the annually approved Economic and Finance Document (DEF), which is the government's core economic policy document and sets the agenda for the following three years. The DEF also includes an annex on progress towards meeting the country's international greenhouse gas (GHG) emission reduction commitments. This is a welcome change, as it raises the profile of the NRP, including of its environment- and climate-related part.[3]

The 2012 DEF broadens the focus from meeting the 2020 EU climate and energy goals to greening the economy. It sets five broad priorities for 2012: energy efficiency, renewables and green technologies (switching to a low-carbon economy); integrated water cycle

Box 3.1. **Environmental components of the 2011-12 fiscal consolidation and growth packages**

The "Salva Italia" Decree, aimed at fiscal consolidation, included a number of fiscal measures that could be considered environment-related, such as:

- Extension to 2012 of the 55% tax deduction for energy efficiency renovations of buildings (Chapter 5). This measure is expected to improve energy efficiency, support economic growth, and reduce widespread tax evasion in the building, construction and renovation sector.
- An increase in the excise duty on transport fuels of between EUR 0.12 and 0.15 per litre (Section 2).
- Introduction of an additional tax on ownership of high-powered vehicles and privately owned boats and aircraft (Section 2), and reduction of the amount of company car costs that can be deducted from corporate income tax.
- Reintroduction of a tax on municipal waste services to replace the existing charge (Section 3).
- Assignment of oversight and tariff regulation responsibilities in the water sector to the Regulatory Authority for Electricity and Gas (Autorità per l'energia elettrica e il gas, AEEG).
- Earmarking of a share (to be determined) of revenue generated by auctioning CO_2 emission allowances for the reduction of public debt.
- Measures to simplify environment-related administrative procedures for businesses, reclamation of contaminated sites, and waste disposal.

The purpose of the "Cresci Italia" Decree was to increase competition in a number of economic sectors with a view to creating better investment conditions, reducing prices for consumers and businesses, and promoting economic growth. A number of measures were intended to further open up the energy and transport markets. These include further unbundling of the natural gas network from the incumbent gas operator, acceleration of investment in the electricity grid, establishment of a regulatory authority for transport services, and simplification of procedures for the distribution of natural gas for automotive use.

The "Semplifica Italia" Decree simplified a number of administrative procedures, including those for compliance with some environmental regulations. It introduced a single environmental license for small and medium-sized enterprises (SMEs), which previously had to obtain sector-specific permits (e.g. for waste, emissions) from different administrative bodies. According to government estimates, the previous licensing system cost SMEs over EUR 1.3 billion per year. The decree eliminated some duplication in the compliance certifications of domestic heating systems and in periodic checks of vehicles' exhaust emissions. It also foresaw preparation of a plan for the modernisation of school buildings, including improving their energy efficiency.

The "Sviluppo" Decree, approved in mid-2012, was a package of urgent measures for economic growth. It included some measures to support sectors of the green economy:

- Use of the revolving Kyoto Fund (Chapter 5) to provide low-interest loans to public agencies and businesses that employ young people for activities involving: prevention of hydrogeological risk; R&D and production of second- and third-generation biofuels; R&D, production and installation of renewables technologies; and improvement of energy efficiency in the residential and service sectors, including social housing.
- Further extension of the 55% tax break for energy efficiency renovation of buildings to mid-2013 (Chapter 5).
- Changes in some procedures concerning the production and commercialisation of biofuels, in order to increase the competitiveness of domestic biofuel production.
- Promotion of greater competitiveness and efficiency in local public services, including environment-related services (Section 3).
- Promotion of low-emission vehicles, including electric and hybrid vehicles, and adoption of a national plan for electric vehicle infrastructure.

management; prevention of hydrogeological risk; recovery and re-use of decommissioned industrial sites; and protection and enhancement of natural areas as tourist destinations. It also renews the commitment to adopt a national energy strategy (Chapter 5). Despite these positive steps, the DEF provides a limited, short-term and uncertain basis for establishing Italy's priorities for green growth, as these priorities can be changed every year. Italy would benefit from the adoption of a fully fledged green growth strategy covering a longer period (e.g. ten years). This would provide a more stable policy framework, which is critically needed in order to spur investment in the green economy. The DEF could then serve as a useful tool for monitoring and following up on implementation of such a strategy.

2. Greening the tax system

The ratio of tax revenue to GDP in Italy remained high in the 2000s. It was 43% in 2010, well above the OECD average (33.7%). Compared to that of many other countries, the Italian tax mix is skewed towards labour, notably because of higher than average taxation of individual income and social security contributions. Local governments collect a fairly high share of revenue (14.5%, the fifth highest level in the EU) as a consequence of the decentralisation process that started in the late 1990s. However, local governments are still far from having effective fiscal autonomy, as they do not have full decision-making powers in regard to most local taxes (DPS, 2012).

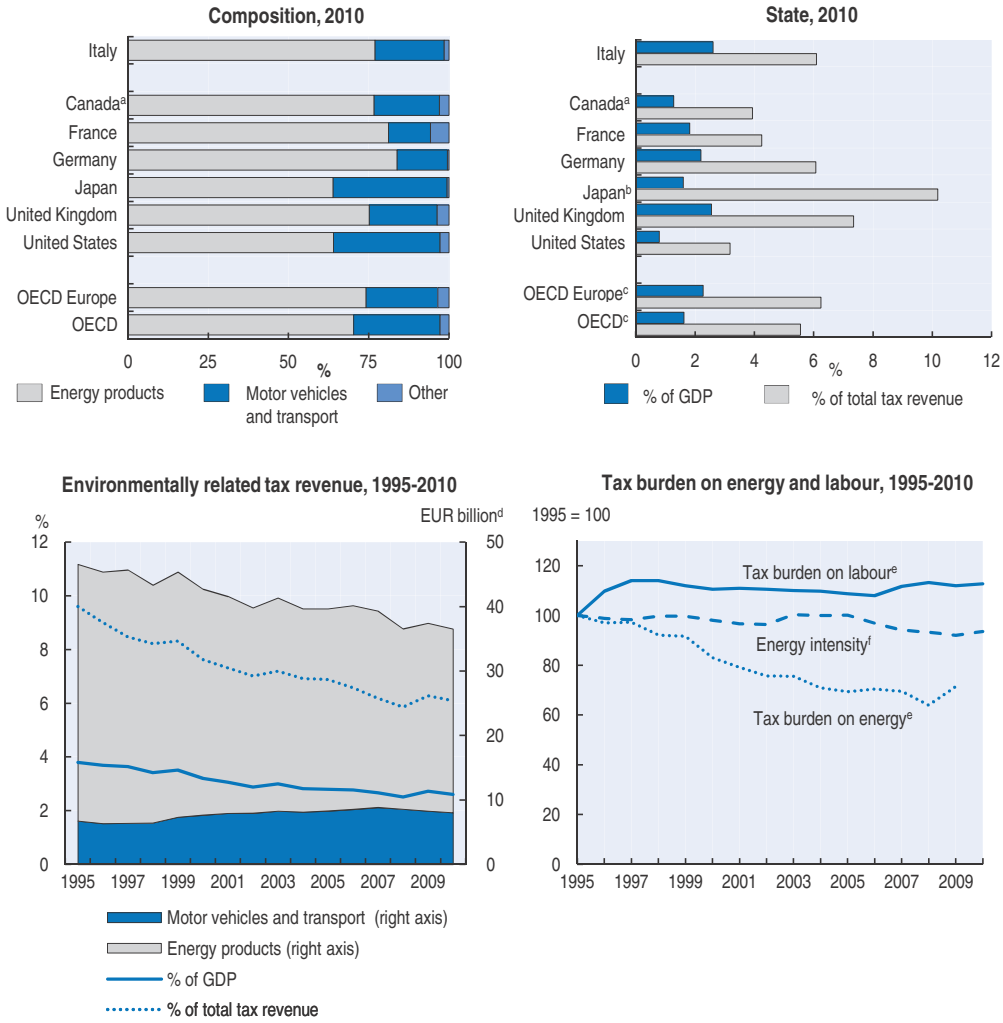
As in all other OECD countries, environmentally related taxes largely coincide with taxes on energy products and vehicles. Italy also levies taxes on air pollution (SO_2 and NO_x emissions) and landfilling of waste, partly at the local level. However, pollution taxes account for a minor share of revenue from environmentally related taxes (about 1.4% in 2010).[4] Resource taxes and charges, such as those on water abstraction and extraction of materials, are in place at regional and local levels. Environmentally related taxes have traditionally been used for revenue raising in Italy and have accounted for a relatively large share of tax receipts. A negligible share of their revenue has been earmarked for environmental purposes. Revenue from environmentally related taxes accounted for 2.6% of GDP and 6.1% of total tax receipts in 2010, higher than the corresponding shares in the OECD as a whole. However, their role has decreased since 2000: revenue from these taxes has stabilised at a level below that of the late 1990s, both in absolute terms and as a share of GDP and total tax receipts (Figure 3.1). This revenue (in real terms) declined by more than 16% between 2000 and 2010. Half of the decrease occurred in the last three years of the 2000s and was largely due to the recession's negative impact on both energy consumption and vehicle sales.

Taxes on energy products

Taxes on energy products contributed nearly 77% of the revenue from environmentally related taxes in 2010, well above the OECD average (Figure 3.1). There are duties on all fuels used for both stationary purposes (such as heating and industrial processes) and transport. Revenue from taxes on transport fuels predominate, although Italy is one of the few European countries that collect more than 0.5% of GDP from taxation of energy products used for stationary purposes. Excise rates on energy products exceed the minimum levels required under EU legislation, with the sole exception of natural gas used as transport fuel.

While nominal tax rates on the main transport fuels (petrol and diesel) were increased repeatedly in the 2000s for revenue raising purposes, they have not kept pace with

Figure 3.1. **Environmentally related taxes**



a) 2009 data.
b) Total tax revenue excludes revenue from social security contributions.
c) Weighted average.
d) At constant 2005 prices.
e) Tax burden on labour: ratio between the revenue from taxes on labour income and social contributions and overall compensation of employees; tax burden on energy: ratio between the revenue from energy taxes and final energy consumption.
f) Total primary energy supply per unit of GDP.
Source: Eurostat (2012); OECD/EEA (2012), *OECD/EEA database on instruments for environmental policy and natural resources management;* OECD (2011), *OECD Economic Outlook No. 90.*

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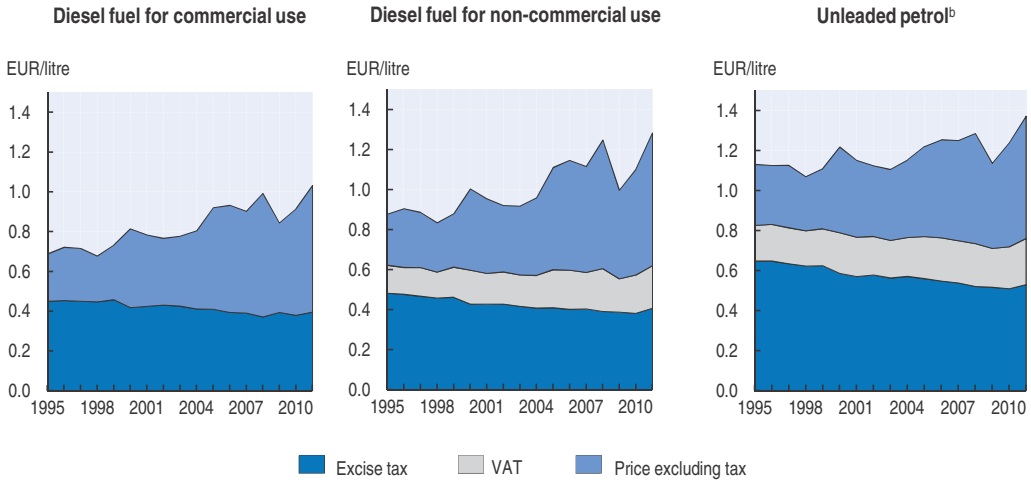
inflation. As a result, real tax rates on transport fuels have declined in the last decade (Figure 3.2). Together with the rise in world oil market prices, this has led to a decline in the share of taxes in fuel prices. In 2011, excise duties accounted for 39% of petrol prices and 32% of diesel prices. Yet tax rates on petrol and diesel, as well as fuel prices, are among the highest in Europe (Reference I.A).

Energy tax revenue fell by nearly 20% in the last decade. The contraction in energy use following the economic crisis explains most of the decline in the late 2000s. However, revenue also decreased between 2000 and 2007 when the economy was growing, although

Figure 3.2. **Road fuel prices and taxes**[a]

1995-2011



a) At constant 2005 prices.
b) Unleaded premium (95 RON).
Source: OECD-IEA (2012), *Energy Prices and Taxes.*

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this growth was moderate, and energy consumption (especially for road transport) was increasing (Figures 3.1 and 5.5). Two main factors underlie the decline in revenue during this period: the aforementioned fall of real tax rates and, to a lesser extent, the switch from oil to gas, which is taxed at lower rates.

Hence, unlike the average trend observed in Europe, the real tax burden on energy (as measured by the deflated implicit tax rate on energy)[5] decreased steadily in Italy during the last 15 years although from a very high level. While the tax burden on energy was declining, the energy intensity of the economy (as measured by energy supply per unit of GDP) remained nearly constant in the first half of the 2000s and has decreased since 2005. This indicates that energy taxation has not played a fundamental role in encouraging or discouraging energy conservation, while other factors have had a more important role in determining energy trends, as discussed in Chapter 5. Nonetheless, Italy still has the fourth highest tax burden on energy among the EU27 countries (Eurostat, 2012). Increases in revenue and in the tax burden are expected from the considerable hikes in transport fuel tax rates introduced as part of the 2011 fiscal consolidation package (Box 3.1). Hence, the possibility of raising energy tax rates further in the near future may be limited by social acceptability concerns.

Despite being high, however, current fuel taxation does not fully address environmental externalities, including those related to climate change and air pollution. In particular, it does not provide a consistent carbon price signal. When converted in terms of the carbon content of fuels, excise duties vary greatly among fuels and users (OECD, 2012b). Despite recent increases, the excise duty on diesel was still 23% below that on petrol in 2011, a difference that is not environmentally justified since diesel has a higher carbon content and emits more local pollutants than petrol. As in all other countries, the excise duties on petrol and diesel imply carbon prices that are significantly above those on fuels used in other sectors of the economy, and well above any CO_2 allowance price that has emerged in the EU Emissions Trading System (ETS). Nonetheless, if excise duties on

transport fuels are assumed to cover other externalities too, such as air pollution, as well as costs that are not environment-related, their implied carbon component becomes more reasonable (Chapter 5). Therefore, even if there were political obstacles to increasing taxes on energy products, there seems to be scope for restructuring tax rates to better reflect the value of the environmental effects of fuel use.

Tax concessions

Several partial or total exemptions apply to fuel consumption, including fuels used for electricity generation, for powering boats, in agriculture, in industrial facilities, and for road freight transport (Table 3.1). In addition, industrial and business users of fuels generally benefit from lower rates than those applied in the residential sector in order to protect Italian competitiveness. However, these lower rates favour all businesses, not just those exposed to international competition (Andersen et al., 2011). The excise duty on electricity and natural gas for households is reduced for consumption below a certain threshold. A lower value added tax (VAT) rate applies, among others, to household consumption of natural gas and electricity. Other price rebates apply, including for low-income households and for transport fuels used by residents in areas where hydrocarbon extraction activities are located. Concerning support to fossil fuel production, a royalty relief applies to production of oil and gas below a certain threshold (OECD, 2011b).

These exemptions, price discounts and reduced VAT rates lower end-use prices and can reduce incentives to use energy efficiently. According to government estimates, special tax provisions on energy and transport cost the public budget about EUR 3.7 billion in lost revenue in 2010, the equivalent of 12% of energy tax revenue and 0.2% of GDP (Table 3.1). In a welcome move, in 2010 the Ministry of Economy and Finance launched the first comprehensive review of tax expenditure. Italy could build on this exercise and establish a process for the systematic review of tax expenditure. This would improve the transparency of the tax system and be the basis for subsequent reforms or the removal of special tax treatment that is not justified on economic, social and environmental grounds. The 2012 tax reform proposal (see below) paves the way for such a revision.

Vehicle taxation

Vehicle taxes are the other major source of environmentally related tax revenue (Figure 3.1). They are also an important source of revenue for local authorities, as they are collected by regions and provinces. However, while Italy has one of the highest motorisation rates in the OECD, its level of taxation for motor vehicles is relatively modest. The combined effect of the various taxes is about EUR 300 per vehicle per year, half the EU average (Andersen et al., 2011).

Taxes on both registration and ownership of vehicles are in place. The provincial vehicle registration tax is reduced for cars with CO_2 emissions below 120 g/km and for electric, hybrid and natural gas fuelled vehicles. The annual regional road tax (*bollo auto*) for cars and motorbikes has been differentiated by engine power and pollutant emission standards since 2007. This has contributed to encouraging purchases of lower emission cars (Table 5.7). The "Salva Italia" Decree extended and raised the surcharge on the annual road tax (*superbollo*) for high-powered vehicles.[6] However, the annual road tax does not take CO_2 emission levels into account. In addition, taxes applied to freight vehicles are not based on any environmental parameter.

Table 3.1. **Energy and transport tax expenditure**

Tax expenditure measure	Revenue loss (EUR million)
Transport	
Fuel tax exemption for commercial aviation	1 613.6
Fuel tax exemption for shipping and fisheries	575.6
Tax relief for rail transport (70% tax reduction on fuel for rail transport)	1.8
Tax relief for public passenger transport, excluding rail transport and including boat transfer in areas where road transport is not available (60% reduction)	14.2
Tax relief for road freight transport businesses: partial tax rebate and exemption from periodic increases in the excise duty	306.0
Total	2 511.2
Stationary uses	
Energy tax breaks for agriculture, horticulture, aquaculture and forestry (78% excise tax reduction on liquefied petroleum gas (LPG) and 51% reduction on petrol)	866.7
Tax relief for fuel used for power generation in manufacturing, agriculture, research on hydrocarbons, and building sites (70% tax reduction, with the exception of natural gas)	10.3
Tax relief for fossil fuels used in power generation	4.2
Tax relief for LPG used in industrial facilities and by buses for public transport (90% tax reduction)	6.3
Tax relief for large industrial users of natural gas (60% reduction of gas excise duties for industrial users consuming a minimum of 1.2 million m^3 per year)	63.0
Tax relief for users of gas oil and LPG in disadvantaged areas (e.g. mountainous areas and areas either not reached or partially reached by the gas network)	231.0
Total	1 181.5
Special provisions	
Fuel tax exemption on fuels used in flooded areas	0.5
Tax relief for ambulances (60% fuel tax reduction)	2.0
Tax relief for the national army	50.0
Tax exemption for NATO countries' national armies	. .
Tax exemption for diplomatic bodies and international organisations	. .
Total	52.5
Total	**3 745.2**

Source: Ministry of Economy and Finance.

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Italy has already reached the EU target of an average CO_2 emission level of 130 g CO_2/km by 2015 for newly registered cars (Chapter 5). Nonetheless, it could consider revising vehicle taxation to take account of CO_2 emissions, in addition to exhaust emissions, as a way to achieve the more ambitious 2020 target of 95g CO_2/km. While vehicle taxes are theoretically less efficient than fuel taxes and road charges in reducing emissions of greenhouse gases and air pollutants (OECD, 2009b), experience in many countries shows that these taxes are effective in changing the composition of the car fleet towards low-emission cars. This could contribute to further reducing emissions from transport, which may increase as the economy recovers.

Towards a green tax reform?

The high tax-to-GDP ratio limits the possibility of further raising tax revenue in Italy. Together with the high level of public expenditure (Box 1.1), this indicates that the country needs to reduce public spending and restructure its tax system to come to grips with two urgent and potentially conflicting objectives: fiscal consolidation and the promotion of economic growth.[7] The 2011 OECD Economic Survey of Italy recommended moving away from labour taxation towards less distortive taxes, such as those on consumption and property (OECD, 2011a). In this context, Italy should consider broadening the use of indirect

taxes on the consumption of goods and services that are potentially harmful to the environment, as well as phasing out inefficient and environmentally harmful tax expenditure. These measures would generate revenue that could help the government with fiscal consolidation and/or be used to partly reduce taxes on households and businesses. This would make the tax system more growth-friendly.[8] The regressive distributional impacts (e.g. on low-income households) could be addressed through targeted social benefit schemes, or through reducing income taxation for the population groups most affected. Experience in several OECD countries that included environmentally related taxes in their tax reforms in the 1990s and early 2000s shows broadly positive results (Andersen et al., 2011).

An attempt along these lines was made in the late 1990s, when a carbon tax reform was launched. By 2005, the tax rates on various energy products were set to increase to take account of the carbon content of fuels.[9] The expected additional revenue was to be used to offset labour taxes (Barde, 2004). However, implementation of this reform was first frozen and then was abandoned in 2000 out of concern for negative impacts on the economy (OECD, 2003). Contrary to the principle of a green tax reform, the tax burden on energy declined in the 2000s while that on labour (as measured by the implicit tax rate on labour)[10] decreased slightly in the first half of the 2000s but has grown markedly since 2006 (Figure 3.1).

Some estimates indicate that there is considerable potential for reviving an environmental fiscal reform in Italy. According to these estimates, environmentally related tax revenue could be raised to about 10%-11% of total tax revenue by 2015, from 6% in 2010 (Andersen et al., 2011). Cingano and Faiella (2011) estimated that a carbon tax of between EUR 17 and EUR 100 per tonne of CO_2 on transport fuels would reduce emissions from road transport by up to 5% and generate additional tax revenue of up to EUR 10 billion in 2020 (Chapter 5). Ideally, the carbon tax should match the expected price prevailing in the EU ETS to ensure an even carbon price across the economy.

There is also scope to restructure current taxes on the basis of energy performance or other environmental parameters. For example, local property taxes could be linked to the energy efficiency grade of houses or to the installation of equipment powered by renewable energy sources. Consideration should be given to reviewing the rates of existing environmentally related taxes, so that they better reflect the value of resources and environmental degradation, as well as to introducing taxes other than those on energy products. As indicated by Andersen et al. (2011), these measures could address: water abstracted by utilities and users in all sectors, which would support demand management and help reduce water losses; wastewater discharges in water bodies, depending on the pollution load; agricultural inputs such as pesticides and fertilisers; and packaging materials, depending on the environmental impact of different materials (in addition to the current fee for covering recycling costs – see Section 3). Any new environmentally related tax should be introduced in clearly defined stages and gradually raised in line with energy and resource efficiency gains. This would allow shrinking of the tax base and rebound effects to be prevented, and would let the economy adapt to changes in relative prices.[11]

Steps in this direction were taken with the 2011 "Salva Italia" fiscal consolidation package, which raised energy and vehicle tax rates (Box 3.1). The comprehensive fiscal reform proposal (presented in April 2012 and under parliamentary discussion at the time

of finalisation of this report) explicitly includes an environmental component for the first time. The proposal foresees partial restructuring of energy taxation based on the carbon content of fuels, as indicated in the proposed EU Energy Taxation Directive. Introduction of the carbon tax would be co-ordinated with the EU ETS: the sectors participating in the system would be exempt from the carbon tax component of the energy tax to avoid double carbon pricing. Revenue from the carbon tax would be earmarked to support renewable energy sources, other low-carbon technologies and environmental protection measures. These provisions would implement the draft 2012 plan to achieve the 2020 climate and energy targets (Chapter 5). However, implementation of such tax measures is conditional on harmonisation of energy and carbon taxation within the EU. The proposed reform mentions the possibility of introducing new forms of environmentally related taxes and incentives, but it focusses on the carbon tax. Overall, the environmental component of the reform proposal could be broadened.

3. Environment-related expenditure and investment

3.1. Expenditure on environmental protection and resource use

Government expenditure on environmental protection

Government expenditure on environmental protection declined (in real terms) at both the central and local levels during the last decade, by 8% and 2%, respectively.[12] In most environmental sectors this decrease occurred in the late 2000s as a result of the government's general fiscal consolidation effort. Only expenditure on waste management grew in the second half of the 2000s (Figure 3.3), reflecting the priority given by the government to responding to recurrent waste management and disposal emergencies in some regions.

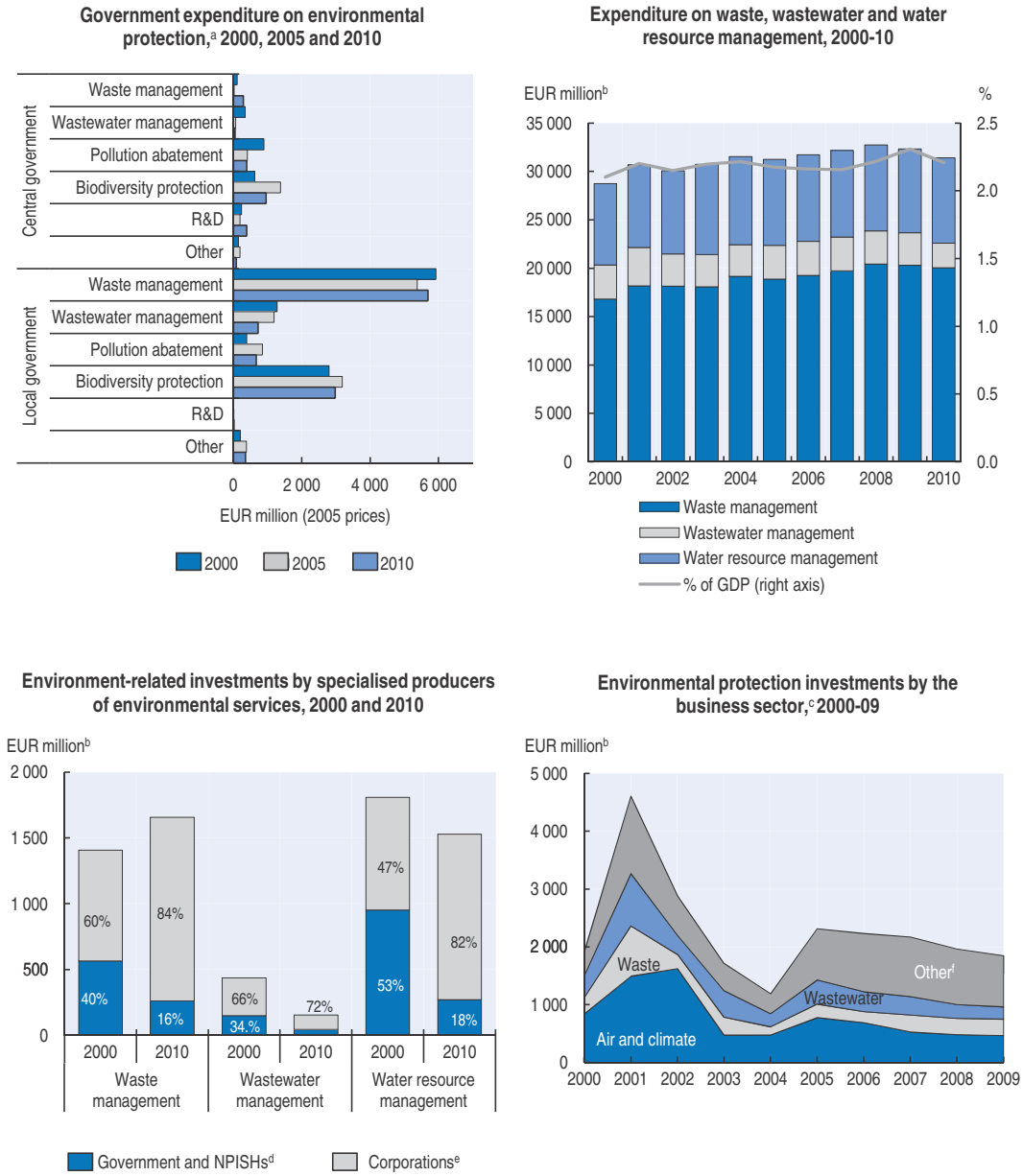
As in most other OECD countries, subnational governments account for the vast majority of government environmental expenditure (87% in 2010). Only in the area of environment-related R&D does the central government play a dominant role, although outlays remain modest. The composition of local government expenditure has remained virtually unchanged since 2000. Waste management accounts for more than half of local government expenditure, followed by biodiversity conservation. Biodiversity conservation and pollution abatement have remained the dominant expenditure items at the central level (Figure 3.3).

National expenditure on waste, wastewater and water resource management

Public and private expenditure on waste, wastewater and water resource management (mainly water supply) increased by about 9% in real terms between 2000 and 2010, but its share of GDP remained stable at around 2.2% (Figure 3.3). Waste management absorbed the largest share of expenditure (64% in 2010), followed by water resource management (28%) and wastewater management (8%).

Growth in expenditure was mainly due to an increase in current expenditure, which represented the vast majority of total expenditure. As in most other developed countries, this reflects a rise in spending on operation and maintenance of infrastructure built in the past decades. Investment made by providers of environmental services in waste, wastewater and water resource management was about EUR 3.7 billion in 2010, equivalent to 11% of expenditure in these areas.[13]

Figure 3.3. **Expenditure on environmental protection and resource use**



a) According to the COFOG classification.
b) At constant 2005 prices.
c) Excluding specialised producers of environmental services.
d) General government and non-profit institutions serving households.
e) Corporations that provide environmental protection services as pricipal activity (utilities).
f) Includes soil and groundwater, biodiversity and landscape, and other environmental protection activities.
Source: Eurostat (2012), *Environmental Accounts Database*; ISTAT (2012); *OECD (2011), OECD Economic Outlook No. 90.*

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Investment trends differ across environmental sectors. Investment in waste management rose during the decade in order to catch up with delays in the development of waste treatment facilities. Investment in the water sector declined, especially that for wastewater infrastructure, mainly due to decreased investment by public entities specialised in the provision of environmental services (i.e. local government units and

non-profit institutions) (Figure 3.3). However, the fall in investment occurred at a time when increased investment was needed to meet EU requirements and to cope with the deterioration and ageing of water supply and wastewater infrastructure (Chapter 4).

While investment by public entities decreased (in real terms) in both the water and waste sectors between 2000 and 2010, investment by corporations specialised in the provision of environmental services (utilities) grew except in the case of wastewater management. Water and waste utilities, which are mostly mixed capital companies, accounted for more than 80% of investment in waste management, water resource management and wastewater management as a whole in 2010, up from nearly 55% in 2000 (Figure 3.3). Government transfers to both types of specialised producers decreased during the 2000s. They covered 28% of expenditure by public entities and corporations in 2010, compared with 46% in 2000. This indicates a growing role for utilities in providing and financing environmental services (see also Section 4), as well as a more market-oriented and less subsidy-dependent provision of these services.

However, the role of utilities remains limited in most of the southern regions. For instance, in 2009 local governments financed half the investment in waste management in the South (Mezzogiorno), compared to 4% in the North (DPS, 2012). The quality of the services provided also varies widely across the country. In a number of cases, contracts for the provision of waste and water services have been awarded without public tenders, and penalties have not been consistently applied where service quality was inadequate. Competition and regulatory oversight has also been weak. It has often been characterised by conflicts of interest at local level, as the local regulators are often also utility shareholders (Cunha Marques, 2010; Bripi et al., 2011). The transfer of regulatory responsibilities in the water sector to the Regulatory Authority for Electricity and Gas (AEEG) in 2011 was therefore a welcome step forward (Chapter 4). The 2012 "Sviluppo" Decree (Box 3.1) introduced measures to promote competitiveness and efficiency in local public services, including incentives for providers' mergers and for greater and more transparent use of tendering procedures.

As discussed in Chapter 4, revenue from tariffs on water supply and wastewater services remains insufficient to cover the costs of these services and guarantee necessary investment. The same is true in the waste sector. The switch from the local waste tax to the waste tariff, which was expected to allow for full cost recovery and promote waste reduction, has been slow: in 2011, after more than ten years of implementation, only about one-third of Italy's population lived in municipalities that had switched to the waste tariff (ISPRA, 2012). The composition of the waste tariff varies across municipalities, and only a few of them apply the pay-as-you-throw approach. In 2009, revenue from waste charges (in the form of taxes or tariffs) covered about 92% of the operating costs of municipal waste services, implying that investment costs need to be covered by other financial resources. To ensure uniform recovery of service costs, including investment costs, the "Salva Italia" Decree reintroduced a tax on municipal waste services as from 2013 (Box 3.1).[14] Better performance has been achieved in covering the costs of recycling packaging waste (OECD, 2011a). The producer responsibility approach applies to this waste: producers and importers of packaged goods are required to pay a fee per weight of packaging materials to the National Packaging Consortium (CONAI) (Box 3.2). In turn, CONAI finances the recycling operations and the fee is passed on to consumers.

Box 3.2. **National Packaging Consortium for collection, recovery and recycling of packaging waste**

The National Packaging Consortium (Consorzio Nazionale Imballaggi, CONAI) was created in 1997 to facilitate the recovery and recycling of packaging placed on the Italian market in order to meet the requirements of the EU Directive on packaging and packaging waste (94/62/EC).

This not-for-profit private consortium, the largest that manages packaging waste in Europe, brings together 1.4 million producers, sellers and users. To guarantee the recovery of packaging from public collection, in 1999 CONAI signed a framework agreement with the national association of Italian municipalities (Associazione Nazionale Comuni Italiani, ANCI) setting out conditions for the take-back of packaging waste collected by the municipalities. The agreement was renewed in 2004 to meet the requirements of EU Directive 2004/12/EC, which amended the 1994 Directive on packaging and packaging waste. In 2009, the agreement was extended again for a five-year period. The CONAI-ANCI agreement regulates the operations of six consortia responsible for various packaging materials: steel (CAN), aluminium (CiAl), paper (Comieco), wood (Rilegno), plastic (Corepla) and glass (CoReVe). To date, 6 800 municipalities (representing 95% of Italy's population) have signed contracts with individual consortia for the take-back of used packaging.

The CONAI system is financed by an environmental fee (the "contributo ambientale") collected when finished packaging is transferred from the producer (or importer into Italy) to the first user. CONAI transfers these contributions to the consortia, which compensate the municipalities for costs related to the take-back of packaging waste from separate waste collection. The amount of the environmental fee, calculated according to weight and type of packaging material, ranges from EUR 8 per tonne of wood to EUR 110 per tonne of plastic packaging.

CONAI established a network of 450 packaging waste centres for the take-back of secondary and tertiary packaging from industrial and commercial activities not covered by public services. These centres process packaging material with no additional costs to companies except for transport. Since 2000, the quantity of packaging waste collected through separate collection managed by the consortium system has more than tripled. In 2010, total recovery of used packaging reached 74.9%, corresponding to 8.5 million tonnes of used packaging. Around 64% is recycled, of which half is assured by CONAI. According to a recent study, collection, recycling and reuse of recovered materials between 1997 and 2010 yielded EUR 11 billion in direct and indirect economic and environmental benefits for Italy and helped to avoid 63 million tonnes of CO_2 emissions.

Source: Althesys, 2011; CONAI, 2012.

Businesses investment in environmental protection

Investment in pollution abatement and control activities by businesses (to remediate or minimise their own environmental impacts) amounted to about EUR 2 billion in 2009 and fluctuated considerably during the 2000s.[15] To a certain extent, investment trends reflect the timing of the introduction of environmental requirements. For instance, transposition of the EU Integrated Pollution Prevention and Control (IPPC) Directive in 1999 and the launch of the EU Emissions Trading System in 2005 may have driven the investment hikes of 2001 and 2005 (Figure 3.3). Investment in environmental protection by the business sector slowed in the late 2000s during the recession.

However, environmental investment in industry has continued to grow. As a result, this type of investment accounted for 5% of total industrial investment in 2009 compared with 3.8% in the previous year. Larger industrial companies (those with more than 250 employees) accounted for nearly 85% of environmental investment in 2009. Investment in end-of-pipe technologies continued to prevail over investment in "integrated" technologies, although the latter are probably underestimated.[16] Nevertheless, industrial small and medium-sized enterprises invest more in integrated technologies than do large companies (ISTAT, 2012).[17]

Environmental investment by industrial companies is concentrated in energy intensive sectors such as refined petroleum products, iron and steel, chemicals, and non-metallic minerals. The composition of environmental investment varies across industries, depending on their specific environmental impacts (ISTAT, 2012). Overall, growing attention to air pollution and climate change has resulted in these two areas representing an increasing share of investment by industry (30% of total environmental investment), followed by wastewater (19%) and waste (12%).

3.2. Investment in "clean energy" and sustainable transport modes

Renewable energy sources and energy efficiency

As discussed in Chapter 5, Italy has invested heavily in the renewable energy sector since the mid-2000s, particularly with respect to electricity generation. Installed capacity more than doubled between 2000 and 2011, from about 18 GW to more than 40 GW. Consequently, power generation from renewable sources has also risen. Italy is reportedly the fourth largest investor in renewables (after China, the United States and Germany) and the largest investor in small-scale photovoltaic (PV) installations (Bloomberg New Energy Finance, 2012). Investment in renewable power and fuels in Italy was USD 29 billion (EUR 20.8 billion) in 2011, a 43% increase over the previous year. This compares with a 17% rise in global investment in the same period, and was largely driven by the boom in small-scale rooftop PV installations, which attracted investment of USD 24 billion (EUR 17 billion). By comparison, Italy's investment in the waste and water sectors was less than EUR 5 billion in 2010 (Figure 3.3).

This growth was the result of generous incentive mechanisms (Box 5.4). In particular, the 2010-11 boom in PV was linked to a sharp decline in technology costs and the expectation, realised subsequently, of a dramatic cut in feed-in tariffs as from 2012 (Bloomberg New Energy Finance, 2012). The cost of these incentives has generally been passed on to end users: in mid-2012 it accounted for some 15% of the electricity bill of an average household consumer. The cost of the incentive mechanisms for renewable power has increased with the rise of installed capacity and electricity generation, reaching about EUR 7 billion in 2011. In addition, central and regional governments have made extensive use of direct financial transfers in the form of investment grants and soft loans, including through EU and national funding for regional development (Section 3.3).

Italy has also invested in further developing its electricity networks to improve service and integrate increasing electricity generation from renewable sources. However, greater investment is needed, especially to upgrade the transmission network in the southern regions and islands, which have a high renewables potential. Priority has also been given to the development of smart grids. While the rollout of smart meters has been completed, additional investment is needed to complete the more advanced phases of smart grid development.

A number of incentives that became available in the second half of the 2000s have triggered growing investment in energy efficiency in the business and household sectors (Box 5.5). For instance, the 55% tax deduction for energy efficient refurbishment of buildings mobilised the investment of more than EUR 12 billion in 2007-10 (ENEA, 2012a). Overall, increasing investment in renewable energy sources and energy efficiency has contributed to stimulating growth and employment in new economic sectors (Section 4). Italy's renewable energy and energy efficiency policies are discussed in more detail in Chapter 5.

Sustainable transport

The government has channelled funding (including national and EU funds) to the development of public transport and railway networks. In the last decade, the Italian railway system has invested about EUR 25-30 billion in high-speed rail infrastructure for both passengers and freight. The costs of high-speed rail in Italy have been much higher than in other European countries such as France, Germany and Spain. While geographical features have played a role, tendering procedures and a long lead-time have also contributed (OECD, 2011a). Further liberalisation of service and the definition of a sound and stable regulatory framework, including for financing of service, are needed (DPS, 2012). In this respect, the establishment in 2012 of a regulatory authority for transport services, whose competences are temporarily assigned to the AEEG, is an important step forward.

As discussed in Chapter 5, some progress has been made in developing integrated urban transport systems. However, in most Italian cities and metropolitan areas local public transport systems remain insufficiently developed (in terms of infrastructure and service quality) to provide an adequate alternative to the use of private vehicles. Like the water and waste services discussed in the previous section, local transport suffers from inconsistent application of competitive tendering and weak regulatory oversight (Bripi et al., 2011). Development of urban transport systems is the responsibility of regional and local authorities, which have differentiated regulatory approaches and implementation capacities. Local governments have been facing serious financial constraints. Therefore, estimated annual transfers for public transport dropped from EUR 2 billion in 2009 to EUR 400 million in 2011 (DPS, 2012). In addition, prices paid by users of public transport are insufficient to cover the service's operational costs. Cost recovery reaches some 35% on average, while the prices paid are relatively low by international comparison.[18] Investment of more than EUR 22 billion in public transport infrastructure is planned in 2007-20. Public and private financing is available to cover slightly more than half these costs, most of which are associated with the development of metro systems (MSE, 2011). The 2012 "Sviluppo" Decree (Box 3.1) foresees the adoption of a national plan for electric vehicle infrastructure, funded by an *ad hoc* fund of EUR 70 million/year in 2013-15. It has also introduced measures to promote competitiveness and efficiency in local public services, including local transport.

3.3. National and EU funds for regional development

Italy has allocated considerable funding to regional development and cohesion policy, with the broad aim of reducing the striking economic and social disparities that persist among regions. As of the end of 2011, about EUR 100 billion had been allocated to investment in regional development for the programming period 2007-13. This included nearly EUR 60 billion in EU Structural Funds and national matching funds. While EU transfers decreased compared with the previous programming period (2000-06), Italy remains the third largest beneficiary of the EU cohesion policy after Poland and Spain.

National and EU funds earmarked for regional development have accounted for a relatively minor share of public spending at the national level, but they have made up about half of investment expenditure in the eight regions in the South (DPS, 2012).

These funds have also been an important source of financing for public environment-related investment, especially in the South (Mezzogiorno). Sustainable use and promotion of environmental and natural resources are among the key funding priorities in the 2007-13 programming period. About EUR 9 billion in EU and national matching funds was allocated to environment- and energy-related investment. This represents 15% of the total allocation of EU and national matching funds, which is higher than the share of funds earmarked for environment-related investment in the previous programming period. This reflects emerging policy priorities such as clean energy and climate change, as well as continued high investment needs for environmental infrastructure in the South. As Table 3.2 shows, the endowment of environment, energy and transport infrastructure and the quality of related services vary widely across Italy's macro-areas.

More than EUR 4 billion was earmarked for renewable energies and energy efficiency. This is one of the largest allocations in the EU, indicating Italy's objective of building industrial and innovation capacity based on the clean energy sector, as well as contributing to the reduction of GHG emissions. A specific multi-regional programme on Renewable Energy and Energy Efficiency was dedicated to achieving these objectives, in addition to allocations included in all regional programmes.[19] According to government estimates, planned projects in the energy, transport and waste management sectors would abate emissions by about 10 Mt CO_2 eq by 2020 (DPS and ENEA, 2009). About EUR 1 billion was allocated to sustainable urban transport. The remaining funds were allocated to investment in the water and waste sectors, prevention of natural risks and adaptation to climate change, natural protected areas, and rehabilitation of contaminated sites.[20] Compared to the previous programming period, there is increased emphasis on more innovative sectors such as renewables, and on more advanced solutions to traditional environmental management issues such as tertiary wastewater treatment and biological waste treatment.

Overall, the allocation of regional development funds in the 2007-13 programming period has been based on a sounder analysis of investment needs and more extensive use of statistical information and indicators than in the past. Italy has also implemented innovative, more results-oriented procedures in the disbursement of funds, including for environment-related projects. For instance, disbursement of funds has been made conditional on a number of criteria including completion of specific sectoral planning. In addition, a performance-based mechanism (the "Obiettivi di Servizio") has been implemented to provide additional funding in the southern regions as a reward for achieving pre-defined targets for urban waste and water services by 2013 (Table 3.2).

EU and national development funds have contributed to improving the quality of life and developing environmental infrastructure and administrative capacity in the Italian regions. However, despite progress, the South continues to lag behind with respect to most environment-related indicators and is generally not on track to meet the 2013 targets for waste and water management (Table 3.2). Spending of funds and realisation of planned investment have both lagged, especially in the energy, waste and nature protection sectors. There are several contributing factors, including: lack of sound sectoral plans to guide investment; insufficient matching finance; inadequate enabling or complementary

Table 3.2. **Selected regional environment-related indicators**

	Italy		South		North and Centre		Targets for the South
	2000	2010	2000	2010	2000	2010	2013
Urban population equivalent served by wastewater treatment plants with at least secondary treatment (%)[a, b]	53.5	56.5	49.5	53.1	55.6	58.4	70
Drinking water distribution efficiency (water distributed as % of total water entering municipal water distribution systems)[a]	67.4	67.9	59.4	60.3	71.5	71.9	75
Municipal waste landfilled (kg/inhab.)[c]	310.3	248.4	395.3	327.0	263.8	206.9	230
Separate collection of municipal waste (% tot. municipal waste)	14.4	35.3	2.4	21.2	20.3	41.8	40
Composted wet waste (% of total wet municipal waste)[c, d]	20.5	38.3	2.6	14.3	29.1	51.3	20
Coastal areas under bathing prohibition (% of tot. coastal area)[e]	5.5	6.2	6.0	6.8	4.0	4.3	. .
Terrestrial protected areas (% total area)[f]	9.1	10.5	11.2	14.2	7.7	8.0	. .
Natura 2000 sites (% total area)[c]	19.1	20.6	22.3	24.1	16.8	18.2	. .
Air quality monitoring (per 100 000 inhab.)[g]	0.5	1.2	0.4	1.0	0.5	1.3	. .
Production of renewable energy (% of total production)	19.1	25.9	5.2	18.2	24.9	30.4	. .
Electrified rail network (% total railway network)[h]	63.4	. .	47.8	49.0	73.8	. .	. .
Public transport demand (passengers ‰ inhab.)[i]	203.3	228.6	90.5	84.6	254.8	291.3	. .
Public transport supply (seat-km per capita)[e, i]	4.6	5.0	2.9	3.0	5.4	5.9	. .

a) 2000 and 2010 data refer to 2005 and 2008, respectively.
b) Inhabitant equivalents served by wastewater treatment plants with secondary or tertiary treatment, as a percentage of total urban inhabitant equivalents; excludes small, medium and large industrial enterprises.
c) 2000 data refer to 2005.
d) Wet waste (organic and green material) treated in composting facilities.
e) 2010 data refer to 2009.
f) Official list of protected areas according to national legislation (Law 394/91). 2000 data refer to 2001.
g) 2000 and 2010 data refer to 2002 and 2009, respectively
h) 2000 data refer to 2004.
i) Public transport includes buses, trams, trolleybuses and metro systems; in provincial capital cities only.
Source: ISTAT (2012), *Indicatori territoriali per le politiche di sviluppo (Database)*.

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infrastructure; unstable and fragmented regulatory frameworks; and still weak institutional and management capacities and inter-institutional co-operation (DPS, 2012; UVAL, 2010). There is, therefore, a need to better tie the disbursement of funds to fulfilment of the framework conditions required to ensure effective use of financial resources. Italy has strongly supported the European Commission's proposal on the definition of such "*ex ante* conditionality provisions" for the next cohesion policy period (2014-20). The government has undertaken a process to tailor these provisions to the Italian context. In 2012, the government adopted a Cohesion Action Plan aimed at re-launching regional development policy and speeding up its implementation, with a view to contributing to economic recovery.

4. Expanding environment-related markets and employment

While information is not complete and is not always consistent across different sources, there is some evidence that the environmental goods and services (EGS) sector in Italy has grown since the early 2000s in terms of output, turnover and employment.[21]

Waste, wastewater and water resource management

As part of its work on environmental protection expenditure accounts, the Italian National Institute of Statistics (ISTAT) collects information on the production of waste, wastewater and water resource management services (mainly water supply) and on

related employment. The gross value of domestic output of these three broad sectors accounted for about 1% of Italy's gross output in 2010. Waste management (collection and treatment of waste) made up two-thirds of the output (Figure 3.4) or about 0.7% of Italy's gross output. Output grew considerably in all sectors in the 2000s. Waste management was the leading sector, with 27% real growth in 2000-09, followed by wastewater (10%) and water resource management (8%).

Corporations specialising in the provision of environmental services (utilities) are the main providers of waste, wastewater and water resource management services. The role of utilities has increased since 2000 (Figure 3.4). They produced 60% of the gross value of waste management services, 55% of wastewater services and 89% of water resource management services in 2010 (ISTAT, 2012). The remaining shares are accounted for by governmental bodies and non-profit institutions serving households (NPISHs), secondary producers (mainly corporations that provide environmental services in addition to their principal activities) and ancillary producers (mainly corporations that provide environmental services for their own use). In particular, provision of environmental services by governmental bodies and NPISHs declined during the last decade. These trends reflect the expenditure and investment trends analysed in Section 3.3. They confirm progress in the liberalisation and corporatisation of the provision of basic environmental services, although reforms have not been fully implemented yet.

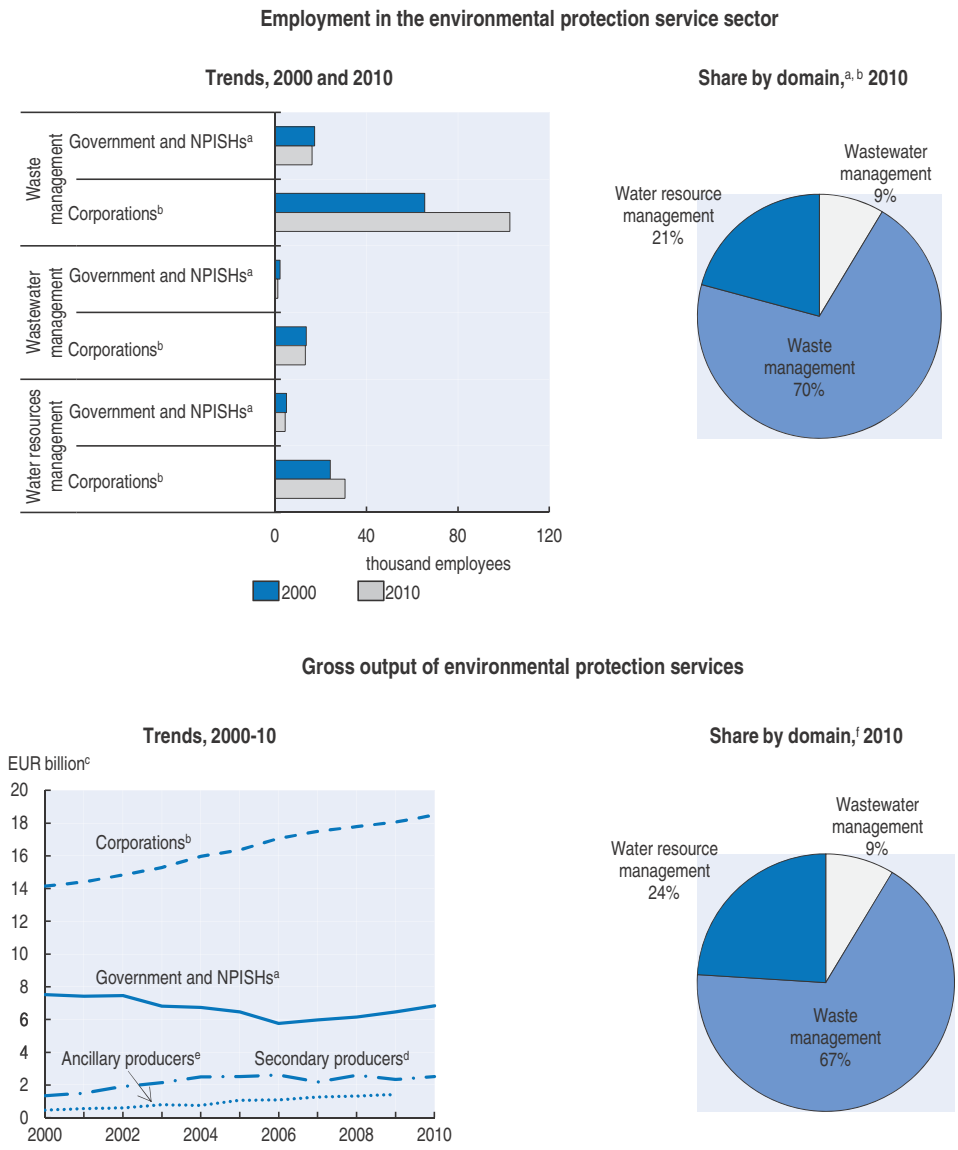
Output growth has resulted in increased employment in the waste, wastewater and water resource management sectors, although with some differences across types of producers and sectors. As Figure 3.4 shows, between 2000 and 2010 employment in the government sector decreased while that in utilities grew. The highest increase occurred in the waste management sector, which also accounted for 70% of employment in the basic environmental services sectors in 2010. Employment in the waste management sector has increased more rapidly than that in the economy as a whole (ISTAT, 2012). Overall, about 168 500 people were employed in these three broad environmental sectors in 2010, representing some 0.7% of total employment in Italy.

Renewable energy sources and energy efficiency

As discussed in Section 3.3, an increased policy focus on renewable energy sources and energy efficiency in the second half of the 2000s resulted in an investment boom in these sectors. This, in turn, led to growing turnover and employment in the "clean energy" sectors. According to EurObserv'ER (2011) estimates, in 2010 turnover in the renewable energy sector was 57% higher than during the previous year in Italy, compared to 15% growth in the EU.[22] This meant that Italy had the second largest renewables market in the EU after Germany. With more than EUR 16 billion, Italy accounted for 12.7% of EU sales turnover. Related direct and indirect employment increased by 38%, more than in the EU as a whole (25%).[23] In 2010, more than 108 000 people were directly or indirectly employed in the renewable energy sector, making Italy the third largest employer in the EU. Italy is among the top EU countries in all renewable energy sectors. In particular, it is the largest geothermal power market and the second largest for PV.

While market performance improved in all renewable energy sectors, PV was the main growth engine. PV turnover more than tripled and employment more than doubled. This is clearly the result of the sharp growth in PV installed capacity in 2010-11, driven by dropping technology prices and generous incentives. PV has become the dominant renewable energy sector, accounting for nearly half of turnover and more than 40% of

Figure 3.4. **Environmental goods and services sector**



a) General government and non-profit institutions serving households.
b) Corporations that provide environmental protection services as pricipal activity (utilities).
c) At constant 2005 prices.
d) Corporations, mainly private, producing environmental services in addition to their principal activity.
e) Private corporations that produce environmental services (waste and wastewater management only) for their own uses in order to manage their own environmental pressures.
f) Excludes ancillary producers.
Source: ISTAT (2012).

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employment, followed by wind power (about 20%). In addition, the White Certificate mechanism and the other energy efficiency incentives (Box 5.5) have stimulated the emergence of a dynamic energy service market.[24] However, a relatively minor share of these enterprises have the technical skills and financial capacities required to qualify as energy service companies (ESCOs).[25]

Most turnover and employment is generated in the downstream segments of the "clean energy" markets, i.e. in the installation, operation and maintenance of renewable energy equipment and the provision of energy services. Domestic manufacturing and supply of renewable energy technologies has not kept pace with the increase in installed power generation (especially of PV), as well as with the strong competitive pressures by Asian countries. This has resulted in growing imports of renewable energy technologies. For instance, the trade deficit for PV technologies was above USD 11 billion in 2010, more than four times higher than in the previous year and much larger than the trade deficit at EU level. About a quarter of this deficit was due to trade with Germany (ENEA, 2012b). Italy's renewables promotion policy has mainly focused on supporting generation from renewable sources, thereby supporting technology demand. So far, this policy has been insufficient to effectively promote the development of supply chains linked to renewable energy technologies. This is partly due to inadequate linkages among energy, industrial and innovation policies and the weaknesses of the Italian entrepreneurial system, as discussed in Section 5.

A number of studies have analysed the economic potential of the renewable energy sector in Italy.[26] While the results of these studies differ and are not fully comparable, they indicate that the growth of this sector is projected to continue, with potential net economic benefits. However, the increase in energy costs and the decline in conventional energy sectors potentially associated with the accelerated development of renewables can moderate prospective growth and employment impacts (Fraunhofer ISI et al., 2009). Improving the competitive position of national manufacturers of renewables technologies will therefore be a key factor in determining the extent to which renewables will be a source of economic growth in Italy. This would allow gradual decoupling of the development of this sector from domestic demand for installations (as well as from incentives) and make it more export-oriented (Symbola and Unioncamere, 2011).

Other green sectors and products

Other sectors associated with the environment have also shown positive trends. For example, Italy is a leader in Europe in the production of goods and services that have been awarded the EU Ecolabel, which identifies products and services that have a reduced environmental impact throughout their life cycle. The number of EU Ecolabelled products has increased exponentially in Italy since the introduction of this label. Italy has issued more than 50% of the total number of Ecolabel awards in the EU, followed by France and the United Kingdom (22% and 9%, respectively).

Another example is organic farming. Italy is one of the European leaders, with 8.6% of its total utilised agricultural area occupied by organic farming. It has the largest certified crop area and the highest number of operators in Europe. Export of organic products was estimated EUR 1 billion in 2010. However, while domestic consumption of organic products is growing, it remains relatively low. Organic products account for 3% of food expenditure by Italian households, compared with nearly 20% in countries such as Austria and Germany (Symbola and Unioncamere, 2011). The green public procurement policy has helped support demand for organic products.[27]

Promoting environmental skills

As in other advanced economies, the environment-related sectors in Italy have been increasingly characterised by medium- to high-skilled employment: 63% of employees in these sectors had completed at least secondary education in 2008, compared to 49% in 1998

(ISFOL, 2009). This goes hand in hand with the increasing weight of employment in sectors such as renewable energies and pollution control, at the expense of sectors such as waste management and forest management. Consequently, there is a need to develop new and improved skills to seize the opportunities presented by new, more technologically advanced green jobs, help workers adapt to more environmentally friendly processes in existing sectors, and facilitate adjustments in the labour market from contracting conventional sectors to expanding "green" sectors (OECD, 2011c).

Italy has increasingly invested in tertiary education and professional training programmes related to the environment. Environmental tertiary education programmes have led to positive employment outcomes.[28] Most vocational training programmes are publicly funded, including through EU funds. Unsurprisingly, the number of training programmes in renewable energy and resource management considerably increased in the 2000s to satisfy increasing demand. However, a long-term framework for environmental education and training, aimed at addressing existing and future skill needs and potential skill mismatches, seems to be lacking (Ecorys, 2010).

5. Promoting environmental technologies and eco-innovation

Italy needs to boost growth in productivity to restore its international competitiveness, recover from the recession and establish the basis for long-term growth. Promoting research and development (R&D) and innovation could make a substantial contribution to meeting these objectives. In particular, the development of eco-innovation could contribute to further improving the energy and resource efficiency of the economy and to creating new sources of growth.[29] Encouraging eco-innovation requires establishing a policy framework that fosters general innovation capacity, as well as implementing targeted promotion efforts in specific environment- and climate-related fields.

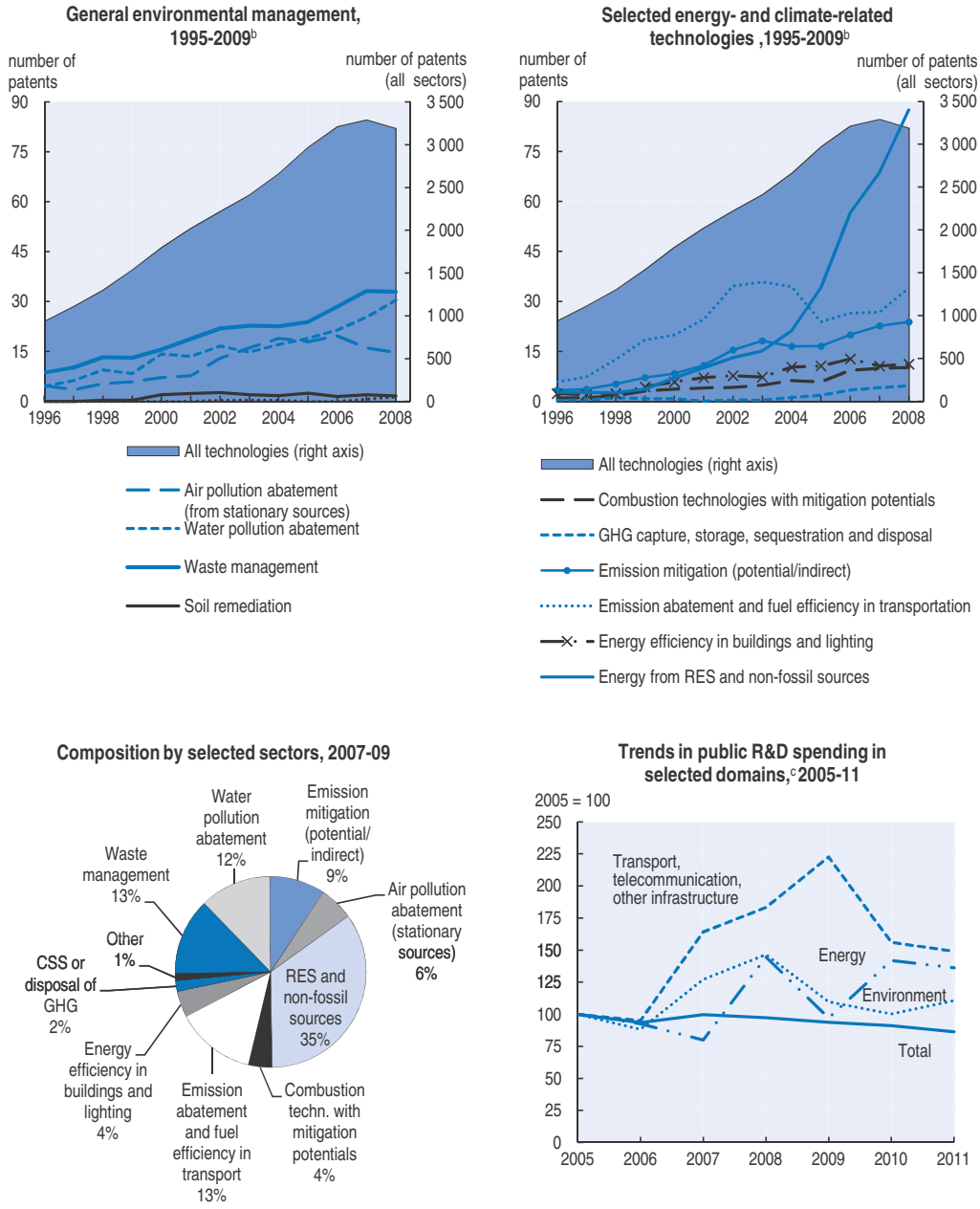
5.1. *General innovation capacity*

Despite some progress, Italy continues to lag behind many other OECD countries with regard to innovation capacity and performance. While gross domestic expenditure in R&D grew by about 2.7% per year in the second half of the 2000s, in 2010 it was less than 1.3% of GDP, or about half the OECD average. The government R&D budget (in real terms) also decreased in the second half of the decade, partly due to the fiscal consolidation effort (Figure 3.5, bottom right panel). It amounted to 0.6% of GDP in 2010. Involvement of the private sector remains limited, with the business sector carrying out only about half of R&D and financing 44% of it, well below the OECD average.[30] Lower than average innovation inputs result in very low output: only 12 triadic patent families are produced in Italy per million population (average 2007-09), less than one-third the OECD average.[31]

Nonetheless, there are highly innovative firms in Italy, including several small and medium-sized enterprises (SMEs). High-tech academic spin-off companies have grown dramatically since the late 1990s. The share of firms introducing technological and non-technological innovation is comparable to that in many other European countries. However, businesses' innovation performance varies greatly across Italy's regions, with much R&D and innovation capacity concentrated in the North and Centre (OECD, 2011d; OECD, 2012c).

Several factors have contributed to keeping R&D and innovation activity low in Italy. Among them are a number of barriers to market entry for new companies (including a high regulatory burden), and the structure of Italian industry with its many small and family businesses (OECD, 2009a). SMEs have more limited access to external capital than larger

Figure 3.5. **R&D spending and patents in environment and climate-related technologies**[a]



a) Patent applications are based on the priority date and the inventor's country of residence, and use fractional counts on filings under the Patent Co-operation Treaty at international phase (European Patent Office designations).
b) Three-year moving average data.
c) Government outlays for R&D; breakdown according to the NABS 2007 classification. Based on data expressed in USD at 2005 prices and PPPs.
Source: OECD (2012), *OECD Patent Statistics Database.*

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companies, which results in difficulties in meeting the often high up-front cost of R&D. Venture capital is in short supply. Limited private sector participation indicates weak industry-science linkages (OECD, 2012c). Italy's tertiary education and research sector also

needs to be improved. The number of researchers is low by OECD standards. A significant number of Italian researchers find more attractive career prospects abroad. The educational attainment of Italian workers is relatively low: despite a substantial increase in educational attainment in the last decade, and in the number of graduates in science and technology, in 2009 only 14.5% of the working-age population had completed tertiary education, among the lowest shares in the OECD.

The Italian authorities have launched a number of initiatives to overcome these barriers, promote research and innovation, and bridge the gap between academic research and industry. This is the main goal of the National Research Programme 2011-13, the latest in a series of national research programmes, which encompasses funding mechanisms dedicated to support different stages of innovation, from research to commercialisation. The "Industria 2015" programme (2006-15) supports business networks and industrial innovation projects. It includes a fund for enterprise finance. In addition, about 20% of 2007-13 EU and national funding for regional development policy has been earmarked for R&D, innovation and business competitiveness. This sector absorbs the largest share of such funds, indicating the prominence it has acquired as an engine of economic convergence for the southern regions, as well as of growth in the whole country (DPS, 2012).[32] Tax credits for investment in R&D have also been provided.

A national innovation agency (Agenzia per la Diffusione delle Tecnologie per l'Innovazione) was established in 2006 to promote industrial applications of innovative technologies (including in SMEs), provide targeted funding, and promote Italian technologies abroad. Similar agencies, business innovation centres and technology transfer offices have been established at the regional level to provide a number of innovation services (e.g. for technology transfer and management of innovative business projects). However, the share of firms using these services remains limited (DPS, 2012).

These initiatives, while promising, have had limited success so far. Italy's institutional and legal framework for innovation remains characterised by a division between R&D and industrial policies, which are the responsibility of different ministries and agencies at different levels of government. There are inefficiencies in government financial support (Bronzini and Iachini, 2011; De Blasio et al., 2011); most innovation funding mechanisms remain difficult to access, in part due to cumbersome procedures. The 2011 OECD Economic Survey of Italy concluded that "policies continue to suffer from lack of continuity, clarity and predictability". Italy therefore needs to further: streamline its specific innovation promotion measures; improve co-ordination of industrial and innovation policies across the government, between the central government and the regions, and between academic institutions and business sectors; and, more generally, implement the structural reforms required to create a more innovation-friendly business environment (OECD, 2011a; OECD, 2012c).

5.2. Eco-innovation performance

Italy has gradually developed a comparative advantage in the field of environment-related technologies, with more marked progress since the mid-2000s. It could develop a specialisation in this field if the trend continues (OECD, 2012c). From a very small base, the number of patent applications[33] related to environment- and climate-related technologies has increased considerably in the last decade (Figure 3.5). This trend is common in many other countries (OECD, 2011d). Environment- and climate-related innovations in Italy accounted for 7.7% of overall patents in 2007-09, up from 5% in the early 2000s.

Patent applications for waste management and water pollution abatement technologies have shown the largest increases among those for general environmental management technologies since the mid-2000s (Figure 3.5). This differs from trends observed in most other countries, where the number of patent applications related to waste and water technologies has tended to stabilise in recent years (OECD, 2011e), and can reflect a degree of "catch-up", with Italy's patent applications focussing on these technologies more than in the past. This can be partly explained by the country's complex, multi-tier waste and water governance system, which has created regulatory uncertainties and slowed down effective and uniform implementation of related legislation across regions in the past (Chapters 2 and 4).

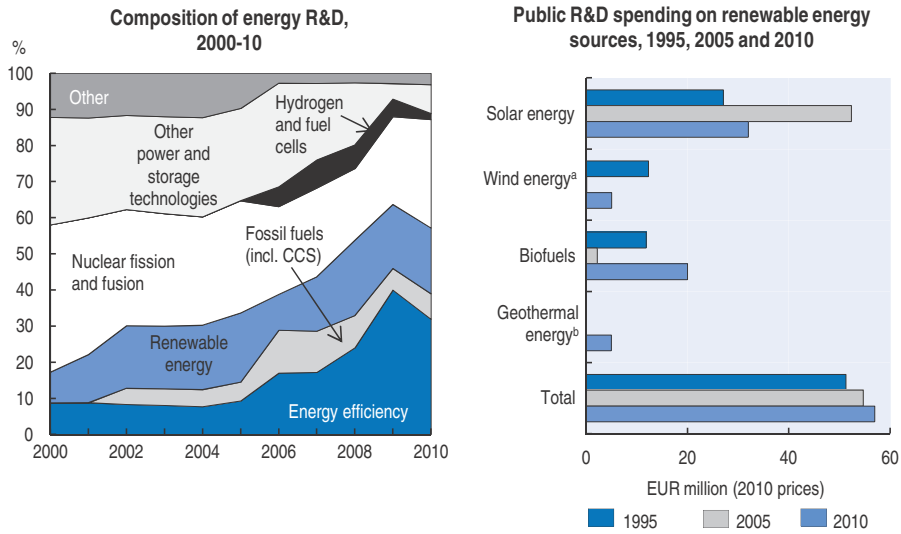
Since 2000, the number of patent applications related to renewable energy and non-fossil energy technologies has increased dramatically, faster than in the case of those related to any other technology (Figure 3.5). The main contributing factors include: a strong policy commitment to increase the share of renewables in energy generation; increased public R&D funding (see next section); the generous incentives provided to electricity generation from renewables (Chapter 5); and increased demand for such technologies, especially in Europe as a consequence of the EU's ambitious goals with regard to clean energy and climate (Hašèiè et al., 2010).

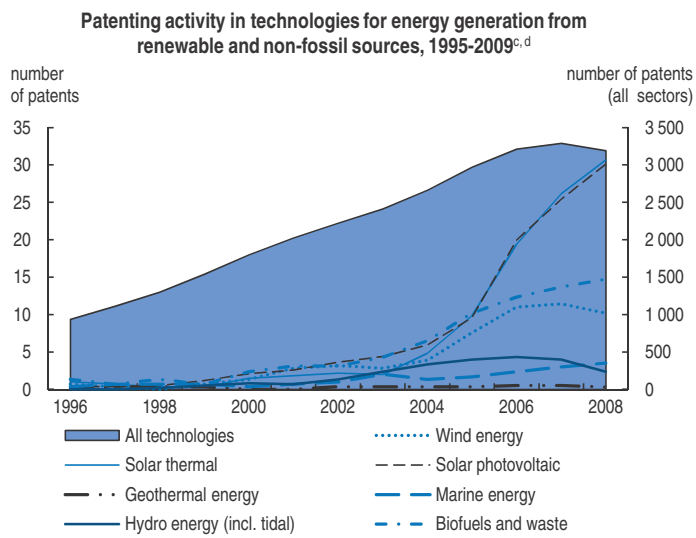
In 2007-09, renewable energy technologies accounted for more than one-third of all patents related to environment- and climate-related technologies, followed by innovations in the transport, water and waste sectors, each accounting for between 12% and 13% of green patents (Figure 3.5). Solar technologies (both thermal and photovoltaic) accounted for over 60% of renewable energy patents. The number of patent applications related to these technologies has grown faster than the number related to all other technological sectors. Patenting activity in technologies related to energy generation from wind, biofuels and waste has also grown considerably. Wind energy has recently become less attractive, contrary to what has been observed in other countries, probably because the focus of Italian renewable support policy and R&D spending has shifted to other, less mature technologies (Figure 3.6; Chapter 5; see also the next section). The number of patent applications related to energy efficiency in buildings also increased in this period, although less than in other technologies. These applications represent a relatively minor share of patents related to clean technologies (Figure 3.5) despite increasing public R&D funding (Figure 3.6) and substantial incentives for energy efficiency improvement in buildings. This appears to confirm that, as discussed in Chapter 5, these incentives have not fostered demand for more advanced energy efficiency solutions yet.

This progress notwithstanding, Italy accounted for some 2.5% of inventions in renewable and non-fossil energy source technologies produced in OECD countries in 2007-09, a minor share compared to most other large economies. In the same period, it produced the lowest number of environment- and climate-related technological innovations per capita among the G7 countries (four patents filed under the Patent Co-operation Treaty per million population).

Progress has been made in bridging the gap between R&D and industry in the energy and environmental sectors. For example, as of the end of 2011 more than 170 academic spin-off companies, half of which were created in the 2000s, were active in these sectors. They accounted for about 17% of the total number of spin-offs, the second largest share after information and communication technology (Daniele et al., 2012).

Figure 3.6. **R&D spending and patents in energy technologies**





a) 1995 and 2009 data.
b) Data available as from 2010 only.
c) Patent applications are based on the priority date and the inventor's country of residence, and use fractional counts on filings under the Patent Co-operation Treaty at international phase (European Patent Office designations).
d) Three-year moving average data.
Source: OECD (2012), *OECD Patent Statistics Database;* OECD-IEA (2011), *Energy Technology R&D Budgets.*

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An increasing number of businesses have invested in environmental protection (Section 3), energy and resource efficiency (and have introduced environmental innovations) at a time of economic crisis. These businesses are reported to be more innovative and competitive on international markets (Symbola-Unioncamere, 2011). As in most other countries, existing or future environmental regulations have been the main driver of the development and uptake of eco-innovation in Italy, followed by current or expected market

demand from customers. Fiscal incentives are the third most important driver. Fiscal incentives appear to be a stronger stimulus in Italy than in other countries. Nearly 13% of firms introducing environmental innovations in 2006-08 have indicated that they did so to take advantage of such incentives, the highest share among surveyed EU countries (OECD, 2011d).

Overall, eco-innovation suffers from the same weaknesses as general innovation in Italy, including the small size of businesses and their difficulties in accessing credit and venture capital. These weaknesses are possibly amplified by the higher inherent risk in developing new technologies in the environmental sector. As in most other EU countries, lack of funding and uncertain market demand are perceived as the main barriers to eco-innovation by Italian enterprises, according to a 2011 Eurobarometer survey. Other barriers include: insufficient access to existing incentives; limited access to external information and knowledge (e.g. lack of well-developed technology support services) and insufficient collaboration with research institutes and universities; existing regulations that do not provide incentives to eco-innovate; uncertain return on investment, or payback periods that are too long; and lack of qualified personnel. Italian enterprises have been more prone to consider these factors, with the exception of the last two, as serious barriers to eco-innovation than have, on average, other European respondents (EC, 2011). In addition, regulatory uncertainties and uneven implementation of environmental regulations across the country may have depressed domestic demand for environmental technologies and discouraged firms' investment in eco-innovation.

5.3. *Building eco-innovation capacity*

Like many other OECD countries, Italy has mainly used its environmental policies to promote sustainable manufacturing and eco-innovation, rather than building coherence or synergies with other policies. Attempts to integrate environmental concerns in its innovation and industrial policies were made in the second half of the 2000s, although not in a systematic manner and mainly building on EU-led initiatives. Italy does not have a strategy specifically targeting eco-innovation and green industries. The Roadmap for the Implementation of the EU Environmental Technologies Action Plan (superseded by the EU Eco-innovation Action Plan in 2011) was approved in 2005 and never updated. While the roadmap was a useful inventory of existing measures to support eco-innovation, it did not provide a basis for developing new approaches (WIFO, 2009). In 2012, the Ministry of the Environment, Land and Sea (MATTM) and the Sustainable Development Foundation launched a participatory process, with the involvement of several green industry associations, to agree on a framework for eco-innovation and the development of the green economy (the Stati Generali della Green Economy).

Overall, the eco-innovation policy mix prioritises climate change and energy issues, which helps explain the better innovation and market performance in these fields. The Italian policy mix for the support of environmental technologies and eco-innovation is skewed towards the supply side. It mainly consists of funding for R&D activities (discussed below) and for enterprises' investment in improving energy and environmental performance. Some general industrial policy programmes have explicit environmental and energy components. For example, the above-mentioned industrial and innovation policy programme "Industria 2015" included support for projects on energy efficiency and sustainable mobility. The MATTM has also supported pilot projects on selected environmental priorities. It is the national focal point for implementation of the eco-innovation section of the EU Competitiveness and Innovation Framework Programme 2007-13.

Demand-side instruments (e.g. standards and economic incentives for cleaner products and processes) have played a limited but increasing role, especially since the mid-2000s. They have been applied mainly to support renewable energy generation and energy efficiency (Chapter 5). Providing a clear environmental regulation framework (increasingly based on adequate price signals) and strengthening implementation of environmental legislation would help increase demand for environmental technologies, goods and services and related market opportunities. Green public procurement, briefly discussed below, can also contribute. At the same time, a stable industrial policy that supports manufacturing of green technologies and goods would help improve the international competitiveness of Italian businesses and prevent the trade balance for environmental technologies from worsening, as has been the case for renewables (Section 4). It would also facilitate the adjustment from conventional to green sectors (Box 3.3).

Box 3.3. **Biodegradable plastic products: an example of green chemistry**

The chemical industry has a long history in Italy, but it was hit heavily by the economic crisis in the late 2000s. At the same time, the know-how and patented technologies exist for the production of biodegradable plastics. For this reason, the Italian government considers the development and production of biodegradable plastic products to be one of the green economy sectors with high growth, export and employment potential.

The government is facilitating realisation of a complex project in Porto Torres (Sardinia) involving rehabilitation of a contaminated site, conversion of a traditional chemical cluster into a "green chemistry" area, and installation of a biomass power plant to supply the industrial facility. This project will be carried out through a joint venture between Versalis (the ENI group's chemicals subsidiary) and Novamont, a medium-sized company that is a leader in bio-plastics. In six years, the project is expected to develop a value chain from non-food agricultural production to bio-plastics and bio-chemicals. The project will allow current employees to be retained and some additional employees to be hired in the future.

The central and regional governments, the joint venture, and trade unions have signed an agreement providing for entirely private investment of about EUR 500 million (plus EUR 230 million for the biomass power plant). This is an example of constructive public-private dialogue, with public authorities not being called upon to provide investment funding. Instead, they are functioning as facilitators in order to foster dialogue among companies and trade unions, cut red tape, and support those who are temporarily unemployed during the contaminated site's reclamation phase.

Funding environment- and climate-related R&D activities

The government budget for environmental R&D did not show a consistent trend in the second half of the 2000s. Overall, it increased by some 10% in real terms, although from a very small amount. This compares with a decrease in the total government R&D budget, especially in the late 2000s, due to fiscal consolidation efforts (Figure 3.5). Environment accounted for about 3% of the R&D budget in the late 2000s, a share that was more or less constant in this period. This was in line with the EU27 average and above the OECD average (OECD, 2011d).

After a decline in the first half of the 2000s, public funding for energy R&D increased, reflecting the renewed priority attached to this sector. However, funding declined again at the end of the decade due to the overall cut in public spending (Figure 3.5). The government

energy R&D budget allocated to energy efficiency and renewables technologies grew steadily during the decade, with the exception of the last few years (Figure 3.5). These have become the dominant energy research areas, accounting for about half the total government energy R&D budget in 2010 (up from 17% in 2000). This is reflected by the growing number of patent applications in these fields (Figures 3.4and 3.5). Public funding for nuclear research grew at the end of the decade, in line with the government's decision to begin using nuclear energy again, a decision which was over-ruled by a 2011 popular referendum. In 2010, nuclear research attracted one-third of government energy R&D funding.

Green public procurement

According to the 2002 Budget Law, 30% of public contracts for procurement of selected products and services must include environmental criteria and 30-40% of public contracts must reduce energy consumption. The National Action Plan for Green Public Procurement, approved in 2008, reaffirmed these requirements. Minimum environmental criteria were approved in recent years for a number of product and service categories, including paper, textiles, food, vehicles and energy supply. Public institutions have reporting obligations under the Plan, and the Authority for the Supervision of Public Contracts is in charge of monitoring compliance with green criteria in public procurement. According to a recent survey, environmental criteria have increasingly been included in public procurement contracts in Italy. In monetary terms, 51% of all contracts signed in 2009-10 included some form of green requirement. Environmental requirements are more common for the procurement of office IT equipment, furniture and paper (CEPS-CoE, 2012). Full implementation of the Plan is expected to create additional demand for greener products and services, thereby providing a stimulus for eco-innovation.

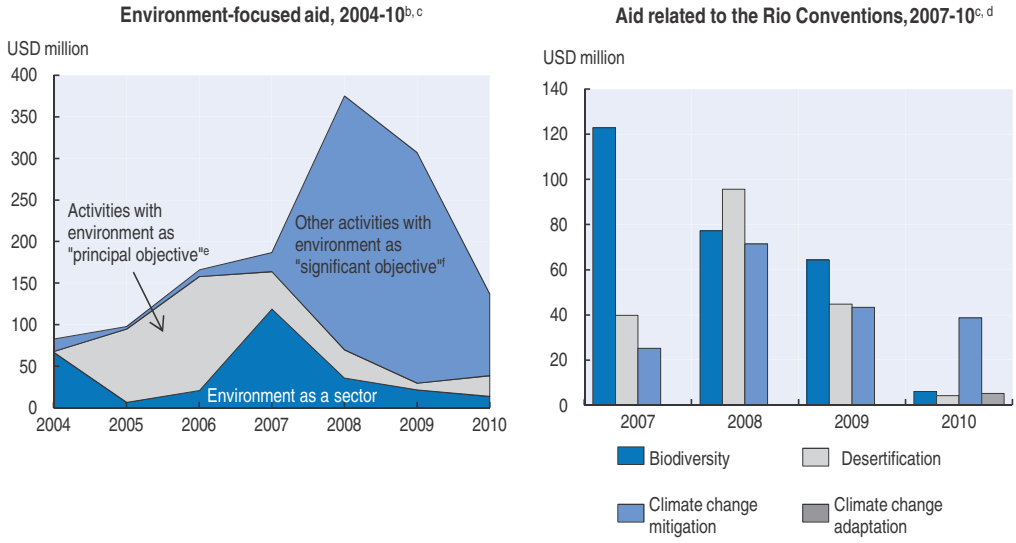
6. Environment, trade and development

6.1. Official development assistance

Since 2000, Italy's net official development assistance (ODA) has increased by 60% in real terms, to reach USD 3.99 billion in 2011. Despite this important increase, Italy was 12th out of 23 DAC members in terms of aid volume in 2011 (providing 3% of the total DAC members' ODA) and 20th in terms of ODA as a percentage of its gross national income (GNI). The latter fluctuated between 0.13% (2000) and 0.29% (2005) and was 0.19% in 2011, well below the DAC average of 0.31%. Italy's weak ODA performance during the last decade (and aid cuts in 2009, 2010 and 2011) means that it did not meet the EU target to provide 0.51% of GNI as ODA by 2010. It is also far from reaching the target of 0.7% ODA/GNI by 2015. To meet the 2015 target, it would need to increase its aid by USD 11 billion (or 268% of the amount in 2010).

Italy's ODA commitments for environment increased after environment was defined as a priority in the 2007-09 Ministry of Foreign Affairs (MFA) Programming Guidelines for Development Co-operation. In 2007, Italy committed USD 112 million to the environment, a significant increase compared with USD 18 million in 2006. Although resources devoted to specific environmental programmes decreased in the following years, funding for activities with environment as a significant objective[34] nearly doubled, reaching close to USD 400 million in 2008 (Figure 3.7). The priority attached to the environment was reflected in increased support for projects related to the Rio Conventions. Support for biodiversity projects increased many times between 2006 and 2007. This was followed by increased support for response to climate change and for fighting desertification in 2008 and 2009 (Figure 3.7).

Figure 3.7. **Bilateral aid in support of the environment**[a]



a) Commitments of bilateral ODA expressed at 2009 prices and exchange rates.
b) The coverage ratio for activities screened against the environment policy marker is 84% of total sector-allocable aid; before 2004, the data coverage was not sufficient to identify significative trends. Excluding activities on water supply and sanitation not targeting environment as a principal or significant objective.
c) The marker data do not allow exact quantification of amounts allocated or spent. They give an indication of such aid flows and describe the extent to which donors address the environment and the objectives of the Rio Conventions in their aid programmes.
d) Most activities targeting the objectives of the Rio Conventions fall under the definition of "environment-focused aid" but there is no exact match of the respective coverages. An activity can target the objectives of more than one of the conventions, thus respective ODA flows should not be added. The climate change adaptation marker was introduced in 2010.
e) Activities where environment is an explicit objective of the activity and fundamental in its design.
f) Activities where environment is an important, but secondary, objective of the activity.
Source: OECD (2012d).

StatLink http://dx.doi.org/10.1787/888932772875

The environmental priorities of Italy's ODA focus on a selected set of issues, including: biodiversity conservation; climate change mitigation and adaptation; fighting desertification; promoting sustainable development of small island states; sustainable use of water resources; and supporting sustainable development of mountain regions. Environment-focused aid plays a dominant role in ODA to several countries: e.g. in China, where it accounted for 95% (USD 64 million) of total sector-allocable aid in 2007-08, and Kenya, Lebanon, Montenegro and Mozambique where 70% of ODA was environment-related in 2008-09. In 2009-10, Iraq was the top recipient of Italy's bilateral aid and 90% (USD 70 million) of total sector-allocable aid to this country was environment-related. Overall, the average share of environment-focussed aid accounted for 41% of total sector allocable aid in 2009, which is high compared to many other DAC members. Italy also improved its reporting against the environmental markers: the percentage of activities screened increased from 47% in 2006 to 100% in subsequent years.

The Inter-Ministerial Technical Working Group on ODA, established in 2010 and co-ordinated jointly by the MFA and the Ministry of Economy and Finance (MEF), is an important forum for ensuring policy coherence for development. In 2011, Italy adopted long overdue written guidelines on the environment that are a practical and user-friendly tool for facilitating integration of the environment into development co-operation activities. The MATTM, which implements its own development co-operation projects, takes an active part in the Working Group's activities. Since 2004, a number of projects

promoting more efficient use of energy, water resources and renewable energy sources have been implemented, providing professional training and fostering the exchange of know-how as well as the application of eco-efficient technologies. The MATTM's co-operative activities have focused on China, India, the Mediterranean region, Central and Eastern European countries, Latin America, the Caribbean and the Pacific islands. A co-operative programme on the environment between Italy and China has been particularly successful. During the 12 years of its operation, this programme has generated investment and capacity building outcomes and become the longest lasting of all international environmental protection programmes in China (Box 3.4).

The environment, together with land use and natural resource management, remained a priority topic in the 2011-13 programming period. However, as the net reduction in public finance continues to affect overall development co-operation, Italian environmental initiatives will need to be even more incisive and effective, in line with the OECD Paris Declaration on Aid Effectiveness. They will also need to be well co-ordinated, carefully monitored and independently evaluated.

6.2. Export credits

The Italian Export Credit Agency (Servizi Assicurativi del Commercio Estero, SACE) has long provided companies and banks with instruments for credit insurance, investment protection, the provision of sureties, and financial guarantees for their investments abroad. In the past, some investments supported by the SACE could be seen as controversial from the environmental point of view. These included the Baku-Tbilisi-Ceyhan (BTC) oil pipeline, the Cernavoda nuclear power plant in Romania, the Iliusu Dam in Turkey, and the Bonny Island liquefied natural gas plant in Nigeria.

Growing attention to environmental issues, and Italy's active participation in negotiating the OECD Recommendation on Common Approaches on Environment and Officially Supported Export Credits, led to disengagement of the SACE from most controversial projects (the Baku-Tbilisi-Ceyhan oil pipeline, the Iliusu dam in Turkey), reconsideration of support, or the introduction of environmental safeguards (the Cernavoda nuclear power station in Romania). Since 2001, the SACE has introduced Environmental Guidelines which define detailed environmental procedures to address the potential negative environmental impacts of Italian exports that require its support. An Environment Unit, established in 2005, carries out project screening, review and monitoring, which is integrated into the due diligence and decision-making process for each transaction covered. The unit also provides professional training on environmental topics.

The SACE carries out environmental assessment reviews for all transactions whose repayment terms are equal to or greater than 24 months, using the Environmental Guidelines to classify transactions in one of three categories of potential impact.[35] To the extent feasible, reviews also go beyond the OECD Common Approaches. All relevant projects are subject to assessment, even when local legislation does not require such procedures. Information on projects classified in Categories A and B, for which a final commitment is expected, is disclosed every four months and at least 30 days prior to final committment. A project's compliance with host country standards is ensured through specific covenants in the covered loan. In 2004, 2008 and 2009, Italy was one of the top three OECD countries with regard to the number of projects with high- and medium-potential

Box 3.4. **The Sino-Italian Co-operation Programme for Environmental Protection (SICP): sharing best practices with China**

In 1999, the Italian Ministry of the Environment, Land and Sea and China's State Environmental Protection Administration (SEPA) launched the Sino-Italian Co-operation Programme for Environmental Protection (SICP) with the aim of helping China improve its environment and support sustainable development. It was also intended to boost trade relations between China and Italy. Listed as a UN partnership initiative for sustainable development at the World Summit on Sustainable Development in Johannesburg in 2002, the SICP became an important global initiative with respect to climate change, ozone layer protection, biodiversity conservation, POPs reduction and phase-out, and the prevention and control of desertification.

The SICP has provided an important channel for the introduction of environmental technologies, funds and management expertise to China. Since 2000, 85 projects have been implemented with a total value of EUR 350 million. Investment in pilot projects accounts for 75% of the SICP budget. Some projects have focussed on addressing short-term and urgent Chinese environmental problems, such as providing expertise for managing and addressing risks in the wake of a serious water pollution incident on the Songhua River in 2005, or assessing environmental damage caused by the earthquake in Sichuan in 2008. Other projects have supported development of longer-term programmes, such as the establishment of a Geographical Information System using satellite images integrated with existing data and on-site surveys, control of mercury pollution from factories using coal as fuel, and management of medical waste.

The SICP has also involved the private sector. For example, it provided the Italian energy company Enel with the opportunity to create effective networks of interested parties (local institutions and enterprises) to start investing in Clean Development Mechanism (CDM) projects. As of 2012, Enel was participating in over 90 projects in China (of which 47 were already officially registered), ranging from hydro and wind power to abatement of industrial gases and energy efficiency in large factories. This programme has become a laboratory where Italy and China can co-operate to develop or upgrade new environmental technologies.

Although capacity building originally constituted only a small part of the SICP, it has become increasingly important. An advanced training programme for senior civil servants and experts from private Chinese companies, launched in 2003, gave more than 4 000 Chinese managers, experts and executives the opportunity to attend training classes at Venice International University and make field visits to Italian public institutions and private enterprises.

Over the years, the SICP has involved a growing number of Chinese government bodies (the National Development and Reform Commission, the Ministry of Water Resources, the State Forestry Administration and the Ministry of Science and Technology), the scientific community (the Chinese Academy of Social Sciences, Tsinghua University in Beijing, and Jiaotong University and Tongji University in Shanghai) and a number of local governments (municipal authorities of Beijing, Shanghai, Tianjin, Xi'an, Suzhou, Lanzhou and Urumqi). In Italy, the programme has involved the National Research Council, the Universities of Bologna, Pavia, Turin, Tuscia, Venice, Bocconi University, Venice International University, the Eni Mattei Foundation, and the University Consortium of Industrial and Managerial Economics.

Source: Sino-Italian Co-operation Program for Environmental Protection, *www.sinoitaenvironment.org/*.

environmental impacts, and in the period 2006-09 with regard to the funding volume. Guaranteed transactions under Category A reached over SDR 1 billion[36] in 2009 and in 2010 and focused on energy, basic metal industries and mineral resources projects.

6.3. Corporate social responsibility

Italy has actively promoted the OECD Guidelines for Multinational Enterprises[37] and has given particular importance to the 2011 update of the Guidelines. It supported the reference to small and medium-sized enterprises (SMEs), which are invited to follow the corporate social responsibility (CSR) principles according to their capacities.

Italy established a National Contact Point (NCP) in 2002 within the Ministry of Economic Development. The NCP Committee includes the Ministries of Environment, Foreign Affairs, Economy, Agriculture, Labour and Justice and members of business associations and trade unions. Recently the Committee was enlarged to increase stakeholder involvement. Since 2011, representatives of the Permanent Regions' Conference, the Association of Italian Banks (ABI), some SME associations and the Italian National Committee of Consumers take part in the Committee's work. The NCP has also signed agreements with many Italian regions in order to reach enterprises at the local level.

Since the establishment of a complaints procedure in 2001, the NCP has accepted five complaints, all of which were resolved by 2007. Two complaints were related to the environment. In 2003, a complaint was filed against Italy's involvement in the Baku-Tbilisi-Ceyhan (BTC) oil pipeline with regard to non-observance of the OECD Guidelines' recommendations on human and labour rights and the environment. The case was referred to the UK NCP, as the consortium that oversaw the construction and operation of the BTC pipeline was led by a UK company and an Italian company was a minority shareholder.[38] The second case was brought in 2007 over non-observance of the Guidelines' recommendations on human rights and the environment on a project in India. The initial assessment led to rejection of the case; it was concluded that there had been no involvement of the Italian firm in the project where the alleged violations had taken place.

Besides its institutional task of mediating and conciliating between enterprises and stakeholders in specific cases arising from breaching of the Guidelines, the Italian NCP actively disseminates knowledge and experiences concerning CSR among national enterprises and other stakeholders and promotes CSR principles in administrative procedures.

In 2011, the Ministry of Economic Development signed an agreement with the ABI and the National Association for Industries (Confidustria) to promote the adoption of CSR key performance indicators by Italian SMEs. The agreement, which was recently renewed for another two years, fosters non-financial reporting among enterprises and promotes pilot projects, together with the Italian banks, to introduce non-financial parameters to evaluate the risk of credit while financing enterprises' projects. Italy also promotes integrated reporting, i.e. a single reporting document including all financial and non-financial information (on environmental, social and governance aspects). To date, eight Italian companies (Atlantia, CNDCEC, ENI, ENEL, Generali Group, PriceWaterHouse Coopers Advisory, SNAM and Terna) have joined the Integrated Reporting Pilot Programme of the International Integrated Reporting Council (IIRC) Business Network, working towards full adoption of integrated reporting. More recently, the NCP has developed and implemented a new procedural guide to address specific instances in order to make the process more accessible and transparent.

The OECD Guidelines are also promoted in investment guarantee programmes. Close co-operation has been established between the NCP and the Italian investment promotion and support agencies. The SACE has published the Guidelines on its website and introduced the acknowledgment declaration of companies on the Guidelines in its procedures. The national institute for the promotion of exports (Agenzia per la promozione all'estero e l'internazionalizzazione delle imprese italiane, ICE), the financial company for export support (Società Italiana per le Imprese all'Estero, SIMEST) and the Inward Investment Agency (Agenzia nazionale per l'attrazione degli investimenti e lo sviluppo d'impresa, INVITALIA) are disseminating the Guidelines to enterprises and publishing them on their websites. Together with the Guidelines, they are promoting the OECD Risk Awareness Tool for Multinational Enterprises in Weak Governance Zones. Italy uses the Risk Awareness Tool as a reference document for NCP activities related to bilateral industrial co-operation. All the agencies were invited to a special session held by the NCP Committee and encouraged to take an active role in supporting dissemination of the Guidelines.

Notes

1. Fiscal consolidation measures of about EUR 20 billion over three years, aimed at reducing the budget deficit from 3.9% of GDP in 2011 to 1.7% in 2012 and 0.5% in 2013.
2. Europe 2020 is the EU's growth strategy for smart, sustainable and inclusive growth. It includes five objectives for employment, innovation, education, social inclusion and climate/energy, to be reached by 2020. All EU member states submit their NRPs to the European institutions annually, together with their stability and convergence programmes. The NRP provides the information necessary to monitor progress towards the Europe 2020 targets.
3. The NRP used to be prepared and submitted to the EU institutions by the Department for European Affairs, which is responsible for co-ordinating Italian participation in EU activities. It was therefore a purely governmental document, prepared in compliance with EU monitoring and reporting requirements. As part of the Economic and Financial Document, the NRP is now prepared by the Ministry of Economy and Finance and endorsed annually by Parliament, which makes it an integral part of Italian domestic policy.
4. A noise tax on flight departures and landings was introduced in the mid-1990s, but implementation seems to have faded out.
5. The ITR on energy is the ratio between the revenue from energy taxes and final energy consumption.
6. The *superbollo* for cars with engine power exceeding 225 kilowatts was extended to those above 185 kilowatts, at rates diminishing over the time elapsed since their registration.
7. In 2012, the government's priority shifted to spending cuts. It conducted a spending review to identify cuts in expenditure of about EUR 4.5 billion in 2012 and higher ones in future years. In mid-2012, a government decree based on the spending review was approved.
8. Several studies show that in regard to a given level of taxes, a higher incidence of direct taxes (especially on business activity) relative to indirect taxes is detrimental to economic growth. There is an overall consensus that growth-oriented reforms of the tax system should shift the burden of taxation from income to consumption and/or residential property and broaden the tax base, thereby allowing for reduction in tax rates (Johansson et al., 2008).
9. The tax on petrol was to increase by 7%, that on diesel by 12%, that on coal by 43%, that on natural gas by 2%, and that on heating oil by 52% for residential users and by 61% for industry.
10. The ITR on labour is the ratio of the revenue from taxes on labour income and social contributions to overall compensation of employees.
11. If environmentally related taxes are effective, the potentially harmful activity on which they are charged will decrease and the tax base will shrink. On the other hand, the improvement in resource and energy efficiency spurred by the tax can lead to rebound effects to the extent that it frees up resources which could be used on increased consumption of the environmentally harmful good (e.g. driving further more fuel-efficient cars).

12. Government expenditure on environmental protection, excluding expenditure by public entities specialised in the provision of environmental services.
13. This excludes investment made by enterprises operating in other economic sectors to remediate or minimise their own environmental impacts.
14. The tax will consist of two components: one based on the costs of providing the service (including investment costs); and the other on the amount of waste generated.
15. This includes pollution abatement and control (PAC) investment made by enterprises operating in all economic sectors to remediate or minimise their own environmental impacts, and excludes enterprises specialised in the provision of waste, water supply and wastewater management services. PAC expenditure includes expenditure on: ambient air and climate; wastewater management; waste management; soil and water; noise; biodiversity and landscape; radiation; and research and development.
16. End-of-pipe technologies are defined as those used to treat, handle or dispose emissions and discharges (water and waste) from production at the end of the production process. Investments in cleaner technologies, which are also called "integrated" technologies, are investments in new or modified production facilities designed so that environmental protection is an integral part of the production process, reducing or eliminating emissions and discharges.
17. Small and medium-sized enterprises invested about 46% of their total environmental investment in integrated technologies, compared to some 16% invested by large enterprises
18. The average price of a monthly pass in the main European capital cities is about 2.5 times higher than the price in Milan and Rome.
19. EU and national funds for regional development are disbursed on the basis of 66 national, multi-regional and regional operational programmes.
20. The allocations were: EUR 1.1 billion for water management; EUR 0.7 billion for waste management; EUR 1.6 billion for prevention of hydrogeological and other natural risks, including adaptation to climate change; EUR 0.1 billion for conservation and sustainable use of biodiversity in natural protected areas; and EUR 0.5 billion for rehabilitation of contaminated sites.
21. Following the OECD/Eurostat definition, the EGS sector includes the production of technologies, goods and services whose main goal is to prevent or minimise pollution and to minimise the use of natural resources.
22. Sales turnover refers to the main economic investment activities of the supply chain, including manufacturing, equipment distribution and installation, plant operation and maintenance.
23. Employment data cover both direct jobs (in manufacturing, equipment distribution, renewable energy production site operations) and indirect jobs (activity in sectors that supply the materials or components used by the renewable sector but not exclusively so). Data refer to gross employment, i.e. the data do not include jobs lost in other conventional sectors.
24. As of 2011, nearly 2 000 energy service enterprises were registered at the Regulatory Authority for Electricity and Gas, although less than 20% of them had been active on the market for White Certificates.
25. Directive 2006/32/EC on energy end-use efficiency and energy services defines an ESCO as an enterprise that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. Payment for the services delivered is based (at least in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria.
26. These include: Istituto Sviluppo Sostenibile Italia (2009), "Indagine sull'impatto delle politiche di mitigazione dei cambiamenti climatici sul sistema produttivo e sull'occupazione in Italia", report submitted to the Consiglio Nazionale Economia e Lavoro, Rome; Istituto di Economia e politica dell'energia e dell'ambiente (2009), "Prospettive di sviluppo delle tecnologie rinnovabili per la produzione di energia elettrica", report submitted to the Gestore dei Servizi Elettrici, Rome; Centro Europa Ricerche (2009), "La Conferenza di Copenhagen: scenari e impatto sul sistema economico italiano", report submitted to the Ministry of the Environment, Land and Sea, Rome; Osservatorio Internazionale sull'Industria e la Finanza delle Rinnovabili (2012), "Costi/Benefici delle Fonti Rinnovabili Elettriche al 2030 calcolati alla luce delle esperienze dell'ultimo quadriennio", AGICI Finanza d'Impresa, Milan.
27. 40% of foodstuffs procured by school canteens is required to be from organic farming.
28. For instance, more than 80% of students with an environmental masters degree found a job within a year (ISFOL, 2009).

29. Eco-innovation can be defined as the development and implementation of new, or significantly improved, technologies and products (goods and services), processes, marketing methods, organisational structures and institutional arrangements that lead to environmental improvements or more environmental benefits compared to relevant alternatives.
30. However, R&D activity is often under-recorded, especially in SMEs, which can bias Italy's innovation performance downward (OECD, 2009a).
31. "Triadic" patent families refers to patents filed at the European Patent Office (EPO), the Japan Patent Office (JPO) and the US Patent and Trademark Office (USPTO) which protect the same invention. Patent families are counted according to the earliest priority date (first patent application worldwide), the inventor's country of residence and fractional counts.
32. For 2007-13, more than 10% of EU and national funding for regional development policy was allocated to improving the educational system and human capital.
33. The number of patents filed under the Patent Co-operation Treaty, based on the inventor's country of origin.
34. In the OECD Creditor Reporting System Aid Activity Database, countries use policy markers to identify activities that have environmental objectives. Italy screened 100% of its sector allocable aid against the environmental marker in 2008-09.
35. The three categories include: Category A, which covers all industrial sectors with potential significant adverse environmental impacts, and plants located in or near sensitive areas and/or for which resettlement of local population is necessary; Category B, which applies to medium potential impact transactions requiring the acquisition of more complete and specific information in addition to that collected through a Screening Questionnaire; and Category C, which includes low potential impact transactions (e.g. studies and design, export of goods and individual equipment).
36. Special Drawing Rights (SDRs) are an international reserve asset created by the IMF in 1969 to supplement the existing official reserves of member countries. SDRs serve as the unit of accounting of the IMF and some other international organisations. Their value is based on a basket of key international currencies.
37. While observance of the Guidelines by enterprises is voluntary and not legally enforceable, 42 adhering governments are committed to promoting them and making them influential among companies operating in or from their territories.
38. The full final revised statement by the UK National Contact Point for the OECD Guidelines for Multinational Enterprises on the specific instance of the BTC pipeline is available in OECD (2011), *Annual Report on the OECD Guidelines for Multinational Enterprises 2011: A New Agenda for the Future*, Paris, OECD Publishing.

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PART II

Progress towards selected environmental objectives

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PART II

Chapter 4

Multi-level environmental governance: Water

This chapter examines Italy's water management policies from a multi-level governance perspective. It presents the main trends in water quality and quantity and in the development of water-related infrastructure, including regional differences. It provides insights on the evolution of policy, legal and institutional frameworks for water management, along with governance challenges in managing water resources. The chapter highlights the interconnection between governance and financing of water management and the way they can be addressed jointly through the mitigation of territorial and institutional fragmentation, better management planning, further engagement of stakeholders, improvement of the information base, and wider use of economic instruments for river basin management. Finally, this chapter presents efforts to improve Italy's water supply and sanitation sector and to strengthen its financial sustainability.

Assessment and recommendations

Despite relatively high average annual rainfall, freshwater availability per capita in Italy is one of the lowest among OECD countries. This is due to high evapotranspiration, rapid run-off and limited storage capacity. Uneven distribution of water between seasons and regions reinforces the complexity of water management. While northern Italy enjoys an abundance of water, the South experiences water shortages which are compensated by the increasing use of groundwater (often above the replenishment rate) and water transfers between regions. Overall, Italy is considered to be a water-stressed country, and competition for water resources among alternative uses is likely to increase in the future. Climate change will exacerbate these pressures.

Pollution pressures have lessened in the last decade due to improved pollution prevention and control, and, especially in the aftermath of the 2008-09 crisis, reduced economic activity. However, water resources still receive heavy pollution loads from industry, households and agriculture, particularly in the industrialised and densely populated North. Polluted water is an additional supply constraint. More than one-third of surface water bodies and 11% of groundwater bodies will not meet the EU Water Framework Directive (WFD) objectives for ecological status by 2015.

Water management in Italy was subject to significant reform before 2000. This included the pioneering introduction of a river basin approach, and the consolidation of water supply and sanitation services. Despite these advances, water governance remains overly complex, largely emergency driven, and oriented towards short-term problem solving. To address current strategic and legal uncertainties, there is an urgent need to formulate a strategic vision for the water sector. This vision should include: more effective multi-level governance; better policy coherence and planning aligned with national and local priorities; more systematic use of economic instruments; a better alignment of river basin authorities with hydrological boundaries; comprehensive and consistent information systems; and better financing and regulatory frameworks for service provision. The process of developing this vision should engage a broad range of stakeholders from national and subnational levels in setting objectives and developing innovative solutions.

In the 2000s, transposition of the EU WFD provided a further push for consolidating water-related legislation, streamlining water management institutions and increasing water-use efficiency. However, the measures implemented have further complicated the water governance system. Proposals were made in 2006 to replace river basin authorities with eight river basin districts to implement some of the main provisions of the WFD. However, they were blocked by interest groups on various grounds, including not always appropriate consultation with regions. The arrangements put in place by the government using emergency powers made the governance arrangements even more complex, with some river basins managed by multiple authorities. The river basin management plans that were subsequently produced to implement the WFD reflected the institutional uncertainty and provided little value-added compared to river management plans prepared by the regions.

Building on earlier reforms, there has been a substantial consolidation of water service providers. Following the designation of optimal territorial areas – ATOs – the number of water utilities was reduced from more than 8 000 to 115 over the last 15 years. This has helped achieve economies of scale, improve planning, and, in some cases, establish the operation of utilities on a more commercial basis. However, the governance of the water supply and sanitation sector remains weak and is characterised by uncertainty and ambiguity. The authorities established to oversee ATOs and utilities – AATOs – have lacked the means to effectively control water service providers. The contracts between AATOs and utilities were, in many cases, poorly structured, creating uncertainties about interpretation and conflict resolution. Participation of local representatives in both AATOs and water utilities has created conflicts of interest. Efforts to more clearly separate water utilities and municipalities have stalled. Measures to abolish AATOs were introduced but uncertainty about the institutions that should replace them has resulted in many continuing to operate. Further uncertainty has been created by the 2011 water referendum, which significantly reduced the role of the private sector. Uncertain and weak governance arrangements have resulted in poorer water service provision in Italy than in many other OECD countries (for example, unaccounted for water is relatively high, and access to efficient wastewater treatment infrastructure is relatively low).

A body that regulates tariffs was established in the 1990s and reorganised following adoption of the 2006 Environmental Code. However, this body remained weak, with no executive powers or capacity. As a result, tariffs were set at the level of ATOs. This in turn resulted in tariffs being set at levels which did not cover the costs of maintaining or renewing infrastructure, and a lack of transparency which created barriers for new market entrants. The recent allocation of water service oversight functions to the National Gas and Electricity Authority (AEEG) is a potentially positive step. Drawing on the experience of managing other utilities, this new regulatory framework is expected to strengthen the financial management of water utilities, including by: reducing regulatory and legal risks, particularly in areas of the country where such risks are considered high by financial markets; further promoting economies of scale and the wider use of innovative financial products that could help to spread the financing of water infrastructure over the lifetime of the assets; and introducing competitive benchmarking of the performance of water utilities.

Italy has applied a wide range of economic instruments for water management. However, the way they are implemented has not always led to more efficient use of the resource, and fails to generate the revenue needed to invest in infrastructure. For water supply and sanitation, although tariffs have increased, they are still much lower than in many other OECD countries. Substantial amounts of water used are not billed, and in several regions the collection of payments for water use remains low. Concerning the management of water resources more generally, instruments in use include water licenses, water allocation quotas, and various charges for water use and pollution releases. However, water abstraction charges remain low and exemptions are numerous. The ongoing reorganisation of water management and the revision of river basin district management plans provide an opportunity for introducing a comprehensive reform of water-related economic instruments and underline the need for reform of the wider legal framework. Responsibility for setting water charges and using the revenue generated should be more closely linked with river basin district planning and management.

Monitoring and data collection related to water quality and quantity remains a challenge at the national level and in several regions. In the past decade, and under the

leadership of the Environment agency (ISPRA), Italy strengthened its capacity to collect hydro-geological, physical and meteorological data in order to support real time monitoring and standardise methodologies across the country. However, there are still substantial information gaps, especially regarding water abstraction, at the regional and local level. Economic analysis is still poorly woven in the development of water policies. ISPRA and the Ministry of the Environment, Land and Sea have very few staff dedicated to the water economy. This lack of capacity could be bridged by drawing more on relevant expertise in academic institutions.

Recommendations

- Develop a common and long-term strategic vision of how the national government can most effectively support regional and local authorities in managing water resources, taking account of territorial disparities in resource endowments, policy priorities and capacities.
- Streamline institutional arrangements for managing river basins, and strengthen their efficiency and effectiveness, by aligning them as far as possible with water catchment areas and establishing one authority in each district; strengthen their planning capacity and ensure co-ordination with national and local priorities; ensure that adequate provision is made for stakeholder and public participation in decision making, and for transparency and accountability.
- More systematically apply economic instruments (abstraction and pollution charges, and user fees) to support the effective management and sustainable financing of water resources at the level of river basins, including to finance measures for adaptation to climate change.
- Ensure that the newly appointed water regulator has sufficient human and financial capacity to carry out the key regulatory functions for the water supply and sanitation sector, including to promote sustainable cost recovery and to benchmark the performance of water utilities.
- Strengthen the collection, analysis and dissemination of information on the economic and financial aspects of water resources management; strengthen the analysis of the drivers of, and trade-offs associated with, competing uses of water.

1. Key environmental trends

1.1. *Water availability and quality*

Italy's average annual rainfall of 1 000 mm/year is well above the European average. However, due to high evapotranspiration, rapid run-off and limited storage capacity, average freshwater availability for the population (2 900 m^3/per capita) is one of the lowest among OECD countries.

National data on freshwater abstraction are only partially available, but estimates indicate that total abstraction decreased by about 10% during the last decade. Despite this decrease, the rate of gross freshwater abstraction per capita is still high, and above the OECD average (Reference I.C). At a rate of about 30% of total available renewable water resources abstracted, Italy is classified as a medium-high water-stressed country according to the OECD definition.

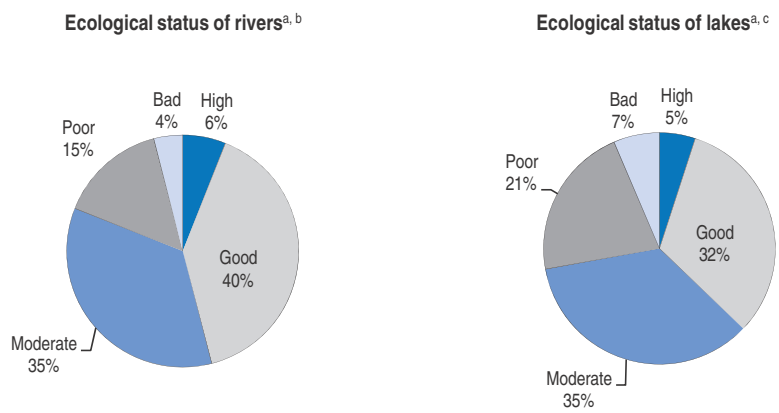
The agricultural sector remains the main water consumer, using nearly 50% of total water abstracted, mostly for irrigation.[1] Water demand for agriculture has decreased in the last decades, while future demand is forecast to stabilise at around the present level. About 19% of water is used by households,[2] 17% by industry[3] and 15% for cooling purposes in energy production.[4] Water abstraction for public water supplies, mostly from groundwater, has increased. It is the highest per capita among EU countries and is well above the OECD average. Water use by industry has declined since the early 1990s, but demand for water for cooling in energy production has increased.

Groundwater remains the main source of water for public supplies and industry. Signs of overexploitation have been recorded in the lower reaches of the plain of the Po River and around Venice due to industrial and agricultural uses as well as gas and oil extraction. In some regions the use of groundwater for irrigation above recharge rates is undermining the economic viability of farming. In the southern part of Apulia and in the coastal plains of Campania, Calabria and Sardinia groundwater withdrawal is the main reason for intrusions of saline water.

Average water quality in rivers has been stable, with class 2 (good) and class 3 (moderate) dominating. There has been a trend towards a decrease in class 5 (bad). In 2009, on average 46% of Italian waterways were classified as class 1 (high) or class 2 and 81% were in classes 1 to 3. About 72% of lakes were in these three top classes (Figure 4.1).

Figure 4.1. **Water quality**

2009



a) In evaluating the data, it should be taken into account that the number of monitoring stations varies across regions.
b) SECA index (Index on Ecological Status of Waterways). Excluding data from the following regions: Piedmont, Friuli-Venezia Giulia, Veneto, Umbria, Calabria, Campania and Sardinia.
c) SEL Index (Ecological Status of Lakes). Data are based on results from 140 monitoring stations in 12 regions; most of the lakes are located in Northern Italy.
Source: ISPRA (2010), *Environmental Data Yearbook 2010.*

StatLink http://dx.doi.org/10.1787/888932772894

For coastal bathing waters, the rate of compliance with both mandatory values and guide values increased between 1990 and 1999 and stayed relatively stable at above 90% in the 2000s. The number of bathing sites closed (i.e. sites where swimming was banned) during the summer season increased from 125 (2.6%) in 2002 to 310 (6.3%) in 2009, but it fell to 33 (0.7%) in 2010. Closing of these sites has been linked to toxic microalgae blooming, which occurs in many coastal regions.

Low water quality is mostly associated with "hot spots" which occur, in particular, where medium or small streams drain areas with large urban or industrial centres. The concentration of industrial sectors with a heavy environmental impact (e.g. tanning and textile industries in the North and food processing in the South, or Mezzogiorno) is the most important cause of pollution. Approximately 70% of livestock rearing in northern Italy has a significant impact on water quality. The low level of wastewater treatment is also an important factor.

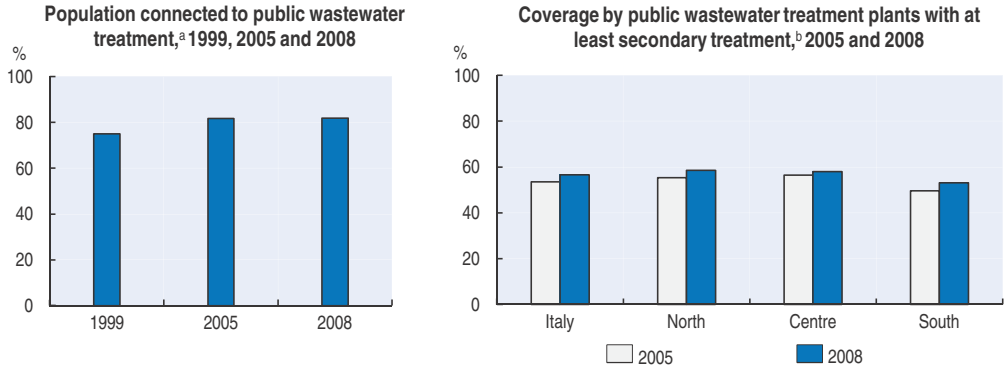
Although surface and groundwater quality has been improving due to the reduction of industrial pollution, investments in sanitation and better agriculture practices, analysis carried out in the context of preparing river basin management plans shows that 36% of surface water bodies and 11% of groundwater bodies will not meet the EU Water Framework Directive (WFD) objectives for ecological status by 2015, but rather in 2021 or 2027. Meeting these objectives will require increasing the efficiency of measures to control pollution from point sources (e.g. more efficient urban wastewater treatment in northern Italy and the extension of the network in the South) and reducing pressures from diffuse sources.

1.2. State of water supply and sanitation infrastructure

Italy has made progress in expanding infrastructure for water supply and for wastewater collection and treatment. In 2011, over 95% of the population had access to safe drinking water, with no significant differences across the country. However, supply networks experience a high level of non-revenue water, with the country-wide average at above 36%. Actual physical losses may be lower, as the data do not account for water not properly metered or paid for. Some estimates suggest, however, that illegal abstraction may account for between 4% and 20% of total water abstraction.

Progress in expanding infrastructure for collection and treatment of wastewater has been much slower. In 2008, 82% of the population was connected to public wastewater treatment plants, with around 60% of wastewater treated by advanced methods (Figure 4.2).

Figure 4.2. **Population connected to sewerage and wastewater treatment facilities**



a) Estimates referring to the population connected to the sewerage network and thus overestimating actual connection rates. Data may include some independent treatment; a breakdown by level of treatment is not available.
b) Based on data expressed in termes of population-equivalent of the domestic sector (excluding small, medium and large industry).
Source: MATTM; ISTAT (2009), *Censimento delle risorse idriche a uso civile.*

StatLink http://dx.doi.org/10.1787/888932772913

1.3. North-South disparities

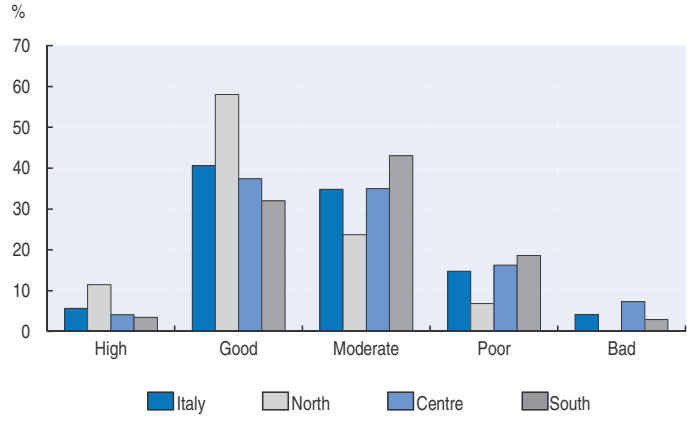
Italy's water challenges vary across regions, as do climate and precipitation. Water availability is low on average, but the situation differs between seasons and regions. While the northern parts of the country enjoy relatively stable and abundant flows in watercourses throughout the year, southern Italy often experiences long periods without precipitation which result in droughts and water rationing, including for household use. From a hydrological point of view, river networks vary significantly. There are large river basins fed by the Alps in the North, characterised by an abundance of water, while there are many watercourses with irregular outflow paths within smaller basins along the entire arc of the Apennine Mountains. The river network is sparse in the South, especially in the region of Apulia. The surface water deficit has been compensated by the growing use of groundwater and water transfers between regions. For example, Apulia, which suffers from low precipitation, limited watersheds and over-exploited coastal aquifers, has signed water resources transfer agreements with neighbouring regions including Basilicata and Campania. Around 60% of water used in Apulia comes from water transfers.[5]

Groundwater is also distributed unevenly. Out of approximately 13 billion m^3 of groundwater available annually, some 70% is located in the North in the alluvial plains, particularly in the Po River plain. Far lower volumes are available in the South. In some locations they are close to total depletion due to exploitation, mostly for agriculture.

The quality of surface and groundwater also differs across Italy. River quality is better in northern Italy, where 70% is class 1 or 2, compared to 44% and 35% in the Centre and South (including the islands) respectively. About 22% of rivers in the South (8% in the North) are classified as poor or bad quality (Figure 4.3). Groundwater quality shows significant regional differences. For example, in the regions/provinces of Trento, Bolzano, Liguria, Lazio and Marche, between 75% and 93% are classes 1 to 3; in Abruzzo and Umbria, 43% and 32% respectively are class 4 (poor). In Emilia-Romagna and Apulia, 57% and 52% of monitored points are class 0, denoting poor quality due to natural causes.[6]

Figure 4.3. **Ecological status of rivers**[a]

2009



a) SECA index (Index on Ecological Status of Waterways). Excluding data from the following regions: Piedmont, Friuli-Venezia Giulia, Veneto, Umbria, Calabria, Campania and Sardinia. In evaluating the data, it should be taken into account that the number of monitoring stations varies across regions.

Source: ISPRA (2010), *Environmental Data Yearbook 2010.*

StatLink http://dx.doi.org/10.1787/888932772932

Availability of resources for drinking water supply is threatened by qualitative factors in the North and quantitative ones in the South. Water supplies in the North rely substantially on underground resources that are increasingly contaminated due to agriculture and urban and industrial discharges. In the South, the main challenges are related to limited storage capacity and competition between different water users.

The southern regions face significant challenges with respect to water infrastructure. Water supply in many areas is inadequate, especially in Sicily. Around 20% of households in the South complain about an irregular supply of water from the tap, with rates as high as 27% and 32% in Sicily and Calabria, respectively. Peak summer demand due to tourism represents another pressure that adds to scarcity problems. At the same time, the rate of non-revenue water in the networks in the South is high, reaching 47% in Apulia. The share of the population connected to wastewater networks with treatment remains much lower in the South, at a level of 70%, and can be as low as 55% (e.g. in Sicily). The application of advanced wastewater treatment technologies is also low (Figure 4.2). All of Italy's regions face problems of aging infrastructure, but these problems are particularly acute in the South. The average age of treatment plants is 21 years in Apulia, but some sewerage networks can be 50 years old or more.

2. Evolution of the policy, legal and institutional framework for water management

2.1. Three major water reforms in two decades

By the turn of the century, Italy had developed a comprehensive policy and institutional framework for water management. This framework was shaped by two key reforms. The first followed adoption of the 1989 Water Resources and Soil Conservation Act, which helped to co-ordinate sectoral policies concerning water use, water pollution reduction and soil conservation. By establishing river basin authorities as the basis for water management, the Act placed Italy in the forefront of water reform among EU countries. The second wave of reforms followed the 1994 Galli Law, which helped mitigate territorial fragmentation of water and sanitation services through aggregation and rationalisation of the sector (Box 4.1).

Since 2000, the EU Water Framework Directive (WFD) has been a key driving force for the development of the legal, planning and institutional framework for protection and restoration of clean water across Italy, and for ensuring its long-term sustainable use. By transposing the WFD, Italy committed to meet a number of specific objectives, including its ultimate objective of achieving "good ecological and chemical status" for all Community waters by 2015 (Box 4.1).

Italy's 2002 Environmental Action Strategy for Sustainable Development echoed the objectives of the WFD and established a number of operational objectives, such as reducing leakage in water supply systems, reducing water consumption and re-using treated wastewater, particularly in agriculture, and reducing the pollution load, particularly through wastewater infrastructure development. Quantified, measurable and verifiable targets were also set for the eight regions of southern Italy and for the Ministry of Public Infrastructure in implementing the regional development policy and the use of EU Structural Funds.[7] Specific water infrastructure targets set in 2007 included reducing the rate of water losses in the network from 38% to 25% and increasing the share of the population served by wastewater treatment plants from 57% to 70% by 2013.

Box 4.1. **Italy's water reform: objectives and scope**

The 1989 Water Resources and Soil Conservation Act (Decree 183/1989) set out the principles of integrated water resources management and developed a structured water policy, while reorganising competences between the central government and local administration. The Act was innovative in three main ways: it defined a river basin as an optimal area of intervention for an integrated policy of soil protection and water management; it created river basin authorities, which involved participation of both the state and the regions; and it made provisions for designing river basin plans. Under this new law, Italy was divided into 6 watersheds of national significance, 18 watersheds of inter-regional significance, and 20 watersheds of regional significance. The Serchio River was identified as an experimental watershed. Subsequently, basin-wide hydrogeological risk exposure plans were developed along with water quality protection plans, which identified the interventions and measures necessary to reach and maintain both the quality and quantity objectives for the water system. These plans were based on the concepts of "water balance" and "compatible water uses" with respect to the use priority and both the quality and quantity characteristics of different uses.

The 1994 Galli Law (Law 36/1994) aimed to improve the water supply and wastewater sector by establishing a clear-cut separation between service provision and public administration activities, and by improving overall efficiency through the gradual independence of the financial systems and operations based on income derived from water and wastewater tariffs (the polluter pays principle, and full cost recovery of both management and investment costs). The Galli Law reduced fragmentation of water services through the aggregation of utilities into larger multi-municipal units called Optimal Territorial Areas (Ambiti Territoriali Ottimali, ATOs), managed by autonomous authorities with a legal status. The reform provided for economies of scale and horizontal integration (one operator for each ATO), as well as economies of scope and vertical integration.

Adoption of the EU Water Framework Directive in 2000 prompted a number of legal and institutional steps that aimed to strengthen the water management framework and harmonise Italy's legal framework with EU requirements. Anticipating the WFD, the 1999 Water Quality Management Framework Act (Decree 152/1999) introduced the concept of quality objectives for water bodies, integrated supply and demand side policy instruments for achieving good ecological status for water bodies, and instruments for protection of groundwater. The Act also implemented the EU Wastewater and Nitrates Directives. Moreover, it required the regions to develop monitoring programmes for surface and groundwater in order to establish a coherent and comprehensive view of the physical, chemical, biological and hydrogeological status within each river basin.

The 2006 Environmental Code (Decree 152/2006) formally introduced the WFD requirements into Italy's legal framework. This legal text reclassified the entire national environmental legislation for pollution control, environmental impact assessment, and environmental decision making (Chapter 2). Part III defined water environmental standards and conditions for water resources management. In transposing the WFD, the Environmental Code divided the Italian territory into eight river basin districts (Serchio, Padano, Eastern Alps, Northern Apennines, Central Apennines, Southern Apennines, Sardinia and Sicily) and defined environmental and public health standards for water resources. It also introduced the principle of cost recovery and confirmed public ownership of coastal and internal waters and groundwater, which had been extended to groundwater by the Galli Law.

Adoption of the 2006 Environmental Code brought the Italian legal system closer to the requirements of the WFD. It introduced river basin districts, required economic analysis of water management and confirmed the full cost recovery principle. As a result, different regulations on water protection and water services are now contained in one legislative document. However, the reform process was spread over time and, to date, the implementation of some its provisions is pending mainly because of difficulties in introducing and using the new model of governance. Indeed, the river basin districts designed by the Environmental Code, which involved the state, the river basin district authorities and the regions, required more time for proper strategic planning and sequencing. Implementation of the reform was re-launched in 2009, but some of the steps envisaged by the WFD have not been implemented (Box 4.2). In March 2012, the EC delivered a reasoned opinion on Italy's failure to transpose a number of the WFD's articles correctly, including the lack of some measures to achieve the "good status" objectives set for river basins before the agreed deadline and the requirement to keep an updated register of protected areas. Italy's failure to reply in a satisfactory manner may lead to it being referred to the EU Court of Justice.

Several water-related legal acts adopted at the national level guided the national water management policy. However, implementation on the ground has been uneven due to environmental and socio-economic differences across the country, different approaches and lack of coherence across levels of government, as well as the absence of a coherent and common information frame of reference for decision makers. Poor monitoring and evaluation of water policy outcomes, and a mismatch between administrative responsibilities and available funding for public authorities to carry out their duties were also important factors. In addition, it has been suggested that unco-ordinated distribution of water management tasks among several actors from different administrative levels (including the central government, regional governments, river basin or district authorities, ATOs, provinces, and reclamation and irrigation boards) is a barrier to timely and adequate implementation of the WFD.

To address current strategic and legal challenges, Italy might consider formulating a long-term strategic vision which could help define clear policy objectives, in line with the WFD, and improve performance of the water sector. This vision could point towards more effective multi-level governance, better policy coherence and planning (including climate change scenarios), more systematic use of economic instruments, alignment of river basin authorities, comprehensive and consistent information systems and public participation, and better financing and regulatory frameworks for service provision. The process should provide a basis for engaging a broad range of stakeholders from the national and subnational level in applying innovative solutions.

The development of a vision for reform of the water sector should also take into account North-South asymmetries in terms of access, quality and quantity of water (in order to rebalance regional disparities), and define the contributions and scope of action across levels of government needed to make water reform happen. Such a strategic vision would require a high level of leadership and commitment to raise the profile of water on the national reform agenda. Its development would also benefit from a bottom-up approach and public participation mechanisms to align visions across multiple stakeholders and create collective commitment and ownership through better transparency, information disclosure, enforcement and compliance.

Box 4.2. **EU Water Framework Directive requirements and status of their implementation in Italy**

The 2000 EU Water Framework Directive (2000/60/EC) established a number of objectives, such as preventing and reducing pollution, promoting sustainable water use, environmental protection, improving aquatic ecosystems, and mitigating the effects of floods and droughts. Its ultimate objective is to achieve "good ecological and chemical status" for all Community waters (inland surface, transitional and coastal waters, as well as groundwater) by 2015.

Requirements of the WFD	Status of Implementation in Italy
• Identify all river basins lying within the national territory and assign them to individual river basin districts (river basins covering the territory of more than one member state will be assigned to an international river basin district)	River basins were assigned to individual river basin districts in 2006. However, river basin districts identified in Italy aggregate several "sub-units" made up of individual river basins. The complexity of the country's hydrographic system (some regions with no rivers, others with large rivers, barriers related to the Appenines, water transfers) has led to a complex aggregation of small- and medium-sized river basins that requires further streamlining.
• Designate a competent authority for application of the rules provided for in this Framework-Directive within each river basin district	Existing authorities assigned in 2006 (Table 4.1) and later in 2009 to prepare river basin management plans. A report on the competent authorities for implementation of the WFD according to Article 3 of the WFD was submitted to the European Commission, with a delay. District authorities not established due to an incomplete legal framework, as the ministerial decree aggregating and transferring the competence and funding from the existing river basin authorities to the new authorities was missing.
• By 2004 at the latest, produce an analysis of the characteristics of each river basin district; a review of the impact of human activity on water; an economic analysis of water use; a register of areas requiring special protection; and a survey of all bodies of water used for abstracting water for human consumption and producing more than 10 m^3 per day or serving more than 50 persons	Produced by the competent authority in July 2006 with a delay of one year.
• By 2009, produce management plans for the period 2009-15 for each river basin district, taking account of the results of the analyses and studies carried out	Management plans produced by 2010, but economic analysis only partially carried out. Plans lack monitoring of the status of surface and groundwaters. Although they fulfil the requirements of the WFD, the programmes of measures to achieve the "good status" objectives set for river basins need to be specified in an appropriate level of detail. RBMPs contain characterisation of water bodies. Water quality status is defined, but in most cases it is based on a classification system not compliant with the WFD, due to delays in the transition to a new monitoring system and delays in establishing new monitoring methods.
• Encourage participation by all stakeholders in the implementation of this Framework-Directive, specifically with regard to the management plans for river basin districts (the management plans must be submitted to public consultation for at least six months)	Partially ensured. Management plans subject to public consultations for two months and subject to strategic environmental assessment.
• From 2010, ensure that water pricing policies provide adequate incentives for users to use water resources efficiently and that the various economic sectors contribute to recovery of the costs of water services, including those relating to the environment and resources	Partially ensured. Progress in increasing water supply and wastewater charges. Water abstraction charges for industry and agriculture are still low and do not recover the costs of water services. Some users are still not subject to a water abstraction charge.
• By 2012, implement the management plans to prevent deterioration, enhance and restore bodies of surface water, achieve good chemical and ecological status of such water by 2015 at the latest, and reduce pollution from discharges and emissions of hazardous substances	Pending. In some cases river basin authorities are required to prepare operational plans to ensure that the measures of the plans are operational by 2012.
• Protect, enhance and restore the status of all groundwater bodies, prevent pollution and deterioration of groundwater, and ensure a balance between groundwater abstraction and replenishment; preserve protected areas	Ongoing

2.2. A tool for diagnosing multi-level governance gaps

The multiplicity of interdependent actors involved in water policy at different levels can generate multi-level governance gaps that need to be diagnosed and bridged to mitigate institutional and territorial fragmentation. The OECD Multi-level Governance Framework provides a tool to support policy makers in making such a diagnosis. This framework identifies seven co-ordination and capacity challenges that countries frequently face, regardless of their institutional setting (unitary, federal), hydrographic characteristics (water-rich, water-scarce) and organisation of water policy (centralised, decentralised) (Table 4.1). The degree to which effective co-ordination and implementation of integrated water policy may be hindered by multi-level governance gaps varies across Italy's regions, but common governance challenges can be diagnosed. The following sections address key governance issues in Italy's sector through the lens of the gap framework. Section 2.3 provides for an institutional mapping of key public actors at national and subnational level in water policy design, regulation and implementation to illustrate the policy gap. The governance issues related to management of water resources and services, and the policy responses adopted, are discussed in Sections 3 and 4.

Table 4.1. **OECD Multi-level Governance Framework: a tool for diagnosing co-ordination and capacity gaps in the water sector**

Administrative gap	Geographical mismatch between hydrological and administrative boundaries. This can be at the origin of resource and supply gaps. • **Need for instruments to reach effective size and appropriate scale.**
Information gap	Asymmetries of information (quantity, quality, type) between different stakeholders involved in water policy, either voluntary or involuntary. • **Need for instruments for revealing and sharing information.**
Policy gap	Sectoral fragmentation of water-related tasks across ministries and agencies. • **Need for mechanisms to create multi-dimensional/systemic approaches and to exercise political leadership and commitment.**
Capacity gap	Insufficient scientific, technical, infrastructural capacity of local actors to design and implement water policies (size and quality of infrastructure, etc.) as well as relevant strategies. • **Need for instruments to build local capacity.**
Funding gap	Unstable or insufficient revenues undermining effective implementation of water responsibilities at subnational level, cross-sectoral policies and investments requested. • **Need for shared financing mechanisms.**
Objective gap	Different rationales creating obstacles to adopting convergent targets, especially in case of motivational gap (referring to the problems reducing the political will to engage substantially in organising the water sector). • **Need for instruments to align objectives.**
Accountability gap	Difficulty ensuring transparency of practices across different constituencies, mainly due to insufficient user commitment, lack of concern, awareness and participation. • **Need for institutional quality instruments.** • **Need for instruments to strengthen the integrity framework at the local level.** • **Need for instruments to enhance citizen involvement.**

Source: OECD, 2011b.

2.3. Institutional setting

Italy's water institutional organisation is characterised by multiple actors involved at central government level, and a wide range of authorities at the subnational level (Annex 4.A1 and 4.A2). The main governance challenges lie in the need to integrate different sectoral and territorial institutions in water strategic planning and design at central government level, and to co-ordinate activities across diverse subnational actors and between levels of government.

At the national level, six ministries and public agencies are involved in water policy design, regulation and implementation. This level of institutional fragmentation at central government level is similar to that in many other OECD countries.[8] Since 1999, the Ministry of the Environment, Land and Sea (MATTM) has been responsible for water policy and co-ordinating river basin authorities. It is in charge of planning, priority-setting, and establishing overall frameworks for water resources management and water services provision (quality, continuity, access and tariffs). Other ministries involved in water management include: the Ministry of Infrastructure and Transport (MIT), which manages national scale infrastructure (i.e. long-distance water transfers); the Ministry of Agricultural, Food and Forestry Policies (MIPAAF), which plays a crucial role in strategic planning, priority-setting, information, monitoring and evaluation related to water for irrigation agricultural practices and related to nitrogen and pesticide use; the Ministry of Economic Development (MSE), which plays an equivalent role regarding water use by industries; and the Ministry of Health, which oversees drinking water standards and is involved in water monitoring, including that of bathing waters.

During most of the review period, oversight of water services was the responsibility of the Water Resources Surveillance Committee (Comitato per la Vigilanza sull'uso delle Risorse Idriche, COVIRI), created by the Galli Law. The COVIRI was responsible for monitoring implementation of water services, proposing rules for tariff definition and tariff setting, as well as protecting customers' interests. In November 2011, all these responsibilities were transferred to the Regulatory Authority for Electricity and Gas (AEEG), which had accumulated vast experience in defining and analysing public utility tariffs.

The Institute for Environmental Protection and Research (ISPRA), under the MATTM, is responsible for technical support for defining rules, norms and standards for water discharges, collecting geophysical and meteorological data, and co-ordinating the action of Italy's regional environmental protection agencies (ARPAs), which operate in each region.

The uneven nature of decentralisation, and successive delays in implementing national regulations, have generated several layers of bodies that manage water resources and provide water services at the subnational level. These include:

- *Regions and provinces,* which oversee quality and quantity monitoring of surface and groundwater, design plans for water use, update planning instruments, and regulate water service investment plans. They are also responsible for water licensing, compliance monitoring, and administrative non-compliance response.
- *River basin authorities,* which are responsible for drawing up river basin management plans and ensuring consistency between the river basin plans and European, national, regional and local rules.
- *Authorities of Optimal Territorial Areas (AATOs),* which are inter-municipal structures responsible for contracting and overseeing the provision of drinking water and wastewater services to the population in areas under their jurisdiction. They develop technical and financial plans, select operators, decide on service levels and tariffs, and enforce water service contracts.[9] All local authorities covered by an AATO adhere to it and take part in its decision-making and management process.
- *Reclamation and Irrigation Boards,* which control land reclamation and water distribution for irrigation. They are managed by associations of landowners.[10]
- *Local communities,* which take part in the implementation of water management plans adopted by each region; their competences therefore vary across the country.

3. Governance challenges in managing water resources

3.1. Aligning river basins and authorities

Historically, responsibilities related to water management have rested with the regions in regard to quality aspects and with the state (principally the Ministry of Public Works) in regard to quantitative issues. Regions have enacted their own laws and prepared water-related plans. The 1989 reform established a number of river basins of national, inter-regional or regional importance (Table 4.2). Since 1999, each region has been required to draft a water protection plan (Piano di Tutela delle Acque) to achieve the environmental objectives defined by the basin authority.

Table 4.2. **River basin districts and river basin district authorities under the EU Water Framework Directive**

River basin district	River basin coverage (km^2)	Basin authorities (BAs) and regions assigned to be in charge of river basin districts	Other existing river basin authorities	Regions within the river basin district
Eastern Alps	38 385	• Regional BA for Isonzo, Tagliamento, Livenza, Piave, Brenta-Bacchiglione Rivers • National River Adige BA • Veneto Region • Trento Autonomous Province	• National Basin Authority Alto Adriatico • Inter-regional Basin Authority for Lemene, Fissero, Tartaro and Canalbianco Rivers	Trentino-Alto Adige, Friuli-Venezia Giulia, Veneto
Padano	74 115	• National River Po BA • Piedmont Region		Emilia-Romagna, Liguria, Lombardy, Piedmont, Tuscany, Aosta Valley, Veneto
Northern Apenines	39 000	• National River Arno BA • Inter-regional River Magra BA • Inter-regional River Fiora BA • Inter-regional River Reno BA • Liguria Region	• Inter-regional Basin Authority Conca Marecchia • 6 Regional River Basin Authorities (Liguria, Toscana, Uniti/Montone/Ronco/ Savio/Rubicone/Uso Rivers, Foglia/ Arzilla/Metauro/Cesano/Misa/ Esino/ Musone, Lamone, Costa Romagnola)	Emilia-Romagna, Lazio, Liguria, Marche, Tuscany, Umbria
Serchio	1 600	• River Serchio BA		Tuscany
Central Apenines	35 800	• National River Tiber BA	• 2 Inter-regional River Basin Authorities (Tronto, Sangro) • 3 Regional Basin Authorities (Abruzzo, Lazio, Potenza/Chienti/Tenna/Ete/ Aso/ Menocchia/Tesino/Marche)	Abruzzo, Emilia-Romagna, Lazio, Marche, Molise, Tuscany, Umbria
Southern Apenines	68 200	• National River Liri-Garigliano and Volturno BA • Campania Region	• 7 Inter-regional Basin Authorities (Sele, Sinni/Noce, Bradano, Saccione/ Fortore/Biferno, Ofanto, Lao, Trigno) • 5 Regional Basin Authorities (Campania, Apulia, Basilicata, Calabria, Molise)	Abruzzo, Basilicata, Calabria, Campania, Lazio, Molise, Apulia
Sardinia	24 000	• Sardinia Region (Regional Sardinia BA)		Sardinia
Sicily	26 000	• Sicily Region (Regional Sicily BA)		Sicily

Source: EC, 2007.

In 2006, a new framework for managing Italy's waters was introduced. It divided the country into eight hydrographical districts. These districts aggregated existing river basins into larger management units. The reform aimed to increase the efficiency of the management system and respond to the requirements of the WFD (Table 4.2). The 2007 report from the European Commission stated that decisions to consolidate territories

previously belonging to different river basins were often not made in line with the WFD intentions. For example, river basins which drain into the Tyrrhenian and Adriatic Seas were grouped together, thus combining waterways which flow in opposite directions. This is the case in the Northern, Central and Southern Apennine river basin districts. The Serchio River Basin District (RBD) was kept separate although it is much smaller than the other management units. At the same time, it divides the Northern Apennine RBD into two separate areas, so that the Ligurian river basins are not linked with the rest of the Northern Apennine RBD. Although the issue of delineation of Italian river basin districts was not included in the infringement procedure concerning the implementation of the WFD, and some of these features are due to the challenge posed by the hydrographic features of the country, the division of Italy into water districts is not optimal and complicates effective river management.

The 2006 reform also formally abolished numerous river basin authorities established under the 1989 law and envisaged the creation of eight river basin district authorities (RBDAs) as entities competent to manage river basin districts. The RBDAs were expected to take over planning and programming functions, including the development of District Management Plans. However, the new institutional framework encountered serious opposition from interest groups and experts, including an influential NGO, the "183 Group".[11] Interest groups accused the authorities of introducing arbitrary delimitations of the hydrological basins without adequate consultations with the regions, inconsistency of the new framework with the previous water basins arrangement and the European directives, and lack of transition periods for appropriate introduction of the new framework. Due to difficulties in introducing the new governance system, the RBDAs were not created. To fill the gap and avoid non-compliance with the WFD, a new legal framework created in 2009 assigned the task of developing the first river basin management plans (RBMPs) to six selected, already existing national river basin authorities in co-operation with the regions belonging to each district (Table 4.2).[12] In the case of the regional districts of Sardinia and Sicily, responsibility was assigned to the regions.

This type of arrangement would not be problematic if there were one authority for two or more districts, as in many other OECD countries. However, in Italy the opposite was the case: more than one management authority was assigned for a single district. While the former Law 1989/183 was coherent with respect to the river basin approach, the design of the new districts introduced unnecessary complications to an already functioning framework. For example, the Northern Apennines is now managed by five different authorities and the Eastern Alps by four (Table 4.2). In fact, all inter-regional and regional river basin authorities established under the 1989 decree were still operational, e.g. including 13 river basin authorities in the Southern Apennines district, pending the institution of river basin district authorities. Arrangements were made to establish a co-ordinating committee, but these arrangements diluted responsibilities, multiplied management layers, created competition between authorities, and delayed the development of river basin district plans. In general, the national river basin authority acts as a co-ordination authority for the regions and only indirectly, through the regions, for regional/inter-regional basins. In the case of the Eastern Alps, two national river basin authorities are involved, i.e. the Adige and Alto Adriatico River Basin Authorities. In practice, for the purpose of implementing activities under the RBMP, the two national basin authorities work together and share management bodies, including the Secretary-General.

Conflicts between authorities were not solved through this sequence of reforms and adjustments to the institutional setting. Although the competences of each authority and administration are set out in legislation, the lack of a clear understanding of the hierarchy between the different administrative levels (i.e. regions, provinces and river basins, ATOs, irrigation boards, and their respective water management plans) has made interactions complex and not conducive to addressing tensions between stakeholders with divergent views. Another obstacle to proper implementation of the WFD is the conflict between national authorities and the regions, as well as regulatory uncertainty due to the perception of continuous changes in the institutional framework. Indeed, when the river basin authorities became river district authorities, the central government acquired more power regarding river basin management while the distribution of power among the state and the regions had previously been more clearly defined. The district authority is now considered a source of conflict between the state and regions, instead of being a planning and co-ordinating authority.

3.2. River basin management plans

The delay in identifying river basin districts and attributing competences to the district authorities reduced the time available for developing river basin management plans (RBMPs) before the WFD deadline of December 2009. To avoid non-compliance procedures by the EU, the deadline was extended and Italy introduced specific procedures, with strict timetables, which allowed the competent authorities (national river basin authorities and regions) to develop the RBMPs. The MATTM provided specific guidelines for plan finalisation and approval.

The first versions of eight RBMPs were adopted by the end of July 2009 and submitted for strategic environmental assessment (SEA), as required by national legislation, and for public consultation, as foreseen by the WFD and the national SEA procedures. All eight RBMPs were approved in 2010.[13] Some RBMPs presented a detailed analysis of the state of surface and groundwater bodies and a summary of significant pressures and impacts of human activities on the status of water bodies (Box 4.3). However, in other cases they fell short of WFD requirements on a number of counts. This included: limited identification of protected areas; limited mapping of monitoring networks and results; incomplete lists of environmental objectives; limited economic analysis of water use, investments and the determination of investment needs; and gaps in the programme of measures to achieve a good ecological status of water bodies.

The difficulties encountered in implementing the WFD reflected, in particular, the inability to provide an appropriate evaluation of measures, as revealed by the status and content of the river basin management plans. Due to late implementation of the WFD and the national provision for the preparation of the plans, proposed measures were designed in only a few months and their evaluation was mostly carried out in parallel with their selection and design, and hence without sufficient detail. According to WWF Italy, the RBMPs do not present any substantial modification of the regional water protection plans (Piani di Tutela delle Acque) and the new guidelines and measures included in the plans are superficial and vague. In many cases, use of water for irrigation was not included due to separate management structures and particular requirements. This created problems of policy co-ordination and effectiveness, especially since in many river basins water withdrawals for irrigation prevail. Adequate implementation was also hindered by lack of resources. The first round of RBMP preparation, in particular, was carried out without any additional resources from the Italian central government.

Box 4.3. **Governance and planning in the Po River basin district**

The Po River basin is the largest river basin in Italy, covering an area of 74 700 km^2 or 24% of the country's territory. Its main river channel is Italy's longest (650 km) and its level of pollution discharge is the highest. The river basin district includes seven regions and one autonomous province (Aosta Valley, Piedmont, Lombardia, Liguria, Emilia-Romagna, Veneto, Toscana and Trento), with a total population of about 17 million. This river basin is a strategic asset for the Italian economy, as it generates nearly 40% of national GDP through intensive industry, agriculture and tourism. About 37% of the country's industries are concentrated in the basin area, while the basin's agricultural production accounts for 35% of Italy's total agricultural output.

In dry years, water availability creates conflicts among users, particularly during the summer when water consumption for agriculture is highest while water is retained in upstream dams for hydropower production. Concerning water quality, surface and groundwater is affected by discharges from industries, agriculture and households. Surface waters suffer from euthrophication, and groundwater from high concentrations of nitrates and coastal aquifers from salt intrusion.

The management structure of the Po River basin district includes the Institutional Committee, which is its executive body. The Institutional Committee comprises five national ministries (environment; infrastructure and transport; agriculture and forests; cultural affairs; and home affairs) and the presidents of the seven regions and the autonomous province of Trento. The Committee is formally chaired by the Minister of the Environment, while the Secretary-General, appointed for five years by the Institutional Committee, is in charge of preparing and implementing the Committee decisions. A Technical Committee, composed of experts from government agencies, ISPRA and the regions, and a Technical and Operational Secretariat carry out technical work.

In many respects the river basin authority anticipated the WFD requirements before 2000. Knowledge developed, based on data collected since 1992, allowed identification of the most critical environmental issues within sectors, as well as development of the process of planning and intervention in the river basin area in order of priority, with efficient and effective results. Many critical issues have been addressed in regional protection plans, and various measures have been implemented. Following the requirements of the WFD, the Institutional Committee adopted the Po River Basin District Management Plan in 2010. The plan must still be approved by the Council of Ministers, but some general and urgent measures came into force during a temporary transitional period and are being implemented by the authority and through planning at lower level, by means of regional protection plans.

The Po River Basin District Authority (RBDA) has opted for an extension of the deadline for achieving good status of water up to 2027. The arguments put forward include technical unfeasibility to achieve the required improvements by the deadline of 2015, and the fact that achievement of these improvements would generate disproportionate costs. Concerning the former, the Po RBDA states that further background studies are required to better understand the reasons for the alteration of water bodies' ecological status. With respect to the latter, the RBDA states that further cost-benefit analysis is needed.

3.3. Use of economic instruments for river basin management

Italy has a long experience with applying economic instruments to manage water resources. These instruments include abstraction fees (even if traditionally very low), irrigation fees, industrial wastewater discharge treatment fees, and charges for the use of

rivers or for withdrawal of sand and inert material from the river beds. Although some efforts have been made to increase the rates and expand their scope, their application is fragmented and disconnected from river basin management planning and investment (Chapter 3).

Particular efforts have been made to increase the impact of fees applied for irrigation. These are the payments to the Reclamation and Irrigation Boards made by farmers for the use of water. Although area-based charges are still widely applied and vary across Italy, the actual rates increased during the review period from EUR 5-14/ha to EUR 30-100/ha in the South and from EUR 20-30/ha to EUR 50-150/ha in the North. Rates up to EUR 700/ha can be applied in some regions with certain water shortages. The fees are also differentiated according to irrigation technology, type of crops and type of irrigation. Some collective systems, mainly located in the South, adopt metering together with a per volume charge which can vary significantly (from EUR 0.04 to EUR 0.20/m³).[14] Water use is coupled with a user-based allocation mechanism for collective irrigation systems.[15] Although the approach of linking water use with payments and the quota system is sound, fee levels are still low and water permits are issued by the regions rather than by river basin management authorities. The revenues from irrigation fees are used to support local investment managed by the Reclamation and Irrigation Boards. While many boards often show a balance between revenues and operational costs, public resources are filling the gaps, reaching as much as 50% of operational expenditure. This occurs particularly in the South, where the capacity of boards to raise the level of charges effectively and collect payments is much lower.

Less progress has been made in reforming payments for industrial use of water. Although industry users pay for water supplied by public networks, most use their own groundwater supplies, which have not been subject to water abstraction payments. Only recently have some regions (e.g. Piedmont and Lombardy) started to raise water abstraction taxes. Wastewater charges are applied, and are linked to permits issued by public authorities. They are set on the basis of effluent quantity and quality and tend to respect the full cost recovery principle.

Fragmentation of water management, delays in introducing river basin authorities, and rushed preparation of river basin district plans have prevented detailed analyses of the use of economic instruments and their impacts on water management. The current revision of river basin plans provides an opportunity to analyse experience with the use of fees, charges and taxes, including their incentive and revenue raising effects. This analysis should also review institutional arrangements which can enhance watershed approaches to water use and pollution reduction and explore the relations with water abstraction licensing and environmental permitting. Multiple stakeholders (e.g. ISPRA, regional environmental agencies, river basin authorities and the research community) can help pool knowledge, meet their mutual needs and strengthen capacity building. As ISPRA takes part in the technical committees of national river basin authorities, it can play an advisory role with respect to environmental economics and how this should be used in basin management. Wider involvement of the research community should be promoted to broaden analytical capacity.

3.4. Public participation

Public participation mechanisms and transparency in decision making are important elements of any governance system. Mechanisms for engaging the public in the preparation of Italy's river basin plans have included consultation events involving

authorities from the national and local level, business, the research community and NGOs, and the provision of information, mainly through publication of official documents on the websites of the RBDAs and press releases. In some cases, such as during the elaboration of the Po River Basin District Plan, discussions have resulted in the setting up of permanent panels on specific themes such as agriculture, industry, energy, research and innovation, tourism, fishing and biodiversity. The consultation process has also been combined with SEA procedures, which requires basin authorities to make the river basin plans available for public consultations for a period of 60 days.

Although mechanisms exist for public participation in water resource management and water services provision, experience with constructive engagement has been limited, thus generating an accountability gap. Delays in developing river basin plans have shortened the consultation period and events have focused on one-way presentation of draft plans, which has not allowed in-depth discussion. Public debate takes place on the basis of limited data and tends to be passionate and confrontational.

Unofficial consultations are also carried out, particularly when actual implementation of measures falls under the authority of bodies other than river basin authorities. They are used to reach agreements ("river contracts") between the public administration and private actors (generally through their representative associations) for defining and implementing specific measures. In the Carpi district, for example, an agreement was reached to respond to over-abstraction of groundwater by the textile industry. The industry committed to voluntarily halt abstraction and to create a joint water supply and wastewater treatment company with the public bodies which would provide water from sources other than groundwater (including reuse of treated effluents).

A number of public campaigns and actions have been carried out by NGOs. For example, the WWF has been active in country-wide awareness raising and educational activities including the production of analytical reports on water management in Italian river basins, filing of complaints over illegal activities, and reaching agreements with other parties to promote river restoration, such as "a pact on rivers" with the Young Entrepreneurs of the Italian industry association (Confindustria) in 2001, management of the natural drainage network with the Association for Renewable Energy in 2005, and an agreement on water saving with the National Irrigation and Reclamation Association in 2006.

3.5. Water-related information systems

Recognising that information and knowledge related to water availability and use are important features of effective and efficient water management, Italy has made substantial efforts to expand its key water-related information hub, the National Information System for Italian Water Protection (Sistema Informativo Nazionale per la Tutela delle Acque Italiane, SINTAI). The SINTAI is managed by ISPRA based on information provided by the regional environmental agencies. It contains a wealth of information related to surface and groundwater quality and water pollution discharges. The system is structured according to key national and EU requirements. The SINTAI is an integral part of the Italian National Environmental Information System (SINAnet) managed by ISPRA. Through SINAnet it interacts with other systems, such as the comprehensive Integrated System for Water Management in Agriculture (Sistema Integrato per la Gestione delle Risorse Idriche in Agricoltura, SIGRIA),[16] and other databases on coastal waters and emissions of hazardous substances.

Most of this information is collected and processed at the subnational level, and ISPRA has contributed to capacity-building of regional and local authorities responsible for data collection. Examples of good governance practices fostered by ISPRA include: establishing thematic working groups (e.g. those which carried out "gap" analyses to oversee challenges to the application of new methodologies); coastal water quality assessment; systematic twinning for joint flood protection and water management; and training activities and real-time information provision support. ISPRA also supports collaboration between the MATTM and river basin authorities to develop methodologies for monitoring compliance with the requirements and technical standards for data quality analysis.

The Italian National Institute of Statistics (ISTAT) has also contributed to filling the information gap and improving national knowledge on water statistics, following the guidelines of the EU Water Framework Directive and Eurostat/OECD initiatives on water statistics and water accounts. ISTAT's surveys of water supply and wastewater statistics allowed the development of an information base that is progressively updated and supported by the development of indicators concerning freshwater resources, water abstraction, water use, and wastewater treatment at various levels (regions, river basin districts) in Italy.

Despite the efforts made, implementation and updating the SINTAI is complex and resource intensive. Information gaps result from the fragmentation and incompatibility of information collected at the regional level, as well as insufficient data on some aspects of water management (e.g. water abstraction). For example, the Information System for Water Resources Surveillance (Sistema informativo di vigilanza sulle risorse idriche, SIViRI), following the COVIRI's difficulties, never started up. Major gaps also remain in terms of the availability or reliability of economic and financial data, and the role of ecosystem services in maintaining water quality and regulating water flows. Better economic and financial data and economic analysis of eco-system services could provide important support for linking the state of the environment and policy measures applied at the national and regional level. ISPRA and the MATTM have very few staff dedicated to water and economic analysis, while relations with academic institutions working in the field of environmental economics are limited and the wealth of information available from the research community is not always used in analysis and policy making.

3.6. EU policy package: a driver to improve water governance in Italy

Over time, the EU has become an increasingly important driver for vertical and horizontal co-ordination of water policy in Europe. The implementation of EU requirements has created some incentives for policy coherence across ministries and public agencies, and for better co-ordination across regions and between levels of government. The preservation and sustainable exploitation of natural resources, as well as improvement of the quality of environmental services, are priorities within the EU Structural Funds and with respect to national resources devoted to regional development. Italy introduced an indicator system called the "National Performance Reserve Scheme" for funds allocated to regional policies in order to improve programme management and effective spending. This involved setting aside a reserve of a programme's budget and distributing it only if specific objectives were achieved. For example, a sub-objective required regions to reduce the water loss ratio from 37% to 25% by 2013. The objective of the national programme was to improve the administration's capacity for reform, rationalise decision making and streamline procedures. Overall, this experience has

already produced some positive results despite a variation in outcomes from region to region (Chapter 3). There are opportunities to broaden this experience in the water sector, and to extend it to other sectors.

4. Governance challenges in reforming water supply and sanitation services

4.1. Clarifying recent institutional reforms to improve the performance and governance of water utilities

With the adoption of the Galli Law in 1994, Italy launched a wide-ranging reform of its water and sanitation services. This reform aimed to overcome fragmentation in the sector, and to create integrated operational structures separate from the direct influence of public administration and capable of attracting private capital and achieving a scale of operations within the Optimal Territorial Areas (ATOs). The law also created a dedicated authority in each ATO (the AATO) to carry out surveys on the state of infrastructure and levels of service, draw up an investment and tariff plan, entrust a service provider with the concession, and exercise supervision over the water service concessionaire. Each ATO has been managed according to an Optimal Territorial Area Plan that summarises water services and infrastructure needs and defines the financial plan, along with future investments and water tariffs.

The way ATOs have been defined varies: in some cases a whole region (e.g. Apulia, Basilicata, Aosta Valley and Sardinia) is considered a single ATO; in others the ATO coincides with the boundaries of lower administrative districts/provinces (e.g. Emilia-Romagna). Only in a few cases has the ATO been delimitated in a way that does not coincide with administrative boundaries (e.g. in Veneto).

Following these reforms, the number of bodies in charge of providing water supply and sanitation services was reduced from over 8 000 in the late 1990s to 115 in 2009. In many ATOs the reform resulted in streamlining and better co-ordination of service provisions (Box 4.4). However, the setting up and operation of the ATOs has not been without difficulties, partly due to the resistance of local authorities that lost control over the provision of water services, but also due to successive changes in the criteria for designating the ATOs.

A number of assessments of ATO operations have shown that, although planning capacities improved, the ATO authorities had serious weaknesses. For example, many ATOs lacked expertise and authority in regard to service providers. Most data for external control by ATOs were furnished by the service providers, making independent assessment difficult. In some cases decisions may have been negotiated and made outside the ATO's assemblies, with the AATO only called upon to ratify them. The authorities did not possess the technical know-how needed to deal with the service provider companies, especially when these were owned by large national (formerly municipal) enterprises or were multinational corporations. The ATO investment plans have been a patchwork of local demands rather than strategic water basin planning documents. The fact that mayors were engaged as stockholders of service providers on the one hand, and members of the regulatory authority on the other, has led to conflicts of interest and influenced decision making. Moreover, the proliferation of appointments (presidents and members of boards of governors) has created opportunities for the consolidation of local political elites, with emoluments and benefits often equal to those of elected members of local councils.

Problems have also been encountered in regard to the way service contracts were designed. Many have lacked adequate consideration of contingencies, and were vague with

Box 4.4. **Water supply management in the Venice city-area**

The water supply system in the Venice city-area has been successfully rationalised, consolidated and integrated on a wider scale. Eighteen municipal water agencies (joint stock companies) now share the ownership of water distribution and wastewater networks. Simultaneously, the four "bulk" water suppliers that previously operated were consolidated in 2007 into a single corporation (VERITAS), owned by 25 municipalities which are owners of various aspects of the bulk water distribution network. It works on a contractual basis with the 18 municipal water providers (until 2018).

Concurrently, the regulatory framework has evolved. Water supply continues to be governed by national laws and associated regional laws and policies. The Veneto ATO also plays a regulatory role: it sets fees for water services, and determines contractually-based incentive payments and fines for compliance with water quality standards/environmental standards established by VERITAS. This situation, although in compliance with current EU legislation, involves a conflict of interest in that the regulators are also owners of the company. At the same time, this arrangement has certain benefits, such as the close exchange of information between the municipalities and the supplier, and economies of scale and scope arising from synergies in planning multi-utility investments.

The case of Venice is interesting because of the degree to which the process of rationalisation was "bottom-up": municipalities were key drivers of the consolidation process. They were motivated by concerns about the implications of new EU water sector requirements. Informally, the desire for consolidation and creating a "critical mass" of water providers gained currency, as it would create an institution that could compete in a sector likely to be opened up to competition from private water supply companies. In this context, the drive to scale up operations, improve performance and increase efficiency was seen both as a defensive and a proactive measure.

The experience in Venice shows some of the benefits that can be achieved through co-ordination across metropolitan city-regions. VERITAS has standardised operating systems and accounting procedures. It is developing an integrated regional water supply network to replace the poor quality surface water being used for drinking water in the southern zone with higher quality water from the northern part of the city-area. When completed, the area water supply network will be a positive, although rare, example of an integrated, co-ordinated infrastructure network operating across an entire city-area.

Source: OECD, 2010b.

respect to the rules that justify tariff revision and cost pass-through. Service levels were defined in a generic way. Although sanctions for missing service quality targets were foreseen, their application was often left to the discretion of an AATO (which usually did not intervene if the company was owned by the same municipality). Renegotiation of contracts has remained a problem, as no provisions were made for situations that justify modifications of the planned figures or disputes that might eventually arise and the criteria to use in settling them. Nor were criteria provided for determining whether deviations of costs from those anticipated depended on planning errors, on internal inefficiency or on external market changes.

The most recent integrated urban water management reform (Decree 42/2010) tried to address these shortcomings, but it has left Italian water governance with uncertainties and ambiguities. While abolishing AATOs as legal entities, this decree did not designate clear responsibilities for taking over the AATOs' tasks (i.e. whether they will be carried out by the regions, municipalities or other entities, or new forms of co-operation). This led to

extension of the deadline for AATOs' operation from the end of 2011 to the end of 2012. The process of redesigning AATOs is still ongoing. Almost half the regions have approved new legislation (sometimes contested by the central government, which appealed to the Supreme Court). In many cases, the AATO's functions are performed by the regions as a temporary measure, maintaining the ATO as a geographical unit for the purpose of planning, contracting and setting tariffs, and supervising the operator. As of July 2012, a number of AATOs continued to operate.

In principle, the whole territory of an ATO was expected to be served by a single water utility. In practice, however, it is common for several water utilities to serve the municipalities of a single ATO. For example, eight ATOs in Emilia-Romagna are served by 16 utilities. As of 2009, 58 utilities were still publicly owned and 31 involved mixed ownership companies with selected partners, while in seven cases concessions had been given to the private sector, including four private concessions awarded in Sicily. A total of 114 agreements between AATOs and water service providers had been concluded. However, 24 AATOs had not assigned service provision at the area's aggregate level and management was still based on provisional contracts with smaller service providers.

In 2008 and 2009, the government took steps to speed up separation of service provision from municipal control with a view to increasing efficiency. A decree was enacted which stipulated that water supply would be managed exclusively by private companies or by mixed public-private companies, where private investors hold at least 40%. The decree called for tendering all "in-house" provisions by 2013 and required local authorities with a stake in utilities listed on the stock exchange to reduce their shareholding gradually to a maximum of 30% by the end of 2015. However, the decree made it possible for municipalities to avoid tendering procedures by demonstrating that current in-house provisions were more efficient than a concession, or by selling 70% of stock in in-house companies to private investors.[17]

Further restructuring of water service providers stalled following the referendum in June 2011. The outcome of this referendum may lead to a rejection, *inter alia*, of competitive tendering in favour of in-house management when the commercialisation of services is not feasible (Box 4.5).

4.2. Oversight of the water supply and sanitation sector

The 1994 Galli reform introduced national oversight of the water and sanitation sector by the COVIRI. The COVIRI, operating under the MATTM, was made responsible for monitoring implementation of the water service reform, proposing rules for tariff definition and tariff setting, and protecting customers' interest.

The law gave the COVIRI a wide range of regulatory functions, but did not provide it with adequate means and resources. Its creation was based on the premise of a strong organisation equipped with a technical secretariat and a water services monitoring centre, and with a staff of 40. However, such capacity has not been established and the monitoring centre was only created in 2004 with a reduced number of staff. Given the importance of the COVIRI's mission, this was insufficient. For example, the COVIRI was charged with determining and revising the water tariff system based on the so-called "normalised method" (Metodo Tariffario Normalizzato, MTN) introduced in 1996. This involved establishing a standard of 7% for return on capital investment. However, no revision of the MTN was approved despite the many shortcomings of the tariff system. The COVIRI was

Box 4.5. **The 2011 referendum on water services**

A country-wide consultation was held on 12-13 June 2011. Two of the issues concerned water management. The first question was whether an article in a 2008 law, which required water supply to be managed exclusively by companies in which private investors held at least 40%, should be repealed. The second question was whether an article in the 2006 Environment Code, which guaranteed a minimum remuneration of 7% on capital costs in the calculation of water tariffs, should be repealed.

Several months of intense, often ideological campaigning preceded the referendum, much of it focusing on the principle of private sector participation in the provision of water services. The yes campaign argued that water was "a public and common good to be publicly managed." The no campaign argued that private participation in the water sector was necessary to drive efficiency and provide much-needed investment.

More than 95% of voters (with a 55% turnout) voted in favour of all four questions. By restricting the return on capital, the referendum limits opportunities for water utilities (public and private) to raise capital for investment in capital markets. The plans of a number of privately operated utilities to upgrade parts of Italy's water network have been shelved. Some public utilities may be able to resort – in the short term – to taxation to repay loans, but this option is not available to private operators, including utilities jointly operated by the public and private sector.

Despite the results of the referendum, most municipalities still apply the pre-referendum rules and allow the private sector's continued involvement in water provision. Supporters of the referendum have asked the Constitutional Court to force these municipalities to comply with referendum outcomes. The decisions taken by the newly designated water regulator, AEEG, may also have a bearing on this issue. The way in which future tariffs, and the associated rate of return on capital, are defined could influence investment decisions. It is clear that current policies have created considerable uncertainty and are an important impediment to investment in the water sector.

also made responsible for verifying the ATO's plans, but lack of capacity and enforcement powers limited evaluations to verifying formal compliance with national guidelines.

Although the COVIRI was reorganised following adoption of the 2006 Environmental Code, the new authority remained weak, with no executive powers and capacity. In the absence of a strong national regulator, tariffs were set by ATOs with no regard to funding needs. The initial rates were generally set at levels that just covered operating costs and did not yield sufficient revenues for the maintenance and renewal of networks, thus creating a funding gap. The regulatory heterogeneity also raised transaction costs for the sector as a whole and made it more complicated for any new entrant, including private investors, to understand the risks in the sector and how they could be managed. This was a disincentive in areas of the country where higher legal risk is perceived at the local level (e.g. in some ATOs in southern Italy).

In November 2011, regulatory responsibilities for water supply and sanitation were transferred to the Regulatory Authority for Electricity and Gas (AEEG).[18] This is a step in the right direction, as the AEEG is regarded as an independent professional body which, in principle, could provide a clearer and more transparent regulatory environment for water companies by overseeing tariffs, promoting efficiency, and ensuring that services are run effectively and transparently.

Simply transferring competences foreseen in the 1994 law to the newly appointed regulator will not be sufficient to realise the potential benefits. Adequate resources will need to be allocated and work carried out to clarify the main regulatory needs and modalities for discharging key regulatory functions. This should include, first and foremost, reducing regulatory and legal risks, particularly in regions considered to be of higher risk by finance market operators. Regulatory risks increase when the legal system changes too frequently. For example, many banks providing loans to the sector after the 2008 laws called for the immediate terminasuspendedtion of all "in house" companies, as the duration of contracts was the sole guarantee on which financing plans had been based. During the last ten years, the ongoing legal changes have made long-term planning close to impossible. Other steps to increase the efficiency of the sector should include encouraging economies of scale and wider use of innovative financial products to reduce the costs of due diligence necessary to analyse and quantify the regulatory risk; and benchmarking utilities' performance based on systematic comparisons of the efficiency and quality of service provided.

4.3. Financial sustainability

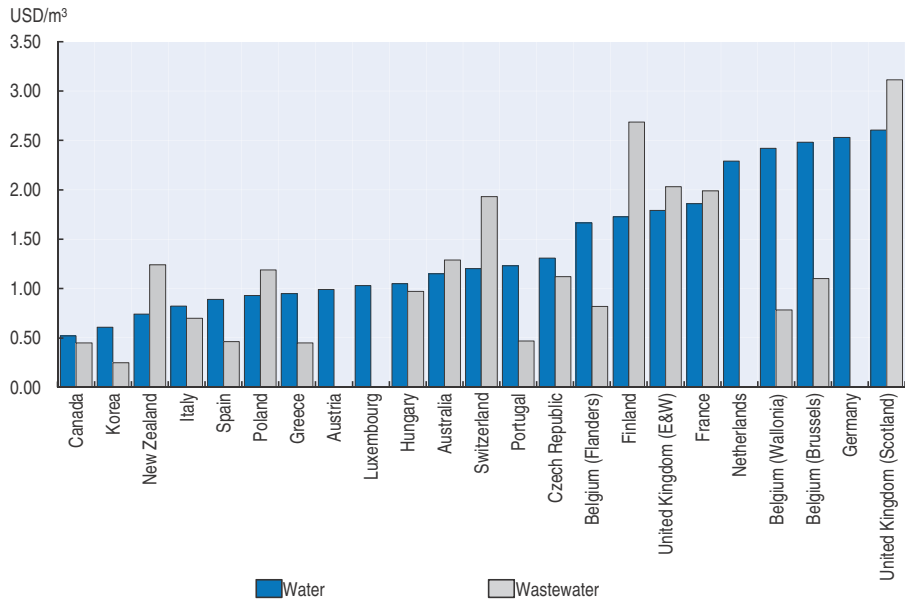
Domestic water supply has been priced using mechanisms that increasingly provide incentives to save water. In many locations water tariffs include fixed and volumetric components, with the latter based on increasing block tariffs. In some ATOs, the water tariff is linked to the quality of the service provided and is assessed using a set of environmental and service performance indicators. After a sharp increase in the 1990s, water prices have continued to increase – although at a slower pace during the last ten years. This has partly been due to insufficient application of the "normalised method" (MTN) and long transition periods in water sector reform when the Inter-Ministerial Committee for Economic Planning (CIPE) functioned as the regulator in areas where no management concession had been awarded. Despite increases, rate levels have remained low. While the average water supply rate in Italy is around EUR 0.90-0.95/m^3 (with wide variations across the country), in many other OECD countries they are already between EUR 2 and 3/m^3. Charges for wastewater collection continue to be lower than in other OECD countries (Figure 4.4).

In the absence of a tariff regulator and of adjustment of the MTN, many ATOs have established their own methods of tariff setting. The Constitutional Court has, however, outlawed tariff setting by the regions. Calculated for a representative level of households' water consumption (200 m^3/year), water bills across regional/provincial capitals range from EUR 0.58/m^3 in Milan to EUR 2.39/m^3 in Florence. A number of analyses have shown that the tariffs of most utilities do not fully cover economic and environmental costs. Cost-recovery problems are aggravated by the approach to billing, which allows payments to be made only at the end of the year, and relatively common non-payment of water bills, especially in the South.

Although the prices of a cubic metre of water and of wastewater services, adjusted for inflation, have increased in recent years, revenues are not sufficient to guarantee necessary investment in the extension and modernisation of water infrastructure and to make up for the structural lag that has grown over the years. The worrying state of water supply and sanitation infrastructure is also due to a decrease in public funds allocated for the development of water infrastructure (Figure 4.6). While expenditure on water and wastewater has remained stable (at constant prices), the share of investment has decreased, particularly in regard to wastewater infrastructure. This trend has been reinforced by limited involvement of private operators and a limited role for other means of financing water and wastewater infrastructure, such as equity or debt financing. The drop in investment has

Figure 4.4. **Comparison of average unit prices of water and wastewater services to households (including taxes) in OECD countries**

2008

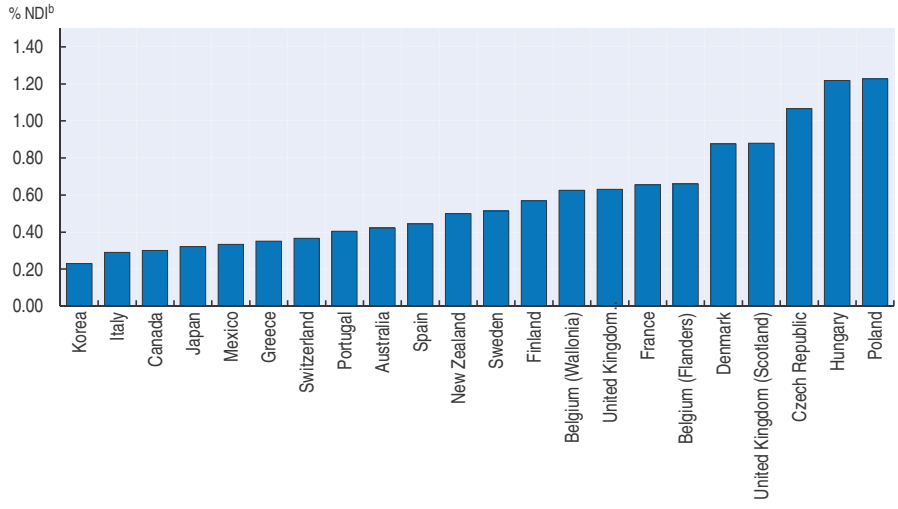


Source: OECD (2010), *Pricing Water Resources and Water and Sanitation Services.*

StatLink http://dx.doi.org/10.1787/888932772951

Figure 4.5. **Water supply and sanitation bill as a share of disposable income in OECD countries**[a]

2008

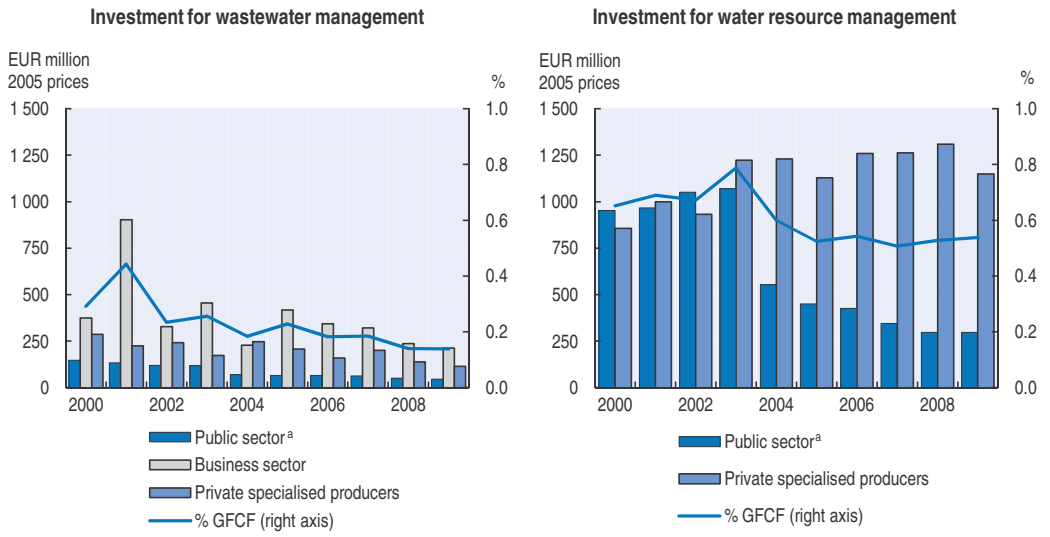


a) Data for water tariffs are calculated for a consumption of 15 m^3/month and based on 2007 purchasing power parities for private consumption.
b) Net disposable income at 2007 prices and purchasing power parities.
Source: OECD (2010), *Pricing Water Resources and Water and Sanitation Services.*

StatLink http://dx.doi.org/10.1787/888932772970

Figure 4.6. **Investment for wastewater and water resources management**

2000-09



a) Includes public specialised producers of environmental protection services.
Source: ISTAT (2012), *Expenditures for the Management of Waste, Wastewater and Water Resources in Italy.*

StatLink http://dx.doi.org/10.1787/888932772989

contributed to increasing obsolescence of infrastructure, a rise in network leakages and a decline in service levels, including disruptions in supplies to end-users.

The fall in investment has occurred at a time when the requirements of the EU Directives, and the deteriorating state of the required infrastructure, require increased investment. The Blue Book 2011, a report by the research arm of the operators' association Federutility, estimates investment needs for water services at EUR 65 billion over a period of 30 years, of which only 9.1% from public funding, corresponding to EUR 2.2 billion per year. The challenge for the sector is therefore to more than triple the current level of investment, without being able to rely any longer on the contribution of public funds at a level comparable with that of the past. As discussed above, meeting this challenge requires clarifying institutional arrangements and moving away from municipally controlled operating bodies to utilities operating on a commercial basis. There will also need to be a greater contribution from consumers. The average water supply and sanitation bill as a share of disposable income is much lower in Italy than in other OECD countries, suggesting that there is scope for a further increase in water tariffs. Wider use of market-based (including water abstraction charges) and private sector financing mechanisms should also be considered to spread payments for water infrastructure over the lifetime of the assets.

Notes

1. The share of irrigated land in total agricultural area (17.4%) is well above the OECD average (4.5%).
2. Italy's water consumption by household is characterised by strong regional variations. Water-rich islands and northern regions have higher water consumption rates on average than the water-scarce southern regions.
3. Failing direct estimations, use of water by industry is calculated on the basis of the water consumption coefficient for persons working in the different manufacturing sectors. The

coefficients are estimated and updated by national experts on an irregular basis. The data do not include withdrawal from watercourses and from groundwater directly made by companies.

4. Use of water for electricity production in hydropower stations is not included.
5. Several water transfer systems (Ionico-Sinni, Ofanto-Sele-Calore or Fortore) have been built to divert water resources from the Sele, Calore, Ofanto, Basento, Biferno and Sangro rivers to reservoirs in Apulia.
6. Water quality designated as Class 0 is affected mostly by volcanic and tectonic activities. These waters are often exploited as a thermo-mineral resource. Groundwater quality can also be affected by contamination of saline water intrusions.
7. A total of EUR 1.6 million was devoted to water from EU Structural Funds received in 2000-06. In particular, capacity building of regional environmental administration has received support from Structural Funds, especially in the South (e.g. a task force of 150 experts to support regional environmental authorities and ARPAs).
8. The number of central government authorities involved in water policy making is a useful indicator of the level of institutional fragmentation, although it has limitations and needs to be appraised in a dynamic way. For example, a large number of agencies is an indication of complexity but does not necessarily entail the negative impacts of fragmentation (e.g. silo approach, asymmetry of information, mismatch of funding, conflicting objectives) if the fragmentation is somewhat compensated by sound co-ordination mechanisms.
9. The ATO authorities (AATOs) can delegate responsibilities for carrying out day-to-day activities related to provision of water services to a third party (i.e. a water operator), which may be publicly and/or privately owned. However, ATO authorities were legally suppressed in 2011 and the regions were asked to perform their functions in accordance with the principles of subsidiarity, differentiation and adequacy.
10. The size, role and type of organisation of Reclamation and Irrigation Boards are not the same in northern and southern Italy due to the different structures of the water supply systems. In the northern part of country, water supply is highly segmented and separated among various sectors (urban, industrial and irrigation). In most cases, irrigation is managed collectively through local scale farmers' associations dedicated only to water supply for irrigation purposes, which do not have a particular connection with urban and industrial water supply agencies. However, in the South irrigation is managed mainly by large Boards which are highly interconnected with urban and industrial water supply agencies. This is essentially due to the fact that most important water structures (e.g. dams, aqueducts, pumping stations) are constructed for multi-sectorial water use and their management is frequently under the Boards' competence.
11. The 183 Group is a not-for-profit organisation established in 1995 by Members of Parliament, environmentalists, and representatives of regions, local governments, trade unions and company managers. The objective of the 183 Group is to promote sustainable development in land management and in the use and management of water resources.
12. Adoption of the management plans was the responsibility of an institutional committee within each district, which comprised the basin authority of national importance and members appointed by the regions included in the district.
13. For each basin belonging to the district, a management plan for environmental protection of water bodies and rational exploitation of water resources must be approved. At the same time, a hydrogeological plan for soil protection and hydrogeological risk (called "Piano di assetto idrogeologico", PAI) is also required. It has a different scope and separate approval procedures.
14. Water must be metered before it can be charged for volumetrically. Metering is often required for permit holders, although limited evidence concerning actual implementation and control at the farm level could be identified.
15. Reclamation and Irrigation Boards receive a quota at the beginning of every year (availability versus needs). Individual farmers, in their turn, are also subject to quotas or abstraction requirements.
16. This contains a complete set of databases and tools concerning land use, irrigation networks and economic data in eight regions of southern Italy (Abruzzo, Molise, Apulia, Campania, Basilicata, Calabria, Sicily, Sardinia).
17. The 70% threshold applied to quoted companies such as Acea or Hera, which would allow them to maintain what was originally entrusted to them if public shareholding was reduced. For in-house companies the threshold was lower (40%), but required that operational responsibilities be delegated to a private partner.

18. Created in 1995, the AEEG has been regulating the gas and electricity sector. It is self-financed by a tax on energy bills, with therefore no impact on the public budget. The transfer was subject to a Prime Ministerial Decree whose purpose was to decide which functions were to be transferred to AEEG and which should be retained by the Ministry of the Environment, Land and Sea. The Decree is still pending; its text has been approved, but is currently awaiting advice by the Supreme Administrative Court (Consiglio di Stato).

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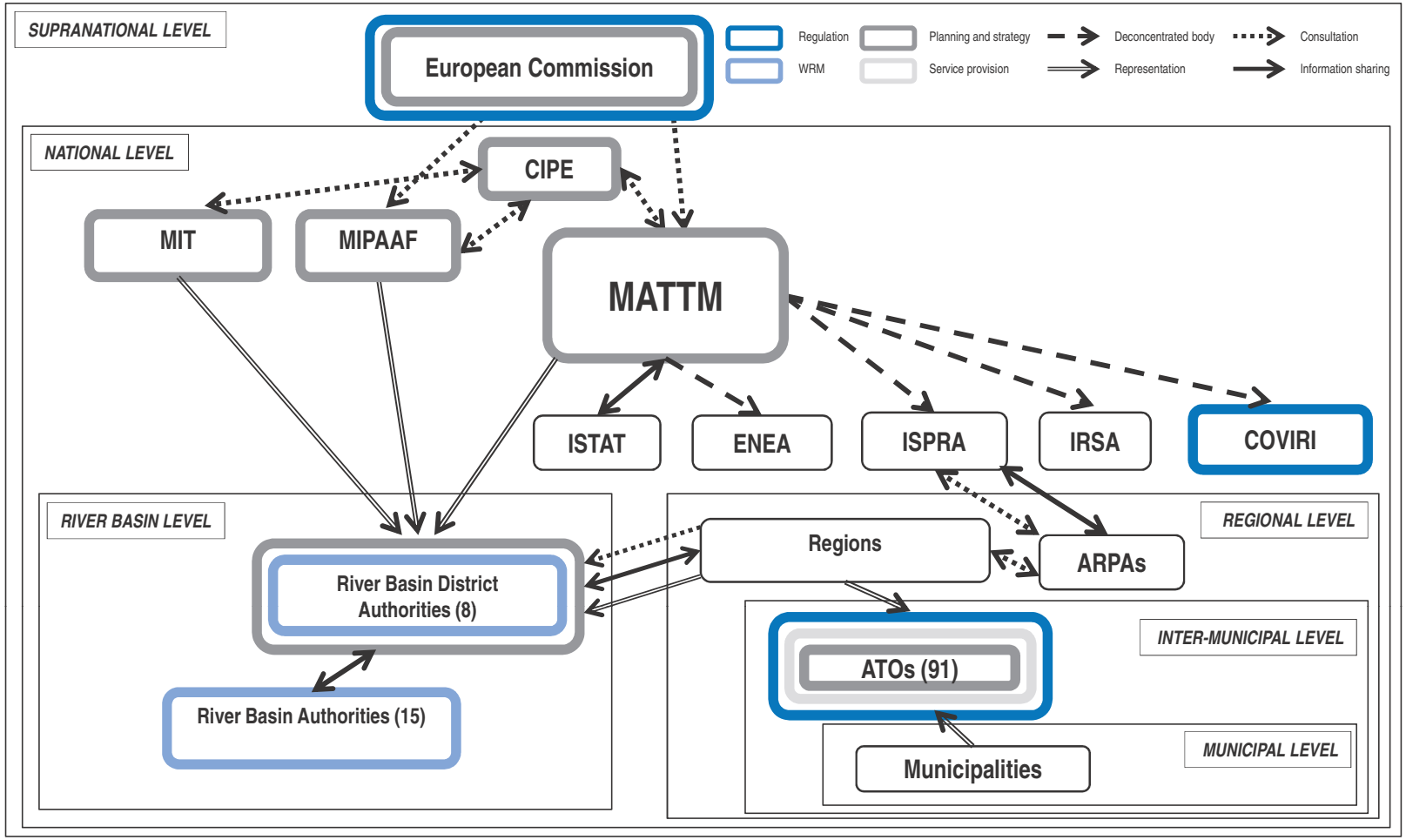
ANNEX 4.A1

Institutional mapping for water resources management


SUPRANATIONAL LEVEL
European Commission
Regulation
WRM
Planning and strategy
Service provision
Deconcentrated body
Representation
Consultation
Information sharing
NATIONAL LEVEL
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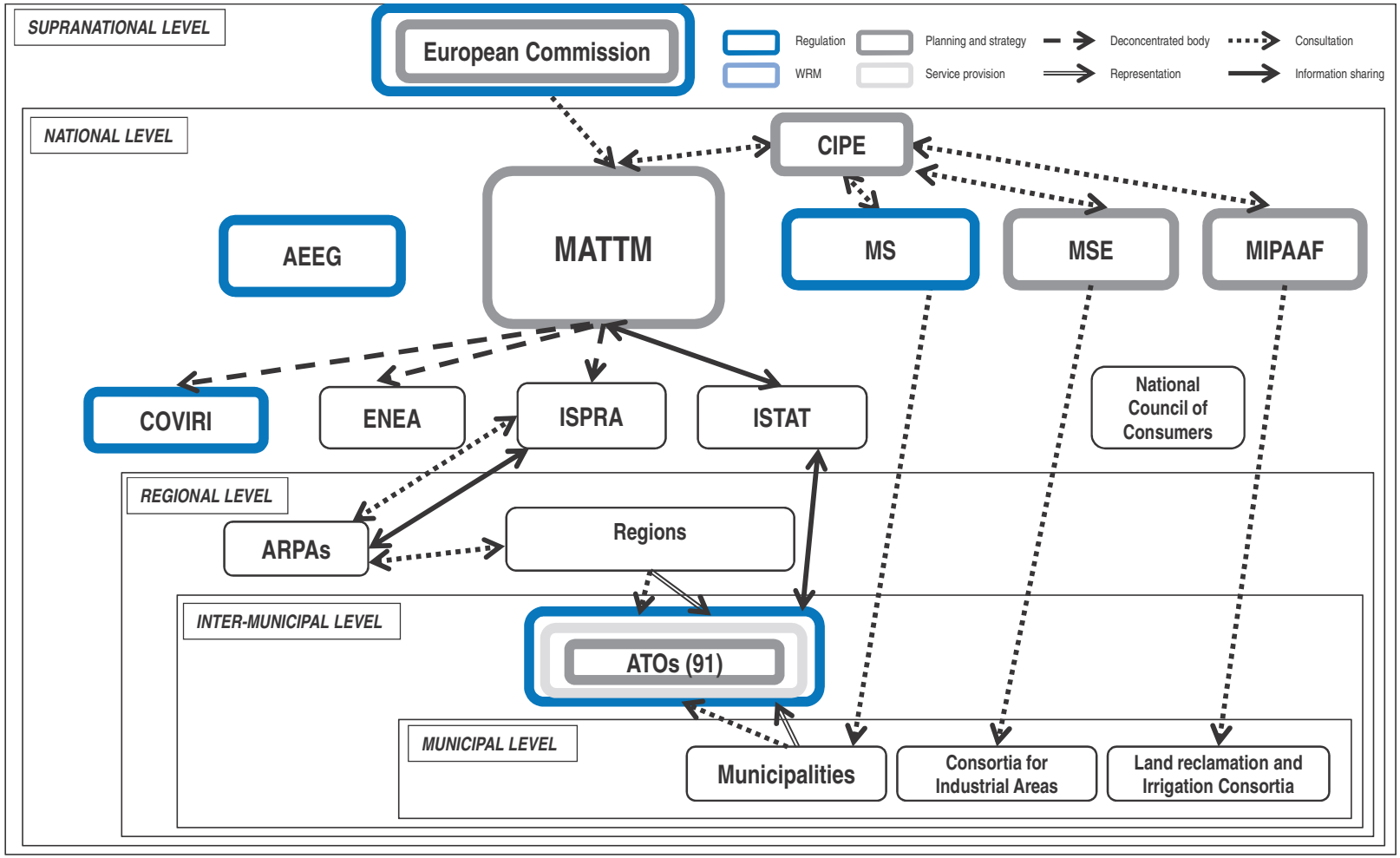
MIT
MIPAAF
MATTM
ISTAT
ENEA
ISPRA
IRSA
COVIRI
RIVER BASIN LEVEL
River Basin District Authorities (8)
River Basin Authorities (15)
REGIONAL LEVEL
Regions
ARPAs
INTER-MUNICIPAL LEVEL
ATOs (91)
MUNICIPAL LEVEL
Municipalities

ANNEX 4.A2

Institutional mapping for water supply and sanitation


SUPRANATIONAL LEVEL
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Service provision
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National Council of Consumers
REGIONAL LEVEL
ARPAs
Regions
INTER-MUNICIPAL LEVEL
ATOs (91)
MUNICIPAL LEVEL
Municipalities
Consortia for Industrial Areas
Land reclamation and Irrigation Consortia

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PART II

Chapter 5

Climate change

This chapter reviews policy initiatives implemented over the last decade in Italy to reduce its greenhouse gas (GHG) emissions. It examines the strategic and institutional frameworks and the mechanisms in place to manage interactions between different policy instruments and monitor their implementation. It assesses progress in using market-based instruments such as emission trading and energy taxes. The chapter analyses the effectiveness of measures implemented in the energy sector, including those to promote renewables and energy efficiency. This chapter also examines measures to reduce transport-related GHG emissions, including improving the emission performance of vehicles and developing effective and efficient urban transport systems. Finally, the chapter analyses steps taken to integrate adaptation to climate change into sectoral policies as well as regional and local activities.

Assessment and recommendations

After more than a decade of continuous growth, Italy's domestic greenhouse gas (GHG) emissions declined in the second half of the 2000s. Several factors contributed to this decline, including: a further switch to natural gas; increased use of renewable energy sources; and some improvement in energy efficiency. The deep economic recession in the late 2000s also contributed significantly. Overall, GHG emissions declined by 9% from 2000 to 2010. The already relatively low energy and carbon intensities of the Italian economy also decreased further, although unevenly across the country. When absorption of GHGs by forest sinks is taken into account, emissions were 6.2% below 1990 levels in 2010, compared to the Kyoto target of a 6.5% reduction in 2008-12. Any shortfall in meeting this target would be made up by purchasing carbon credits.

Italy's climate change policy has largely been developed in the framework of EU climate and energy policies. The central government has overall responsibility for climate policy, although regions have acquired increased policy-making and implementation responsibilities. Despite improvements in institutional arrangements for horizontal and vertical co-ordination, policy co-ordination has often been difficult. This, together with uneven administrative capacity and differentiated approaches across regions, has led to implementation and investment delays. While climate change mitigation did not have high political priority during most of the last decade, it has been given renewed impetus more recently. The development of a national climate adaptation strategy is also under way. Since 2011, the Ministry of the Environment, Land and Sea (MATTM) has reported annually on Italy's progress in meeting international GHG emission reduction commitments in the Economy and Finance Document.

A national GHG emission reduction plan, adopted in 2002 and subsequently revised, outlined the main approaches for meeting Italy's Kyoto target and included an array of potential mitigation measures. It also established an annual monitoring and reporting process. However, the plan did not clarify which measures (other than purchasing international carbon credits) would be used to narrow the "distance to target", and delegated responsibility for identifying specific measures to the competent ministries and authorities. In 2012, the MATTM presented a draft plan for achieving the EU-related target to 2020. This plan overcomes the weaknesses of previous plans. It integrates the measures foreseen in the national plans for renewables and energy efficiency, as well as regional actions supported by EU and national funds for regional development. Further efforts should be made to assess the cost-effectiveness of measures included in the plan.

Italy has made greater use of economic instruments in its climate mitigation policy. The EU Emissions Trading System (EU ETS), launched in 2005, covers about 40% of Italy's GHG emissions. This is a lower share of emissions than in other large EU economies, leaving most emission abatement to be achieved by domestic measures in the non-ETS sectors. Unlike in most other countries participating in the ETS, installations in Italy bought allowances on the market in the first years of trading since their emissions were

above the allocations. Over-allocation emerged at the end of the decade, however, largely due to the impact of the economic downturn. Uncertainty remains about whether the ETS will lead to a CO_2 allowance price that is stable and high enough to provide incentives to invest in low-carbon technology. This suggests the need for complementary measures. There is scope to complement the ETS with a form of carbon tax on energy products used in the non-trading sectors, particularly transport and services, so as to establish a consistent carbon price across the economy. While energy taxes are high in Italy and have recently been increased, the rates do not fully or consistently reflect CO_2 emissions and other environmental externalities across fuels and energy uses.

Italy's strategy for achieving climate mitigation goals has relied heavily on increased use of renewable energies. Economic incentives for electricity generation, in the form of feed-in tariffs and tradable renewable energy certificates (green certificates), have been at the core of the renewables policy mix. These support programmes have driven a dramatic increase in generation of electricity from renewable sources and have helped stimulate growth and employment in the renewables sector. Overall, renewables accounted for about 10% of gross final energy consumption in 2010, up from less than 5% in 2005 and above the intermediate target set by the Renewable Energy Action Plan. Therefore, Italy is on track to meet its 2020 target of 17% of renewables in gross final energy consumption. However, such rapid progress has entailed increasingly high costs, mainly due to the rapid growth in installed solar photovoltaic capacity. Solar power has been prioritised at the expense of more cost-effective options, such as use of renewables for heating and cooling. In addition, the cost of abating 1 tonne of GHG emissions implied by these incentives is estimated to be relatively high. In a welcome move, the government adopted new rules in 2011-12 aimed at aligning incentive rates with the decreasing costs of renewable technologies, redressing the bias towards solar power, and better controlling costs for electricity consumers in the period to 2020.

Italy is a front-runner in Europe in the development of smart grids, which are expected to facilitate the integration of the growing number of small, dispersed and intermittent renewable electricity sources into the distribution network. The rollout of smart meters, the first step in the development of smart grids, has virtually been completed. However, like many other countries, Italy needs to further develop its networks, especially the transmission network in southern regions and islands, which have a high renewables potential. While progress has been made in simplifying some administrative processes, spatial planning and authorisation procedures for plant construction and grid reinforcement are complex and regionally differentiated. This can hold back investment in renewables. In 2012, the central and regional governments agreed to share renewables targets among regions.While this could lead to some loss in economic efficiency, it could help improve governance and effectiveness and facilitate investment. Systematic and rigorous monitoring will be crucial for successful implementation.

Italy has introduced a number of regulatory measures and economic instruments to promote energy efficiency, including tax incentives and a trading mechanism. These measures have contributed to energy savings above the intermediate target set by the national Energy Efficiency Action Plan, mainly in regard to electricity used by the residential sector. Progress in the service and transport sectors has been more modest and below expectations, underlining the need for additional efforts. Analysis suggests that energy efficiency measures have been cost-effective, with benefits (in terms of avoided energy costs) well above the costs borne by energy users and tax payers. The market for energy efficiency certificates (White Certificates, or WCs) has been the most cost-effective measure. It could be

further expanded and reinforced. The effectiveness of the current incentive mechanisms would also benefit from more complete and consistent implementation of the certification of building energy performance, which is currently uneven across regions.

Despite progress, Italy's renewables and energy efficiency policies have lacked a general long-term vision. Management of the incentive systems for energy efficiency and renewables involves a number of different agencies and institutions, which results in co-ordination difficulties and increasing transaction costs. There has been a multitude of overlapping measures, which have also changed several times within a few years. This has created unnecessary complexity and regulatory uncertainty, although recent measures have addressed some of these problems. In addition, the interaction between energy efficiency and renewables incentives and the EU ETS requires ongoing evaluation, as these initiatives could further depress the CO_2 allowance price and lead to displacement of emissions. A long-awaited national energy strategy was released for consultation in 2012, and provides the opportunity to address all these issues in a comprehensive way.

Trends in passenger and freight transport have broadly followed Italy's economic performance, although with some differences among transport modes. Road transport has continued to heavily dominate the modal split, despite considerable investment in extending and upgrading the railway network. The economic recession in the late 2000s and specific policy measures led to a decline of GHG emissions from the transport sector. Nonetheless, transport, particularly by road, has remained the main energy end-use and the second largest source of CO_2 emissions. Improving energy efficiency in the transport sector and reducing related GHG emissions should, therefore, be a priority. While Italy has one of the highest car ownership rates in the OECD, the energy efficiency of passenger cars is good and improving, compared to that in other European countries. Italy reached the EU target of an average 130 g CO_2/km for newly registered cars ahead of the 2015 schedule. However, the fleet of freight vehicles is relatively inefficient, partly due to reduced fuel tax rates. Taxes on car ownership are based on pollutant emission standards, but not on CO_2 emission levels, while those on heavy goods vehicles are not linked to any environmental criterion. A 2007-10 scrapping incentive has been the main measure implemented to further reduce cars' average CO_2 emissions. While it was effective in maintaining the car renewal trend at pre-crisis level, the economic efficiency of this measure was relatively low, and its medium- and long-term benefits are questionable.

Some progress has been made in developing integrated urban transport systems, and many of the larger cities have implemented low-emission zones. In Milan, the low-emission zone has been combined with a pollution/congestion charge, which has reduced vehicle use in the city centre and related emissions. Otherwise, with the exception of parking pricing, use of price-based mechanisms to manage transport demand and reduce emissions from private vehicle use has been limited and could be expanded. In general, public transport systems in most cities remain insufficiently developed (in terms of infrastructure and service quality) to provide an adequate alternative to use of private vehicles. This is particularly true in southern regions. Similarly, further financing and regulatory efforts are needed to develop the infrastructure of medium- and long-distance rail and multi-modal transport, and improve service quality. Further investing in alternatives to road transport would reinforce the environmental effect of fuel taxes and of a future carbon tax. While many national transport infrastructure plans have been developed, Italy still lacks a comprehensive transport strategy aimed at rebalancing the modal split of both passenger travel and freight haulage.

Recommendations

- Adopt the draft plan to meet the 2020 domestic emission-reduction targets at the earliest opportunity; implement it on the basis of a clearly defined implementation schedule and progress indicators; systematically review the cost-effectiveness of implemented measures and the consistency of the national plan and regional actions.
- Use the opportunity provided by the current reporting requirements on GHG emissions in the annual Economic and Finance Document to enhance transparency and promote broader participation of stakeholders and civil society in climate-related policy making.
- Restructure taxation of energy products to explicitly include a carbon tax component, with a view to complementing the EU Emissions Trading System and providing a consistent price of carbon across the economy.
- Further develop the renewable energy policy in the framework of a long-term, comprehensive national energy strategy; ensure consistency of the incentive mechanisms and related rules, and continue to align incentive rates with the decreasing costs of renewable technologies; continue to streamline administrative procedures for plant construction and grid reinforcement, e.g. by establishing a centralised system for monitoring regional and local procedures.
- Streamline energy efficiency incentive measures, and make sure that multiple incentives effectively address different barriers and do not entail excessive costs; further strengthen implementation of the White Certificate system, e.g. in the transport sector.
- Promote effective and consistent implementation of the EU Energy Performance of Buildings Directive in the regions; develop a monitoring system at national level to support the use of consistent methodologies for assessing and certifying energy savings at the regional level.
- Rationalise the governance and management of the incentive systems for energy efficiency and renewables. Speed up implementation of plans for investment in urban public transport infrastructure and multimodal freight networks, in the framework of a comprehensive strategy to rebalance the modal split of both passenger travel and freight haulage.
- Extend the use of price-based mechanisms, such as pollution and congestion charges, to reduce emissions from vehicle use in urban areas; restructure vehicle taxation, for both cars and heavy goods vehicles, to include components reflecting CO_2 emissions and other environmental externalities.
- Complete preparation of a climate adaptation strategy through an open and inclusive process involving all stakeholders; establish priorities based on comprehensive economic and social assessment, emphasising low-cost and no-regrets actions; include a structured review process based on clearly identified indicators.

1. Overview

As a party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, Italy is committed to reduce its greenhouse gas (GHG) emissions by 6.5% compared with 1990 levels in the period 2008-12.[1] To meet this target, Italy adopted a national plan in 2002, which was subsequently revised (Section 3). In addition, under the 2008 EU Climate and Energy Package Italy is committed to achieve a number of targets by 2020:[2]

- Reducing GHG emissions by 13% from 2005 levels in sectors not covered by the EU Emissions Trading System (EU ETS).[3]

- Increasing the share of renewables in final energy consumption to 17%.
- Increasing the share of renewables used in transport to 10%.
- Achieving 20% savings in primary energy consumption, compared with projected levels.

Moreover, like all other countries participating in the EU ETS, Italy is subject to the EU-wide emission cap that implies a 21% cut in emissions from the ETS sectors compared with 2005 levels by 2020. In May 2012, the Ministry of the Environment, Land and Sea (MATTM) presented a draft plan for achieving the 2020 targets (Section 3).

Successive EU policy packages have provided the overall strategic direction and impetus for Italy's climate policy. For most of the last decade, climate policy did not have a high political priority. Elements within Italian political and business circles have opposed the country's climate commitments (OECD, 2011a).[4] Compared to other EU countries, there appears to be less discussion or awareness in civil society of climate policy and related issues. For example, according to a 2011 Eurobarometer opinion survey, 42% of Italian respondents considered climate change to be one of the world's most serious problems compared with an EU average of 51%. In general, Italian citizens also seem less interested in taking personal action to tackle climate change than is the case in many other EU countries, and to be more sceptical about a low-carbon future based on renewable energy, more fuel-efficient vehicles and higher energy efficiency (EC, 2011).

2. GHG emission performance

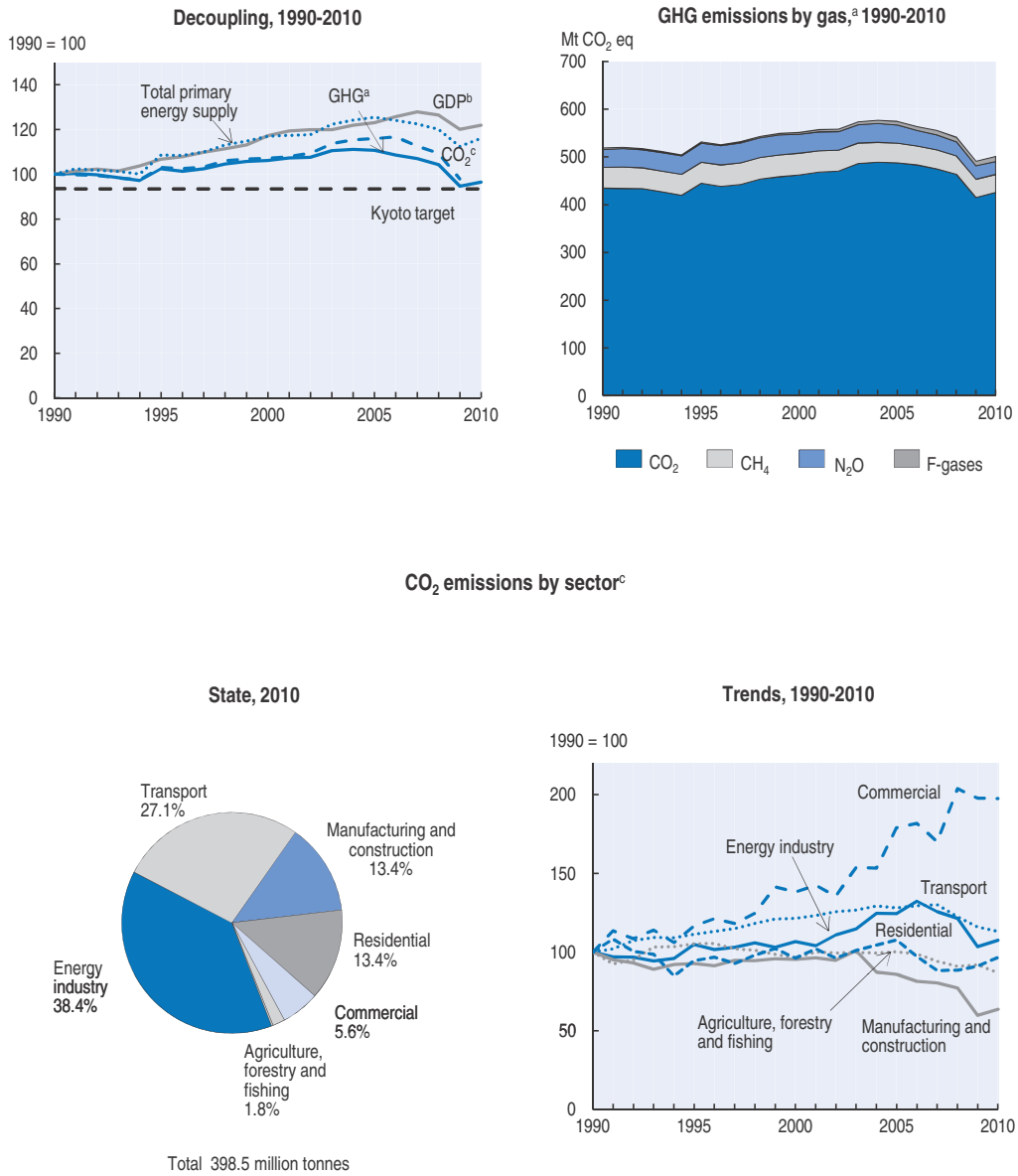
2.1. GHG and CO_2 emission trends

After steady growth in the 1990s, total GHG emissions (excluding emissions and removals from land use, land-use change and forestry) increased by 4.5% between 2000 and 2004, but dropped subsequently (Figure 5.1). Overall, GHG emissions declined by 9% in 2000-10. Several factors contributed to this decline, including: a further switch from oil to natural gas in electricity generation and in manufacturing industry, partly as a result of Italy's participation in the EU ETS since 2005; increased use of energy from renewable sources; and a drop in emissions from some energy-intensive industrial sectors (ISPRA, 2012). However, it was not until 2009 that domestic GHG emissions fell below the 1990 level, owing to the dramatic decline in economic activity brought about by the severe economic recession. Emissions grew again in 2010 (by 2%) as a result of the mild economic recovery.

Consequently, total GHG emissions in 2010 amounted to 501 million tonnes of carbon dioxide equivalent (Mt CO_2 eq), about 3.5% below the 1990 level. When emission removals from the so-called "Kyoto forests" are taken into account, emissions were 6.2% below the 1990 Kyoto Protocol base year emissions in 2010.[5] This is slightly above Italy's Kyoto objective of reducing GHG emissions by 6.5%, or of reaching an annual average of 483 Mt CO_2 eq between 2008 and 2012. Italy will therefore need to use the Kyoto Protocol trading mechanisms to fill the distance to target, although to a lesser extent than was planned before the economic crisis.[6]

Accounting for about 85% of total GHG emissions, carbon dioxide (CO_2) is the main GHG. It primarily originates from energy generation and use. Overall, energy-related CO_2 emissions declined in all economic sectors in the second half of the 2000s with the notable exception of the commercial sector. The greatest decline was in the industrial sector (Figure 5.1). Box 5.1 briefly describes these sectoral trends.

Figure 5.1. **GHG emissions**



a) Excludes emissions/removals from land use, land-use change and forestry.
b) GDP at 2005 prices and purchasing power parities.
c) CO_2 emissions from energy use only; excludes international marine and aviation bunkers; sectoral approach.
Source: ISPRA (2012); OECD (2011), *OECD Economic Outlook No. 90;* OECD-IEA (2011), *CO_2 Emissions from Fuel Combustion;* OECD-IEA (2012), *Energy Balances of OECD Countries.*

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There has been a surge in emissions of fluorinated gases,[7] mainly due to more widespread use of air conditioning and the resulting growth of HFC emissions (ISPRA, 2012). Emissions of N_2O and CH_4 have steadily decreased since 2000, and accounted for about 13% of total GHG emissions in 2010 (Figure 5.1). Agriculture and waste management are the main sources of these emissions. CH_4 and N_2O emissions from agriculture declined by 12% and 19%, respectively, between 2000 and 2010. This was mainly the result of a reduction in livestock, crop production and fertiliser use (ISPRA, 2012). Emissions from waste

Box 5.1. **Energy-related CO_2 emissions trends: sectoral breakdown***

The energy industries, which include power generation and refining, accounted for 38% of CO_2 emissions in 2010. After a steady but rapid increase in the first half of the 2000s, emissions from this setor dropped by 22% between 2006 and 2009. This was mainly due to an increased share of natural gas and renewables in electricity generation, together with lower energy demand caused by the economic recession (Figure 5.1; see also Section 5 below). In 2010, CO_2 emissions from the energy industry were back at their 2000 level and above their 1990 level.

The transport sector (mainly road transport) accounted for about 27% of CO_2 emissions in 2010. Emissions from this sector continued to increase for most of the 2000s due to growth of the vehicle fleet, total mileage, and, in turn, fuel consumption. However, fuel consumption and emissions fell sharply in 2007-10 (Figure 5.1): contributing factors were the negative impact of the economic crisis on road transport demand, and some efficiency improvement in the sector (ISPRA, 2012; see Section 6). This resulted in an overall reduction of CO_2 emissions from transport of 6.7% during the 2000s, although in 2010 these emissions were still 13% above the 1990 level.

Emissions from industrial production accounted for about 13% of CO_2 emissions in 2010. Emissions from this sector have declined by 33% since 2000, with most of the decline occurring since 2003 (Figure 5.1). This is mainly attributable to a sharp reduction of emissions from some industrial sectors due, in particular, to reduced production of some types of chemicals and restructuring of steel production. Italy's participation in the EU ETS since 2005 has also contributed, by spurring further uptake of natural gas in manufacturing industry (ISPRA, 2012).

Emissions from the residential sector accounted for about 13% of CO_2 emissions in 2010. They have decreased by nearly 3.5% since 1990. Emissions reflected energy use in the sector: they fluctuated from year to year in the first half of the 2000s and rapidly dropped between 2005 and 2007. This is largely due to improved energy efficiency in dwellings, especially with respect to electricity use (e.g. use of more efficient electric appliances) but is also partly a result of targeted policy measures (Section 5.4). However, emissions started to rise again in 2007 and have increased since, despite the economic recession and unlike in other sectors of the economy. In 2010, CO_2 emissions from the residential sector were back at their 2000 level.

Emissions from the commercial and public services sector accounted for 5.6% of CO_2 emissions in 2010, a relatively low share. However, these emissions grew consistently in the 2000s: emissions from this sector in 2010 were 43% above their 2000 level and nearly twice as high as in 1990. This reflects the sector's economic growth, the increase in large-scale retailing, and extensive use of air conditioning. Only with the economic recession did emissions slightly decline.

Emissions from agriculture, forestry and fishing were about 2% of CO_2 emissions in 2010. This was about 13% below 1990 levels. Overall, CO_2 emissions have reflected production trends in these sectors.

* IEA data on CO_2 emissions from energy use only.

management accounted for 3.6% of emissions in 2010. Following an increase in the 1990s, these emissions steadily declined in the following decade. In particular, CH_4 emissions fell by 8.5% as a result of a shift in waste disposal methods from landfill to other types of waste treatment.

As regards land use, land-use change and forestry, a total of 56.5 Mt CO_2 eq was absorbed in 2010, an increase of 31% compared with 2000. Steady growth in the extent of forest areas was the main factor underlying this trend. Progress has been offset to some degree by repeated forest fires, which were particularly destructive in 2007 (ISPRA, 2012).

2.2. Carbon intensities

Italy uses less energy per unit of output and per capita than most other OECD countries. Overall, the energy intensity of the economy continued to decline during the 2000s, although at a relatively slower pace than in many other OECD countries (Section 5; Reference I.A). Together with an increase in the share of gas and renewables in electricity generation, this led to a decrease in the carbon intensity of the economy and relative decoupling of GHG emissions from economic growth (Figure 5.1). At 0.3 t CO_2/USD 1 000, Italy's GHG emission intensity is well below the OECD average. GHG and CO_2 emissions per capita are also below the OECD averages (Reference I.C). However, as shown in Box 5.2 and Figure 5.2, national averages may hide wide variations at regional level.

While Italy decoupled production-based GHG emissions from economic performance, there was no decoupling of consumption-based emissions during the last decade.[8] Italy's decoupling performance worsened in the 2000s compared with the 1990s, when relative decoupling of consumption-based emissions was achieved (OECD, 2011b). As in many other OECD countries, this is probably due to an increased share of imports of carbon-intensive products and the relocation of economic activities to new EU member states and emerging economies.

Box 5.2. **Regional CO_2 emission trends**

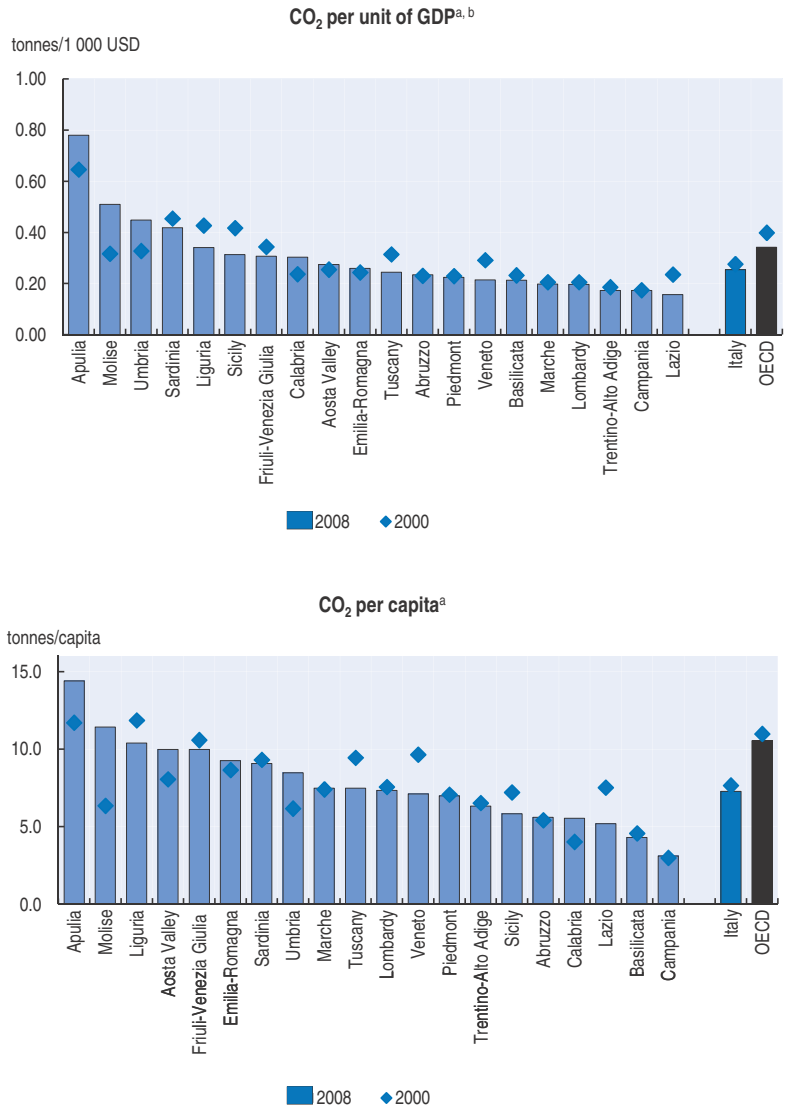
Italy is one of the most economically diverse countries in Europe. There is a clear difference between CO_2 emission trends in each region and each of the macro-areas (the North, Centre and South). This reflects regional differences in energy and industrial structures, economic performance, population levels and climatic conditions.

In the 2000s, the eight northern regions (Piedmont, Aosta Valley, Liguria, Lombardy, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia and Emilia-Romagna) emitted about half of total CO_2 emissions from energy generation and use, reflecting these regions' larger share of national GDP and population. The southern regions and the major islands (Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily and Sardinia) accounted for about 34% of CO_2 emissions, while the central regions (Tuscany, Umbria, Marche and Lazio) accounted for the remainder. Overall, CO_2 emissions rose in almost every region and in all three macro-areas in the first half of the 2000s and started to fall in the second half, as did emissions at national level.

Italy's CO_2 emissions per capita and per unit of GPD are generally below the OECD averages. Only a few Italian regions have levels of carbon intensity above the OECD average (Figure 5.2). In particular, the region of Apulia has some of the largest coal-fired power plants and steel-making plants in the country while contributing a relatively small share of national GDP and population, which explains its high carbon intensities. With some exceptions, there are lower CO_2 emissions per capita in the southern regions than in those in the North and Centre. This mainly reflects the lower absolute levels of emissions associated with relatively poorer economic conditions. However, on average the southern regions emit more CO_2 per unit of GDP than the northern regions, as they host some energy-intensive, low value-added industries and large power plants of national importance while accounting for a relatively small share of national GDP.

Figure 5.2. **CO_2 emission intensities by region**[a]

2000 and 2008



a) CO_2 from energy use only.
b) GDP at 2005 prices and purchasing power parities.
Source: ENEA, June 2012; OECD (2012), *Regional Statistics Database.*

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3. Policy framework for climate change mitigation

3.1. Institutional arrangements

Unlike in other areas of environmental policy, the central government has overall responsibility for climate policy including implementation of the Kyoto Protocol, the EU Climate and Energy Package and other related EU directives. In a range of related policy areas, however, such as renewable energy and promotion of energy efficiency (Section 5), the state and regions have concurrent legislative powers while the regions have nearly full administrative powers.[9] For instance, in the absence of a national energy strategy, all the regions and autonomous provinces have adopted Regional Energy-Environment Plans, which outline regional energy policy objectives and their impact on GHG emissions.

In practice, the development (and not just implementation) of energy and climate policies has increasingly taken place at regional level, although the central government retains responsibility for country-wide incentive mechanisms for renewables and energy efficiency (see Section 5). This situation is rather unique in Europe. As in other areas of environmental policy, it has led to implementation and investment delays. The regions do not always have the necessary resources to manage the increasing number of responsibilities that have been transferred to them. In addition, while a comprehensive system is in place to ensure policy co-ordination between national and regional authorities (namely the State-Regions Conference), co-ordination has often been difficult (Chapter 2). In some cases, these difficulties have impeded timely implementation of energy-related EU Directives.

Institutional arrangements for horizontal co-ordination of climate policy at state level have evolved considerably since 2000. The Ministry of the Environment, Land and Sea (MATTM) has overall responsibility for co-ordinating climate policy issues. It also shares responsibility for promoting renewable energy and energy efficiency with the Ministry of Economic Development (MSE), which is in charge of national energy policy. The Institute for Environmental Protection and Research (ISPRA) and the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) provide data, information, and technical and scientific support. ISPRA is also in charge of national emission reporting to the EU and the UNFCCC. The Inter-Ministerial Committee for Economic Planning (CIPE) approves national GHG emission reduction programmes.[10]

In 2002, the Inter-Ministerial Technical Committee for Emissions of GHGs (CTE) was established to support the CIPE's climate-related work. The CTE is chaired by the MATTM and composed of representatives of all relevant ministries and of the Presidency of the Council of Ministers.[11] The CTE is responsible for monitoring implementation of policies and measures identified in the national climate strategy (see below) and their impacts on emission trends, as well as for identifying further measures to meet targets. The CTE can also propose updates to the overall national strategy to the CIPE. The Italian Carbon Fund (ICF) was established at the World Bank in 2003 to purchase carbon credits as necessary.

3.2. The national policy framework

Strategy to achieve the Kyoto target

Further to ratification of the Kyoto Protocol, a national action plan for reducing GHG emissions in the period until 2012 was approved in 2002.[12] This plan projected that emissions would increase on a business-as-usual basis to 580 Mt CO_2 eq by 2012. It included a "reference scenario", which incorporated the impact of a range of existing measures (as of June 2002) to be implemented. Based on the reference scenario, indicative sectoral emission targets and a net distance to the Kyoto target of nearly 31 Mt CO_2 eq were identified (Table 5.1).

The plan delegated to the CTE the identification of necessary additional measures in the framework of the annual monitoring and reporting mechanism (see above). The plan was partially revised in 2007 to update projected emissions to 2010 and the Kyoto target (Table 5.1). A full update of the plan, taking account of the necessary new measures and of implementation of the EU ETS (which had entered into force in the meantime), was due to follow shortly thereafter. However, only in May 2012 did the MATTM submit to the CIPE a new draft plan for achieving the Kyoto target, as well as the 2020 targets of the EU Climate and

Table 5.1. **Successive roadmaps to meeting the Kyoto Protocol target**[a]

	2000[b]	2010[b]	2010 (revised in 2007)[c]	2010 (revised in 2012)[c]	2012[c]
Emission trend (A)	479.7	579.9	587.0	511.4	503.9
Existing measures, as of June 2002 (B)	. .	39.8	39.8	. .	. .
CDM/JI (C)	. .	12.1	12.1	2.0	2.0
Reference scenario (D = A-B-C)	. .	528.0	535.1	509.4	501.9
Kyoto target (E)	. .	487.1	483.3	483.3	483.3
Gross distance to target (D-E)	. .	40.9	51.8	26.1	18.6
Removals from forest carbon sinks (F)	. .	10.2	10.2	. .	. .
Net distance to target (D-E-F)	. .	30.7	41.6	26.1	18.6

a) The table illustrates the successive government plans to achieve the Kyoto target (2000, 2007 and 2012) and how the projected GHG emissions and distances to target were subsequently revised between 2000 and 2012.
b) GHG emission reduction plan, approved in 2002 (CIPE Decision No. 123/2002).
c) Revised plan (CIPE Decision No. 135/2007), which updated the emission trend (A) and the Kyoto target (E) only. The distance to target is calculated assuming that estimated emission reductions from existing measures, CDM/JI and carbon sinks remain unchanged.
d) As proposed in 2012 by the MATTM.
Source: CIPE; MATTM; OECD calculations.

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Energy Package. This draft plan updates the distance to the Kyoto target (Table 5.1). It defers a decision on options to meet this target, particularly regarding use of carbon credits, to November 2013, when a more reliable emission scenario is expected to be available.

Overall, a number of aspects of the GHG emission reduction plans have undermined their ability to guide the formulation and implementation of climate policy during the last decade. The 2002 plan did not identify mitigation measures in sufficient detail, leaving them in the form of broad objectives (such as growth of renewables generation capacity).[13] The plan delegated responsibility for identifying specific measures to the competent ministries and authorities. Priorities were not set, nor was a timetable for implementation established. Indicative sectoral emission targets were set using the generous reference scenario level (i.e. assuming that no further domestic emission cuts would be required despite the sizeable distance to target).[14] Further technical abatement potential was identified in each sector. However, it was left unclear whether this potential would be exploited and, if so, which measures would be implemented, or whether only the alternative (the purchase of carbon credits) would be pursued. Successive revisions of the 2002 plan have not addressed this issue. The purchase of carbon credits may well be an economically viable option in Italy, where emissions per unit of GDP are relatively low (Section 5) and marginal abatement costs are therefore likely to be higher than in more carbon-intensive countries (OECD, 2011a). Nonetheless, no evaluation has been made of the costs and benefits of domestic emission abatement versus use of the international carbon market. The central question that a climate mitigation strategy should address – how a country is to meet its target – has consequently been left unanswered. As a result, the annual monitoring and review process has lost much of its original rationale.

Several additional policy measures have been introduced since 2000 (Sections 5 and 6), but these measures have been introduced in a piecemeal fashion with insufficient *ex ante* assessment of costs, benefits and regulatory impacts. In several cases the measures would not appear to be cost-effective in relation to alternatives for reducing emissions (OECD, 2011a) and the reasons for their prioritisation is unclear to stakeholders and experts. Absence of significant input from civil society and stakeholders in the formulation

and review of plans is also apparent. No formal consultation process has been undertaken, and it is unclear how inputs from civil society organisations and stakeholders have been managed. Progress reviews of climate programmes required by the EU are undertaken by ISPRA and are of high technical quality, but they have not provided an appropriate basis for facilitating debate by the wider society. Moreover, there is no publicly available information on the annual reviews that were to be conducted by the CTE. In 2011, Italy introduced a legal requirement that the annual Economic and Finance Document (DEF) should include an annex on progress towards meeting the country's international GHG emission reduction commitments. This is a welcome step forward and should strengthen parliamentary review of national climate policy, as the DEF is the Italian government's core economic policy document and is discussed in Parliament every year.

Strategy to achieve the 2020 target

As mentioned above, in May 2012 the MATTM submitted to the CIPE a draft plan for achieving the EU-related target of reducing GHG emissions by 13% compared with 2005 levels in sectors not covered by the EU ETS. The draft plan is based on two emission scenarios. According to the first scenario, which includes the effects of existing measures as of December 2010, the gap with respect to achieving the reduction target in the domestic sector would be 18 Mt CO_2 eq in 2020. Additional measures planned to promote renewable heat and energy efficiency in the residiential, commercial and transport sectors are expected to yield emission savings enabling Italy to exceed the 2020 target by 14.3 Mt CO_2 eq (Table 5.2).

Although formal adoption was still pending at the time of the finalisation of this report, this draft plan is better designed than previous ones and overcomes some of their weaknesses: existing and additional measures are clearly detailed; their intermediate and final emission abatement potential is indicated (Table 5.2); the plan integrates measures foreseen in the national plans for renewables and energy efficiency (Section 5), as well as regional actions supported by EU funding;[15] and the MATTM is required to report annually on the plan's implementation as part of the DEF (see above). The plan identifies some priority actions, including: extension to 2020 of existing energy efficiency incentives (Section 5.4); establishment of a low-carbon technology register and of a VAT reduction on investment in registered technologies; devotion of at least half the revenue generated from auctioning ETS allowances to climate mitigation activities (Section 4); and introduction of a carbon tax to finance a revolving Kyoto Fund. This fund (EUR 600 million in 2012) provides financial support for projects on energy efficiency, small renewable energy and combined heat and power plants, research and forestry through low-interest loans to public agencies, businesses and private citizens.[16]

However, the costs of these measures and how their cost-effectiveness was evaluated remain unclear. Yet the draft plan seems broadly consistent with the results of several national and international studies on GHG abatement costs. For instance, the marginal abatement cost curve developed by the ENEA indicates that energy efficiency would be a cost-effective means of reducing emissions, whereas renewables would be more costly (ENEA, 2009). In addition, it finds that promoting a shift away from road transport would be the most cost-effective abatement option in Italy. This is unusual by international comparison, and it is not clear to what extent the cost of infrastructure development is factored in (Figure 5.3). Consistent with these abatement cost estimates and strategic energy policy documents, the government strategy prioritises energy efficiency measures

Table 5.2. **Emission reduction potential of measures to achieve the 2020 target**

	GHG emission reduction potential in 2020			
	Existing measures (December 2010)		Additional measures	
Categories of measures	Mt CO_2 eq	%	Mt CO_2 eq	%
Renewable electricity	8.6	16.8	4.5	8.6
Renewable heat		0.0	17.4	33.0
Biofuels	3.1	6.0		0.0
Electricity infrastructure		0.0	0.7	1.3
Energy efficiency in industry	5.6	10.9	13.7	26.0
Energy efficiency in the residential and commercial sectors	11.0	21.6	12.9	24.5
Transport infrastructure	7.0	13.7	3.5	6.6
Transport technologies	10.2	20.0		0.0
Agriculture and waste	5.6	11.0		0.0
Total GHG emission savings (ETS and non-ETS sectors)	51.1	100.0	52.8	100.0
Total GHG emission savings in the non-ETS sectors	32.3		32.3	

Source: MATTM.

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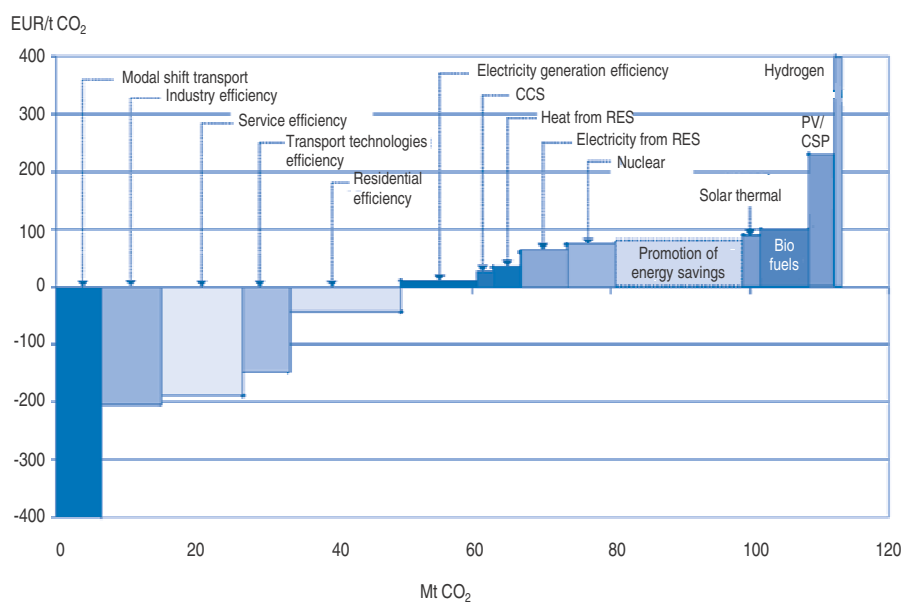
(expected to yield the largest savings) and relies more on renewable heat than on renewable electricity. This is particularly the case for additional measures planned, in order to correct some existing unbalances (Table 5.2).

Figure 5.3. **Marginal abatement cost curve for reducing Italian CO_2 emissions in 2020**



Source: ENEA (2009), *Rapporto Energia e Ambiente 2008 – Analisi e Scenari.*

4. Pricing carbon

Emissions trading

The EU Emissions Trading System (EU ETS) covers CO_2 emissions from more than 1 000 industrial installations and large power plants in Italy, and about 40% of total emissions. The EU ETS is therefore a central instrument of Italian climate policy, although

less so than in other countries where it covers a larger share of emissions. The majority of Italy's emissions remain outside the ETS, thus leaving most emission abatement to be covered by domestic measures in the non-trading sectors.

EU member states were required to share the national emission cap between sectors of the economy covered by the ETS through National Allocation Plans (NAPs). As in most other EU countries, allowances have been fully allocated free-of-charge to companies operating in Italy, including electricity generators. In the first trading period (2005-07), a general trend towards over-allocation of allowances was observed across the EU. As a result, the price dropped to below EUR 1 per allowance (EUA) in the spring of 2007. Italy, however, was one of four trading countries that allocated fewer allowances than the verified emissions for each of the first three years of trading; hence, it was forced to buy allowances on the market (Figure 5.4; EEA, 2008).[17]

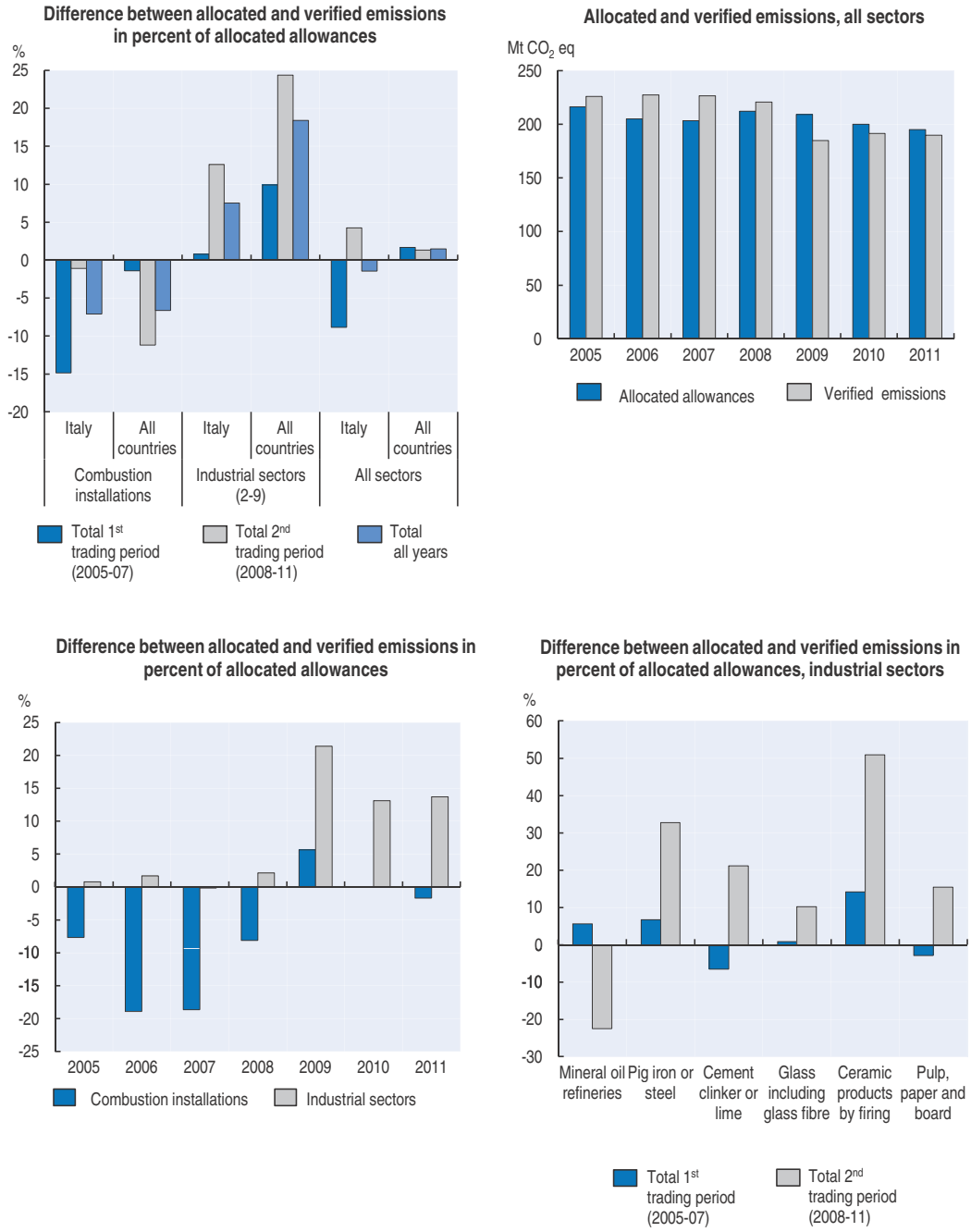
The total cap for Italy for the second trading period (2008-12), with the addition of several new industrial processes, was 201.6 Mt CO_2 eq per year on average. This represented a reduction of nearly 10% from the allocation of the previous trading period. The EU ETS and the flexible mechanisms of the Kyoto Protocol taken together were projected to deliver reductions in the range of 13-20 Mt CO_2 eq per year by 2010 (IEA, 2009).[18] So far in the second trading period, verified emissions have been 4.2% below the allocated allowances, compared with 1.3% across the ETS (Figure 5.4). The trend in the first trading period has therefore been reversed, which is attributable to the disproportionally severe impact of the global economic downturn in Italy. However, when considering the whole 2005-11 period, verified emissions in Italy were above allocations while the opposite was the case across the system. Overall, combustion installations were short of allowances in both trading periods (except in 2009, due to the lower energy demand associated with the economic recession). On the other hand, industrial installations have consistently received excess permits (Figure 5.4).

In the third phase of the EU ETS (2013-20), an aggregate reduction of 21% below 2005 emissions by 2020 will be required across the EU. Modifications to the system, particularly the progressive introduction of auctioning and tightening of the overall cap, should enhance its effectiveness in the next trading period. Auctioning a larger share of emissions will eliminate a high proportion of the windfall profits that accrued to the power generation sector across Europe in the previous trading period.[19] CO_2 allowance price forecasts indicate that market and regulatory uncertainty will persist, while the allowance price may continue to be too low or too volatile to provide sufficient incentives for investment in low-carbon technology (HM Treasury, 2010).

As most energy-intensive installations will receive freely allocated allowances even after 2013, windfall profits may continue to accrue to those sectors across the EU (De Bruyn et al., 2010; Martin et al., 2010). The extent to which the EU ETS will fully internalise the GHG externalities in the period to 2020 and provide a strong price signal to induce low-carbon investments, in Italy as elsewhere in Europe, is therefore open to question. For example, according to simulations by Bonenti et al. (2010) the ETS will promote investment in the Italian electricity generation sector, but mainly in increasing fossil-fired power capacity (natural gas). This suggests the need for complementary measures in Italy. At the same time, potential interactions between the ETS and other policy instruments, e.g. tradable energy efficiency certificates and feed-in tariffs (discussed in Section 5), should be considered in policy design to avoid overlaps that could lead to increasing the overall cost of mitigating GHG emissions.

Figure 5.4. **Allocated allowances and emissions in the EU ETS**

2005-11



Source: EEA (2012), *EU ETS data viewer.*

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Carbon taxation

GHG emissions from sectors of the Italian economy not covered by the ETS do not face an explicit carbon price. A carbon tax reform was initiated in 1999 as a response to Italy's Kyoto obligations, with the objective of accounting for the CO_2 content of energy consumption in the taxation system. By 2005, the tax rates on various energy

products were to increase and the expected additional revenue was to be used to offset labour taxes (Barde, 2004).[20] However, implementation of this reform was first frozen and then abandoned in 2000 due to concerns about potential inflationary impacts (OECD, 2003).

While a case remains for energy tax reform in Italy, it would need to be designed in a co-ordinated way with the EU ETS. In addition, the already high rate of energy taxation in Italy needs to be considered (Chapter 3). The carbon prices implied in energy tax rates applied to industrial process, heating and other non-transport uses are higher than in many other countries such as France and Germany (OECD, 2012a). However, industrial fuel users benefit from several tax exemptions (Chapter 3). Excise duties on petrol and diesel also imply already significant carbon prices of about EUR 310 and EUR 220 per tonne of CO_2, respectively, which are among the highest in the Euro area and well above any CO_2 allowance price that has emerged in the ETS.

Nonetheless, if excise duties on transport fuels are assumed to cover other externalities such as local air pollution, as well as costs that are not environment-related, their implied carbon component becomes more reasonable. Hence, there remains scope for restructuring tax rates to better reflect the carbon content of transport fuels. According to Cingano and Faiella (2011), a carbon tax of between EUR 17 and EUR 100 per tonne of CO_2 on transport fuels would increase fuel prices by between 3% and 20% compared with 2007 and reduce emissions from road transport by up to 5% in 2020. A large part of the emissions reduction is estimated to come from a decrease in fuel demand from relatively better-off households. Additional tax revenue of up to EUR 10 billion in 2020 could be used to lower distortionary taxes such as those on labour, or to offset the impact of renewables incentives on electricity prices.[21]

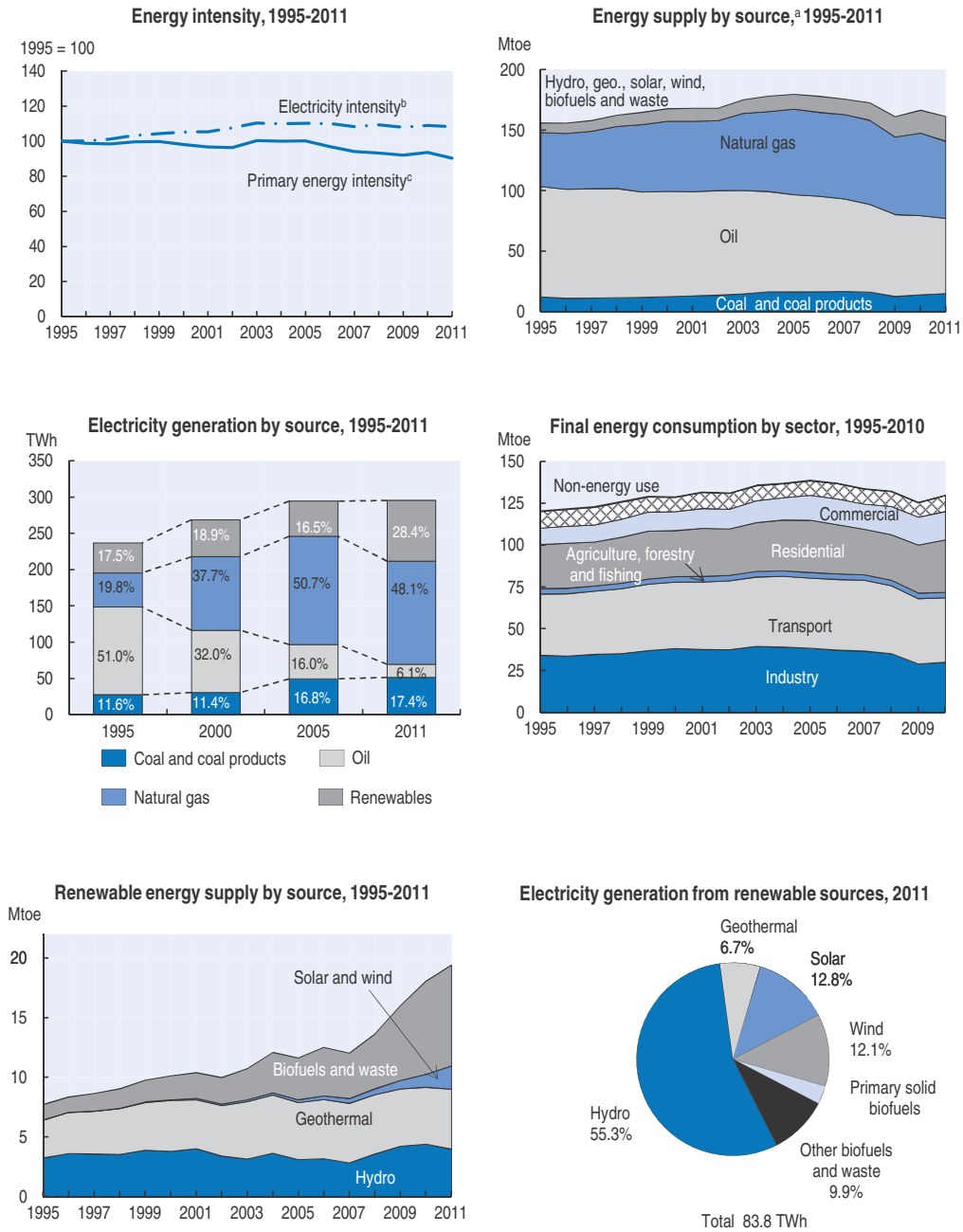
A combination of a tax on energy products and the EU ETS, which sets a consistent carbon price across the economy in a manner which avoids both gaps and double regulation, could minimise the costs to society of meeting emission mitigation objectives (OECD, 2011c). While the proposed EU Energy Taxation Directive may result in some form of carbon taxation being introduced in EU member states, this development is far from certain. In addition, the non-ETS sectors account for a larger share of emissions in Italy than in many other countries and, despite high energy prices, emissions from the service and transport sectors increased during most of the 2000s (Box 5.1). Thus, there would appear to be a case for the introduction of some form of carbon taxation in the areas of the economy not covered by the EU ETS, as indicated by the draft plan to achieve the 2020 targets (Section 3.2).

5. Climate and energy policies

5.1. *The Italian energy sector: an overview*

Italy's energy mix is characterised by heavy use of oil (mainly for transport) and gas, a relatively low share of coal, and absence of nuclear power. Italy is highly dependent on the import of fuels, which makes domestic energy costs especially sensitive to world oil prices (Figure 5.5; Reference I.A). In 2011, oil and gas accounted for about 38% and 40% of total primary energy supply, respectively, followed by renewables (12.6%) and coal (9.4%). Total primary energy supply increased consistently and remained steadily coupled with GDP between 1990 and 2005. As a result, the energy intensity of the Italian economy (as measured by primary energy supply per unit GDP) hovered around the same level in the

Figure 5.5. **Energy structure and intensity**[a]



a) Total primary energy supply. Breakdown excludes electricity trade.
b) Electricity consumption per unit of GDP. GDP at 2005 prices and purchasing power parities.
c) Total primary energy supply per unit of GDP. GDP at 2005 prices and purchasing power parities.
Source: OECD-IEA (2012), *Energy Balances of OECD Countries*; OECD (2011), *OECD Economic Outlook No. 90.*

StatLink http://dx.doi.org/10.1787/888932773065

first half of the 2000s. Energy demand started to decline in 2005, before the Italian economy entered recession, and then continued to decline at a higher rate than GDP. Despite a slight increase in 2010 due to the mild economic recovery, energy intensity fell by nearly 10% in 2005-11 (Figure 5.5).

Italy's economy has traditionally had relatively low energy intensity due to limited national endowments, high energy prices and taxes, and an industrial structure characterised by small firms mainly operating in sectors that are not energy-intensive. At 0.1 tonnes of oil equivalent per USD 1 000 of GDP (adjusted for purchasing power parties) in 2011, Italy's energy intensity was well below the OECD average and among the lowest in the OECD. However, in the OECD context, the decline in energy intensity (from an already low starting point) has been slower than in other countries (Reference I.A).

Transport is the main energy end-user, accounting for about 30% of total final energy consumption (TFC) in 2010. Industry and households made up some 23% and 24% of TFC, respectively, followed by the commercial/service sector (13%). TFC decreased by 2.5% between 2000 and 2009, although it picked up again in 2010. Most of this decline occurred in the second half of the decade. It was mainly due to reduced energy consumption in the industrial sector. On the other hand, energy use grew rapidly during most of the 2000s in the transport and service sectors, which led to rising GHG emissions in these sectors (Box 5.1; Figure 5.5).

The share of gas in electricity generation grew during most of the 2000s and remained higher than in many other OECD countries. Natural gas accounted for some 51% of electricity production in 2005. This share decreased to about 48% in 2011, mostly compensated by increased electricity generation from renewables (Figure 5.5).[22] Italy has a long tradition of using renewable sources for electricity generation: because it is poor in energy resources, it has relied for decades on hydropower and geothermal power. However, as demand for (and generation of) electricity increased, the contribution of renewables shrank in the 1990s. The 2000s saw renewed growth in electricity generation from renewable sources, largely as a result of the incentive policy discussed in the following section.

Italy's "race to renewables" was particularly notable in 2005-10, despite the impact of the economic recession at the end of the decade. Due to good water availability and the installation of new wind farms, bioenergy plants and solar photovoltaic (PV) power plants, generation from renewables reached 28% of electricity supply in 2011, up from nearly 19% in 2000. Hydropower accounts for over half of renewable electricity. Solar photovoltaics has become the second source of renewable electricity, followed by wind, biofuels and waste (Figure 5.5). Electricity generation from renewable sources has increased in all the macro-areas, with large regional variations (Box 5.3; Figure 5.6).

Italy has made great strides in reforming and liberalising its energy sector (IEA, 2009), but it is still in the process of developing a national energy strategy (which was issued for public consultation in October 2012). In practice, the EU has provided the main directions of Italian energy policy, including in matters related to reducing GHG emissions from energy generation and use. Pursuant to EU requirements, the government adopted the national Renewable Energy Action Plan (REAP) in 2010 and a new national Energy Efficiency Action Plan (EEAP) in 2011. These have been the two key strategic documents for pursuing energy and climate policy goals. Renewables and energy efficiency have helped reduce GHG emissions in the second half of the 2000s, although their role was not clearly identified in the national plan to meet the Kyoto target. They are expected to deliver most GHG emission reductions in the period to 2020 (Section 3 and Table 5.2).

5.2. Renewable energy policy

Italy's renewables policy is guided by the EU targets for renewable energy use agreed under Directive 2009/28/EC (as transposed in Italian legislation in 2011). Italy is required to

Box 5.3. **Regional trends in power generation from renewable energy sources**

Electricity generation from renewable sources varies greatly among the macro-areas and regions, in terms of both growth rates and sources used. In general, the northern regions have supplied the majority of electricity from renewable sources, particularly hydropower. The amount generated increased by 24% in these regions, but their contribution to national renewable electricity generation decreased from 75% in 2000 to 57% in 2011. This was compensated by nearly four-fold growth in generation in the southern regions, which accounted for 23% of total renewable electricity produced in 2011, up from 8% in 2000. The amount of generation also increased substantially in the central regions, by 82%; these regions contributed 19% of national renewable electricity generation in 2011 (Figure 5.6).

The increase in renewable electricity generation resulted in rising shares of renewables in total electricity production. In particular, the share of electricity produced from renewables more than tripled during the decade in the South (Mezzogiorno), albeit from a low level, and nearly doubled in the central regions. A more modest 7% increase took place in the North (Figure 5.6). However, renewable sources still accounted for some 18% of electricity production in the southern regions in 2010, compared to about 30% in both northern and central Italy.

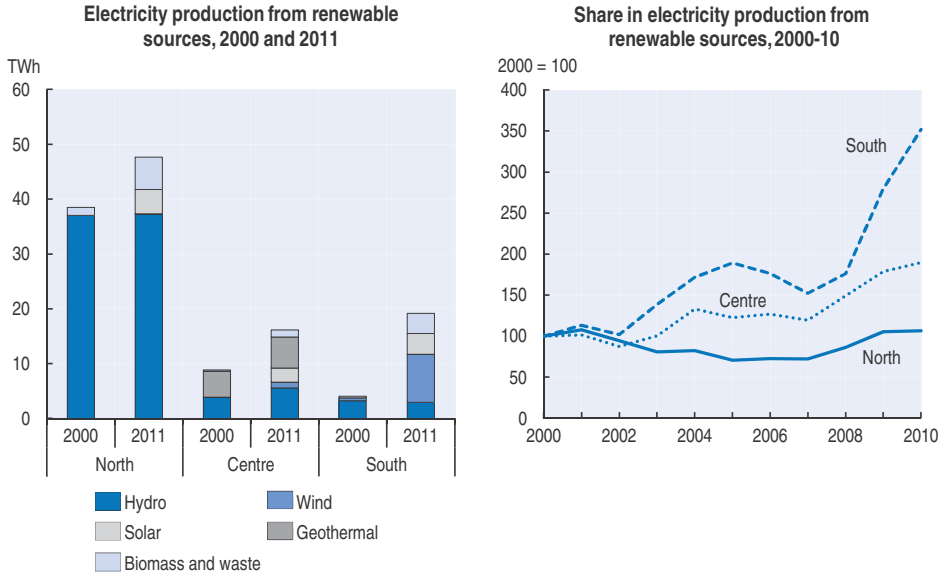
Figure 5.6 shows that the mix of renewable sources differs across macro-areas. Traditional sources such as hydropower and geothermal are largely dominant in the North and Centre, where they have long been exploited. Among non-traditional sources, biomass and waste, and solar photovoltaics, are the most used in these regions, where they each accounted for some 11% of the renewables mix in 2011. Wind is the dominant source of renewable electricity in the South, where it represented 46% of renewable electricity generation in 2011, up from 14% in 2000. Nearly 90% of wind power was produced in the southern regions in the same year, reflecting their higher wind potential. Overall, the South presents a more balanced renewables mix than the other macro-regions, with solar photovoltaics and biomass contributing about 20% each, followed by hydropower (15%).

The South has benefited most from national incentives to use renewables to generate electricity. It has greater potential to use some sources, especially wind and solar. Additional investment subsidies for renewables plants located in the South have been provided through EU funds and national development funds. However, massive growth in these regions could exacerbate some weaknesses of the electric networks, which are generally less developed in the South, and ultimately hamper future expansion of the renewable energy sector (DPS, 2010).

achieve 17% of its gross final energy consumption from renewables by 2020, compared with less than 5% in 2005.[23] The 2010 REAP divides the overall target between heating/cooling, electricity and transport and indicates intermediate targets. While the largest share of energy use covered by renewables is expected to be in the electricity sector, much higher growth is expected in the heating/cooling and transport sectors (Table 5.3). This is partially consistent with the ENEA's marginal abatement cost curve and the MATTM's draft plan to achieve the 2020 GHG emission targets (Table 5.2; Figure 5.3).

Italy has used a mix of instruments to promote the development of renewables. As in many other countries, economic incentives for electricity generation, in the form of feed-in tariffs (FITs) and tradable green certificates (GCs), have been the main policy instruments. Direct investment subsidies and requirements to install micro-renewables in buildings have also been used (Box 5.4). All these support programmes have been effective

Figure 5.6. **Electricity production from renewable sources by region**



Source: ISTAT (2012), *Indicatori territoriali per le politiche di sviluppo (Database);* TERNA (2010 and 2012), *Statistical Data on Electricity in Italy.*

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Table 5.3. **Progress towards the 2020 renewable energy targets**

	Renewable energy as a share of gross final energy consumption					Estimated GHG savings
	Achieved (%)		Target (%)			Mt CO_2 eq
Renewable energy sources for:	2005	2010	2010	2015	2020	2010
Heating and cooling	2.8	9.5	6.5	10.1	17.1	13.3
Electricity generation	16.3	20.1	18.7	22.4	26.4	46.2
Transport	0.9	4.8	3.5	6.6	10.1	2.0
Total	4.9	10.1	8.5	11.2	17.0	61.4

Source: MSE (2010; 2011a).

StatLink http://dx.doi.org/10.1787/888932773217

in spurring the development of renewable energy, especially in the electricity sector (Section 5). The 2010 intermediate targets set by the REAP have already been achieved and even exceeded: in five years, the share of renewables in gross final energy consumption doubled (Table 5.3). However, while progress has been rapid, it has entailed high costs.

As renewables' installed capacity has risen, so have costs associated with the incentive mechanisms. Those associated with the PV feed-in premium (*conto energia*) increased sharply in 2010-11, with over MW 9 000 added in 2011 alone. As a result, Italy has already achieved its target of MW 8 000 of PV installed by 2020 as set in the REAP. The overall cost of its renewable electricity support system stood at EUR 7 billion in 2011, of which EUR 4 billion was associated with the PV FIT alone, and it is set to rise further (AEEG, 2012a). This was twice the total cost in 2010 and represented a more than five-fold increase in the PV FIT cost (Table 5.4). Moreover, the cost of the GCs and the all-inclusive FITs increased over time, reaching some EUR 2.2 billion in 2010, of which 1.3 billion related to the buy-back of GCs not absorbed by the market (Box 5.4).[24] The majority of this growth was associated with wind power and biomass plants. As can be seen from Table 5.4, Italy's

Box 5.4. **Incentives for the development of renewable energy**

In Italy, economic incentives for electricity generation from renewable sources have mainly taken the form of tradable green certificates (GCs) and feed-in tariffs (FITs). These incentive programmes are managed by the state-owned company Gestore dei Servizi Energetici (GSE). The first FIT-like incentive (the so-called "CIP6") was introduced in 1992. While it is not in force anymore, plants commissioned before 2000 continue to benefit from it, and its costs are covered by electricity tariffs.

The GC system, in place since 2001, is a market for renewable energy certificates. It is based on an obligation imposed on energy producers and importers to supply a given percentage of renewable electricity (with the exception of PV from 2008), for which they must present certificates to the regulatory authority. The obligation has increased over time, from 2% in 2001 to 7.55% in 2012. Suppliers can acquire certificates by generating and importing renewable electricity, or by purchasing certificates on the market. Here the GC demand is determined by the minimum renewable targets to which suppliers are subject, whereas the supply is provided according the GCs attributed to certified renewable power production. In case of excess supply, the GSE buys back unused GCs at a pre-established price and recovers the costs through electricity bills. Originally, the system did not differentiate among technologies. In 2008, to avoid over-incentivising mature technologies, the system was revised to differentiate the number of GCs awarded by technology, using a coefficient that is higher for less mature technologies (Table 5.4). The average price of a GC was about EUR 145 per MWh in 2005, but then fell to about EUR 85/MWh in 2010. The system will start to be phased out in 2013, and the renewables obligation will gradually be reduced to reach zero in 2015. This is partly because of the lack of international partners to trade with, and is partly an attempt to simplify Italy's system of renewables incentives. As from 2013, the system will be replaced by the all-inclusive FIT (see below) for small plants and reverse auction tendering procedures for larger plants (in general, above 5 MW).

Small producers with generation capacity not exceeding 1 MW (200 kW for wind), and excluding PV generators, can choose between the GCs and an all-inclusive FIT (*tariffa omnicomprensiva*). The latter is a fixed payment that includes both the incentive component and the value of the energy sold or used by the producer (Table 5.4).

Incentives for solar energy are based on a separate set of premium FITs (*conto energia*) launched in 2005. Tariffs (a premium paid to producers on top of the electricity price) are available for 20 years for PV and 25 years for solar thermodynamic. Rates depend on the size and type of plants and the date of commissioning. Rates and conditions have undergone several downward adjustments due to a rapidly evolving PV market and the rising costs of the incentives. Since 2011, rates have been set to decline over time and a cap on annual costs has been applied. From 2013, the all-inclusive FITs will also apply to PV, but excluding the share of electricity produced for own consumption, which will continue to receive the premium.

Production of heat from renewables is supported by the White Certificate system for energy efficiency (Section 5.4). Solar-thermal plants and biomass heating plants have also benefited from a tax rebate of up to 55% of total costs (Section 5.4). These incentives are expected to be replaced by a feed-in tariff for heat generation from renewables (*conto energia termica*). However, the related implementing regulations have not yet been adopted. Obligations are in place for private and public buildings to derive heating and power from renewable energy sources, install solar thermal systems that cover at least 50% of hot water demand, and install PV systems in all new buildings and in existing buildings with a total floor area over 1 000 m^2.

Use of renewables in the transport sector is promoted through a biofuel blending obligation introduced in 2007. Reduced excise duties on biofuels, which had also been in place for 15 years, were phased out in 2010. Petrol and diesel producers are required to mix these fuels with a percentage of biofuels (in energy content). This share gradually increased to 4.5% in 2012 and is set to reach 5% in 2014. Second generation biofuels are considered to have double energy content for compliance purposes. The Ministry of Agriculture, Food and Forestry issues certificates against the verification of compliance with the obligation. Each certificate is worth Gcal 10 of biofules and is tradable, so that producers can also fulfill their obligation by purchasing certificates through bilateral contracts. Non-compliance with the quota is subject to penalties. A system for verification and certification of biofuels against sustainability criteria was established in 2012.

Source: MSE (2010; 2011a).

incentives for use of renewables have been generous when compared with the average wholesale price of electricity (EUR 72/MWh on average in 2011). The cross-subsidies implied by these incentives (excluding hydropower) were estimated to account for some 0.19-0.21% of GDP in 2009, the third highest share in OECD Europe after Spain and Germany (Égert, 2011). All this has resulted in increasing costs for electricity consumers: incentives to use renewables represented some 15% (EUR cents 2.86/kWh) of the electricity bill of an average household consumer in July 2012, up from 7.3% (EUR cents 1.18/kWh) in January 2010.[25] Nonetheless, the rising cost of electricity generated from fossil fuels (primarily natural gas, which is imported) has been responsible for most of the increase, while increased renewable electricity generation has contributed to reducing electricity price at peak time (AEEG, 2012a).

Table 5.4. **Incentives for electricity generation from renewable sources**

2010-12

Technology	Incentive mechanisms					New installed capacity	Total installed capacity	Target installed capacity
	Incentive period	Feed-in premium[a]	All-inclusive FIT[a]	Green Certificate[b]	Annual cost			
		2012	2012	2012	2010	2011	2011	2020
	years	€/MWh	€/MWh	Coefficient	Million €	MW	MW	MW
PV	20	148-418 (31-186)	(113-288)		740	11 456	12 600	23 000[c]
Wind (onshore)	15 (20)		300 (127-291)	1.0	728	1 012	6 800	12 000
Wind (offshore)	15 (25)		300 (165-176)	1.5		0	0	680
Bioenergy	15 (20)		180-280 (85-236)	0.8-1.8	1 281	831	2 850	3 820
Wave, tidal	15 (15-20)		340 (194-300)	1.8	0	0	0	3
Hydropower	15 (20-30)		220 (96-257)	1.0	733	199	17 920	17 800
Geothermal	15 (20-25)		200 (85-99)	0.9	108	35	772	920
Total					3 590	14 423	40 942	58 223

a) In brackets: revised rates and incentive periods applicable as from September 2012 for PV and 2013 for the other sources; rates decrease over time.
b) Phased out as from 2013.
c) Revised target. The original target set in the 2010 REAP was MW 8 000.
Source: Ministry of Economic Development.

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As in other countries, this demonstrates one of the main drawbacks of technology-specific incentives such as FITs: the inability of the regulator to directly control how much new capacity investors install in a given year, and the consequent inability to control costs. Such instruments need to be reviewed frequently to take account of the decreasing costs of renewables, placing a high information requirement on the regulator (OECD, 2012b). In 2011-12, the government took a number of measures to control the cost of incentives to use renewables, including reducing incentive rates, setting a cap on total costs of PV FITs, introducing annual digression rates, and introducing a tendering mechanism for large plants (Box 5.4, Table 5.4). These reforms are positive developments, which align incentive rates with the decreasing costs of renewables technologies and should help control costs for electricity consumers in the period to 2020. At the same time, several observers have claimed that these reforms create additional bureaucratic burdens for operators, thereby discouraging investment.

Overall, the cost of abating 1 tonne of GHG emissions implied by the FITs has been estimated to be quite high. The cost of abating 1 tonne of CO_2 implied in the incentives to use renewables has been estimated to vary between EUR 196 (for biogas) and EUR 718 (for PV) (Égert, 2011). Such high abatement costs are also due to the fact that these incentives reflect the actual costs of investment in renewables, and that renewables displace energy produced from a relatively low carbon-intensive fuel mix in Italy. The ENEA (2010) estimated that the annual cost of supporting renewable electricity would amount to about EUR 78 per MWh in 2020. This is above the estimated value of the externalities of fossil fuel generated electricity that would be avoided, which is estimated to be in the range of EUR 27-67 per MWh (OECD, 2011c).

In theory, the carbon price faced by energy operators in the EU ETS should provide incentives to invest in renewables. OECD analysis shows that, when a carbon price exists, applying other policy instruments could lead to overlap and undermine cost-effectiveness (OECD, 2009; 2011b). In particular, both FITs and GCs can lead to displacement of emissions and depress the demand and prices of ETS allowances (NERA Consulting, 2005). However, as indicated in Section 4, the price of CO_2 emissions in the EU ETS has been generally too low to stimulate such investment: some technologies cannot compete with conventional energy sources even when the allowance price is taken into account. Technology-specific instruments such as FITs may be used to promote renewables beyond the incentives provided by the EU ETS, to the extent that such measures aim at encouraging innovation and long-term cost reductions rather than only short-term emission abatement. While the costs of incentives to use renewables have been criticised as too high for the outcomes achieved, they have stimulated growth in some economic sectors linked to renewables. This is estimated to have had positive economic and employment impacts, although it has also resulted in surging imports of renewables technologies, especially PV technologies (Chapter 3).

Overall, Italy's renewables policy has appeared to lack a general long-term vision, perhaps due to the absence of a national energy strategy and the fact that a plan for renewables was prepared only in 2010, triggered by EU requirements. Support schemes have mainly been introduced in a reactive manner, without sufficient planning, consultation or assessment, and outside a coherent strategic framework. For instance, Italy started with an advanced technology-neutral, market-based mechanism, the GCs, and then moved back to technology-specific FITs. With the benefit of hindsight, the opposite might have been more cost-effective and better aligned with technology development. Solar PV was prioritised at the expense of more cost-effective options in the fields of renewables for heating and cooling, and energy efficiency. In the case of several technologies there have been multiple support systems in place, creating both unnecessary complexity and regulatory uncertainty. Support instruments have changed several times within a few years, while announced measures have often been implemented with much delay. The 2012 revision of the incentive mechanisms (mentioned above) were aimed at overcoming some of these issues.

Non-economic barriers to the deployment of renewables remain. Spatial planning and authorisation procedures for plant construction and grid reinforcement are complex and regionally differentiated, resulting in a long lead-time for the realisation of plants and infrastructure (IEA, 2009). Regional and provincial authorities can block investments that have the potential to serve the national interest.[26] Rules at local level can themselves be fragmented, often bureaucratised, and expensive. As in other areas, the "not in my

backyard" (NIMBY) syndrome has been an issue, probably worsened by the complexity of local rules and reluctance to consult local populations in a constructive dialogue before decisions are taken (Chapter 2). Progress has been made in overcoming these obstacles, with the approval of national licensing guidelines and simplification of some procedures, although these could be further streamlined (IEA, 2009). As suggested by the REAP, a system for examining regional and local procedures could be useful to encourage exchanges of best practices.

In an effort to further engage regional authorities, and facilitate some processes and investment, in 2012 the central and regional governments agreed to share the REAP targets among regions.[27] Targets were set on the basis of a number of criteria, including region-specific potential for renewable energy generation. Targets must be reflected in regions' energy-environment plans. This burden-sharing agreement allows compensation of surpluses and deficits among regions, and annual revisions of targets where the distance to the national objective is above 20%. The central government can appoint special commissioners if the regions are not on track to meet their intermediate targets by 2017, or do not take action to do so, and this impedes Italy's compliance with the EU target. While sharing the national targets among regions could lead to some loss in terms of economic efficiency, it could help improve governance and effectiveness. Systematic and rigorous monitoring will be crucial for the success of the system.

5.3. *Carbon capture and storage and smart grids*

In view of the country's dependence on gas for its electricity generation portfolio, the Italian authorities have invested in carbon capture and storage (CCS) technologies to help achieve emission abatement and energy security objectives. The Ministry of Research has funded two CCS research and development projects for CO_2 capture at the Enel Federico II power plant in Brindisi. In March 2011, the project inaugurated an innovative pilot plant for capturing and storing CO_2, one of the first of its kind in Europe.

It is intended that lessons and experience in designing and operating post-combustion carbon capture plants from the Brindisi project will be used on an industrial scale at a new coal-fired power plant under construction in Porto Tolle (Rovigo), a project supported by the European Commission. There are plans for 660 MW of the new 2 000 MW plant (which will replace an oil-fired plant) to have CCS technology installed. This will separate up to 1 million tonnes of CO_2 per year, to be stored in a saline aquifer below the Adriatic Sea. It is projected that the plant could be operational by 2015. Significant funding has been secured from the European Commission. Further funding is expected from revenue obtained from auctioned ETS allowances. However, a significant funding gap remains.

Like many other countries, Italy needs to further develop its networks to integrate growing electricity production from renewables, especially the transmission network in the southern regions and islands (Box 5.3). Italy is already a European front runner in developing smart grids for electricity distribution, with the aim of improving energy efficiency, reducing electricity losses, and integrating expanding electricity generation from small, territorially dispersed and intermittent sources. The rollout of smart meters, mandatory since 2008, has been virtually completed.[28] In 2010, the Regulatory Authority for Electricity and Gas (AEEG) introduced a pilot incentive mechanism for the development of advanced smart grids.[29] The AEEG selected eight pilot projects as eligible for these incentives. Actual implementation is slightly behind schedule. The results of this test phase, which will continue until the end of 2013, are expected to contribute to formulating a structural smart grid promotion policy.

However, investment so far has mainly focused on smart metering, which is just the first step of a complex grid development. Investment in more advanced steps is lagging, probably due to the absence of a systematic approach and targeted legislation on smart grids. It is estimated that full implementation of smart grids in Italy will require between USD 68 and 106 billion to 2050 for investments in infrastructure, product and services, including investments that have already been made (EnergyLab, 2012).

5.4. *Energy efficiency policy*

Italy's Energy Efficiency Action Plan (EEAP) was first adopted in 2007, in compliance with Directive 2006/32/EC on energy end-use efficiency and energy services, and was revised in 2011. It identifies the contribution of each end-use sector to achieving the EU-set targets of reducing final energy consumption by 9.6% by 2016 (compared with the 2000-05 average) and primary energy consumption by 20% by 2020 (compared with projected levels). According to the EEAP, most savings are expected in the residential sector, although the ENEA's marginal abatement cost curve indicates that there would be cheaper opportunities for improving energy efficiency in other sectors (Figure 5.3). The EEAP outlines the main policy measures, including regulatory instruments (e.g. energy efficiency standards for buildings) and economic incentives, such as tax deductions and tradable energy efficiency certificates (Box 5.5). It also takes stock of the main measures existing at the regional level. However, mechanisms to ensure co-ordination between this national plan and the Regional Energy-Environment Plans remain vaguely defined, as is the system for monitoring the contribution of regional actions to meeting national targets.

The implementation of these measures, although not all were included in the 2007 EEAP, resulted in energy savings exceeding the 2010 intermediate target set by the first plan (Table 5.5). The implementation of minimum energy performance standards for buildings, albeit still incomplete, and the system of White Certificates generated more than 80% of these savings, most of which were achieved in the residential sector (Table 5.5; ENEA, 2011). Energy consumption per dwelling in Italy is among the lowest in Europe and has continued to decrease, although at a lower rate than in other European countries such as France and Germany. Improved efficiency in electricity use has been partially offset by increased heat consumption per dwelling, to some extent due to the still partial application of energy performance certification of buildings across the country (ENEA, 2011). The regions are responsible for implementing building certification. As of 2010, only half of them had the related legislation and only five (all in the North) had issued certifications. Despite the adoption of national guidelines in 2009, a variety of regional approaches to measuring and certifying energy savings remain, which creates uncertainty in the housing market (Antinucci et al., 2011). A national monitoring system could help harmonise and reinforce implementation of the standards, with a view to achieving further energy savings and being fully compliant with the EU Energy Performance of Building Directive, as revised in 2010.

Good results have also been achieved in the manufacturing sector (Table 5.5). Overall, industrial energy efficiency has improved, although less than in the EU on average. This is due to the sector's already low energy intensity, as well as to the Italian industrial structure, which is based on small and medium-sized enterprises with a relatively low propensity to investment in energy efficiency with a long payback period (ENEA, 2011). Energy savings in the service and transport sectors have been more modest and below expectations. Therefore, achieving mid- and long-term targets, especially in these sectors and in industry, together with the associated GHG emission reductions will require additional efforts.

Box 5.5. **Tradable certificates and tax incentives for energy efficiency**

The tradable White Certificate (WC) system, which began to operate in 2005, is one of the first market mechanisms for energy efficiency in Europe.[a] Under this system, electricity and gas distributors with more than 50 000 customers are obliged to achieve energy saving targets among end-users. Targets rapidly increased from Mtep 0.2/year in 2005 to Mtep 6/year in 2012, and they are more stringent in the electricity sector. Certificates (for 1 tonne of oil equivalent each) are issued against achieved savings of electricity, natural gas and other fuels in all end-use sectors. These include transport, although the related implementing measures have not been adopted yet. In 2011, the system was extended to high-efficiency combined heat and power (CHP) generation under a special regime. Savings can be obtained by energy distributors under this obligation, energy service companies (ESCOs), and big energy end-users that hire energy managers. Distributors can meet their obligations by implementing energy savings projects, so as to receive WCs, or by purchasing certificates on the organised market or bilaterally. At the end of each compliance period, distributors must surrender to the independent Regulatory Authority for Electricity and Gas (AEEG) a number of WCs equivalent to their energy saving objective. In practice, the AEEG buys back the WCs at a predetermined price (standard costs) and recovers the cost via a component of the energy end-use tariffs. Non-compliance with the objectives is sanctioned.

Energy savings associated with the WC mechanism have steadily increased since its launch in 2005 and the market has become increasingly dynamic. The system has also driven a thriving ESCO sector in Italy, especially in the northern regions (Chapter 3). However, savings have been below the targets since 2008, when the targets were substantially raised and perhaps became too ambitious. The mix of energy saving projects under the system has become progressively more balanced, again due to some regulatory modifications, and the share of savings achieved in industry has increased in recent years (reaching 20% in 2011). However, over half of energy savings continue to be achieved in the residential and services sectors through relatively cheap electricity-related projects (e.g. efficient light bulbs and appliances) (AEEG, 2012b). In addition, delays in adopting the post-2012 objectives for distributors have generated uncertainty and hindered investment. This may have contributed to falling short of the objectives (AEEG, 2012b).

A number of fiscal incentives encourage private investment in energy efficiency. These include 20% tax allowances for efficient refrigerators and for the installation of high-efficiency electric motors and frequency inverters in industrial facilities, both in place between 2007 and 2010. Since 2007, 55% of the costs incurred for energy efficient renovation of existing buildings have been tax deductible.[b] This incentive has yielded considerable energy savings (about GWh 9 000/year), equivalent to some 2 Mt CO_2 eq saved per year. It has mobilised growing investment, mostly in the northern regions, reaching some EUR 4 600 million in 2010 alone. The average cost per unit of saved energy was between EUR 0.07/kWh (for solar thermal) and EUR 0.22/kWh (for geothermal equipment). As in the case of WCs, cheaper projects with relatively lower energy saving potential (i.e. window insulation) have absorbed more than half of incentivised investment. However, investment in heating systems has grown and is expected to deliver the largest savings by the end of the incentive period (ENEA, 2012).The 55% tax incentive has been modified several times and renewed on an annual basis at the time of state budget approval. It is expected to be phased out in mid-2013 and replaced by the tax deduction that is common to other (including not energy-related) building renovation. This regulatory uncertainty, exacerbated by the economic recession and constrained public finances, is likely to have undermined the effectiveness of the tax incentive.

a) It is similar to obligation schemes in operation in Denmark, France, the Flemish region of Belgium, Ireland and the United Kingdom, although not all schemes include tradable certificates.

b) Primarily concerning the insulation of buildings' doors, windows, walls and floors, and efficient air conditioning and heating systems, but also installation of solar panels for hot water production.

Table 5.5. **Progress towards energy savings targets**

	Savings in final energy consumption								Estimated GHG savings
	Achieved		Target (%)						
	2010		2010[a]		2016[b]		2020[b]		2020
Energy savings in:	TWh/year	%	TWh/year	%	TWh/year	%	TWh/year	%	Mt CO_2 eq
Residential sector	31.5	66	17.0	48	60.0	47	77.1	42	18.0
Services	5.0	11	8.1	23	24.6	19	29.7	16	9.5
Industry[c]	8.3	17	7.0	20	20.1	16	28.7	16	7.2
Transport	3.0	6	3.5	10	21.8	17	49.2	27	10.3
Total	47.7	100	35.7	100	126.5	100	184.7	100	45.2

a) As set in the first EEAP (2007).
b) As set in the second EEAP (2011).
c) Excluding manufacturing sectors covered by the EU ETS.
Source: MSE (2011b).

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According to the ENEA (2011), the main energy efficiency measures have been cost-effective (Table 5.6). For instance, public incentives per unit of energy saved were well below the average price of electricity (EUR cents 7.2/kWh) and the incentives provided for electricity generation from renewable sources (presented in Table 5.4). In particular, WCs were found to be the most cost-effective measure. This confirms an earlier assessment by the Regulatory Authority for Electricity and Gas (AEEG), which concluded that savings for residential energy users (in terms of avoided energy costs) in 2005-09 were 6 to 15 times higher than the WCs' costs charged on their energy bills. When the contribution to reducing GHG emissions and meeting the renewables target is also considered, the AEEG found that economic savings per unit of primary energy avoided were up to six times higher than the costs (AEEG, 2009).[30] In addition, both the WCs and the 55% tax incentive have fostered development of sound methodologies for monitoring and certifying energy savings, as well as the production and diffusion of a wealth of data and information.

Table 5.6. **Cost-effectiveness of the main energy efficiency measures**

Measure	Total investment cost per unit of energy saved (EUR cents/kWh)	Public contribution per unit of energy saved (EUR cents/kWh)
Implementation of Directive 2002/91/EC (minimum energy performance standards of buildings)	13	Not applicable
Tax deductions (55%) for energy upgrading of existing buildings	10	5
Tax deductions (20%) for the installation of high-efficiency electric motors and controllers in industry	1.3	0.2
White Certificate system	. .	0.12[a]
Scrapping incentives for passenger cars and light commercial vehicles (up to 3.5 tonnes)	82	10

a) For WCs the public contribution is recovered through electricity and natural gas bills.
Source: ENEA (2011).

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However, cheaper projects with relatively lower energy saving potential have absorbed more than half of incentivised investment (Box 5.5). It is likely that the costs of the incentive system will increase as low-hanging fruit is exploited. Moreover, this multitude

of incentives could seriously undermine the cost-effectiveness of the Italian energy efficiency policy. Only the WC mechanism is structural, whereas the other incentives are linked to the annual budget laws. For instance, the subsequent introduction of the 55% tax incentive and of the special White Certificate regime for combined heat and power may have crowded out the WC mechanism and limited its ability to meet annual targets (Box 5.5). Multiple and overlapping incentives create risks of over-incentivising some types of energy efficiency projects while leaving out others, as well as regulatory complexity and ambiguities. The successive announcement of incentives has also added uncertainty for potential investors (AEEG, 2012b). As the WC mechanism has passed the cost-efficiency test, it could be more efficient to reinforce it, as opposed to introducing new incentives. Further expanding the portfolio of energy saving projects that can be awarded WCs could bring greater efficiency to the system, although this could entail additional administrative costs (Pavan, 2008). In addition, as with renewables policy, the interaction between these energy efficiency incentives and the EU ETS requires ongoing evaluation, as they could depress the CO_2 allowance price and lead to displacement of emissions (Sorrell et al., 2008).

Multiple instruments can be justified to the extent that they help overcome a number of different obstacles to investing in energy efficiency products and services. These obstacles include: limited awareness of energy costs and interest in reducing energy expenses; lack of consumer confidence; difficult access to capital; and historically or socially formed investment patterns (IEA, 2003). Energy labelling and minimum energy efficiency requirements for appliances and buildings are also needed to overcome some barriers to investment. The effectiveness of the current incentive mechanisms would benefit from additional efforts to raise consumer awareness and involve the financial sector.

Overall, Italy needs to further streamline its renewables and energy efficiency policy measures, and make sure that multiple incentives effectively address different barriers and do not entail excessive costs. Rationalising the governance of the incentive system for energy efficiency and renewables would also improve effectiveness. Management of the incentive system now involves a number of different agencies and institutions, resulting in co-ordination difficulties and increasing transaction costs.[31] For instance, Italy could consider assigning management of energy efficiency and renewables promotion activities to a fully fledged agency, leaving to the AEEG the fundamental role of independent supervision and regulation of energy markets.

6. Climate and transport policies

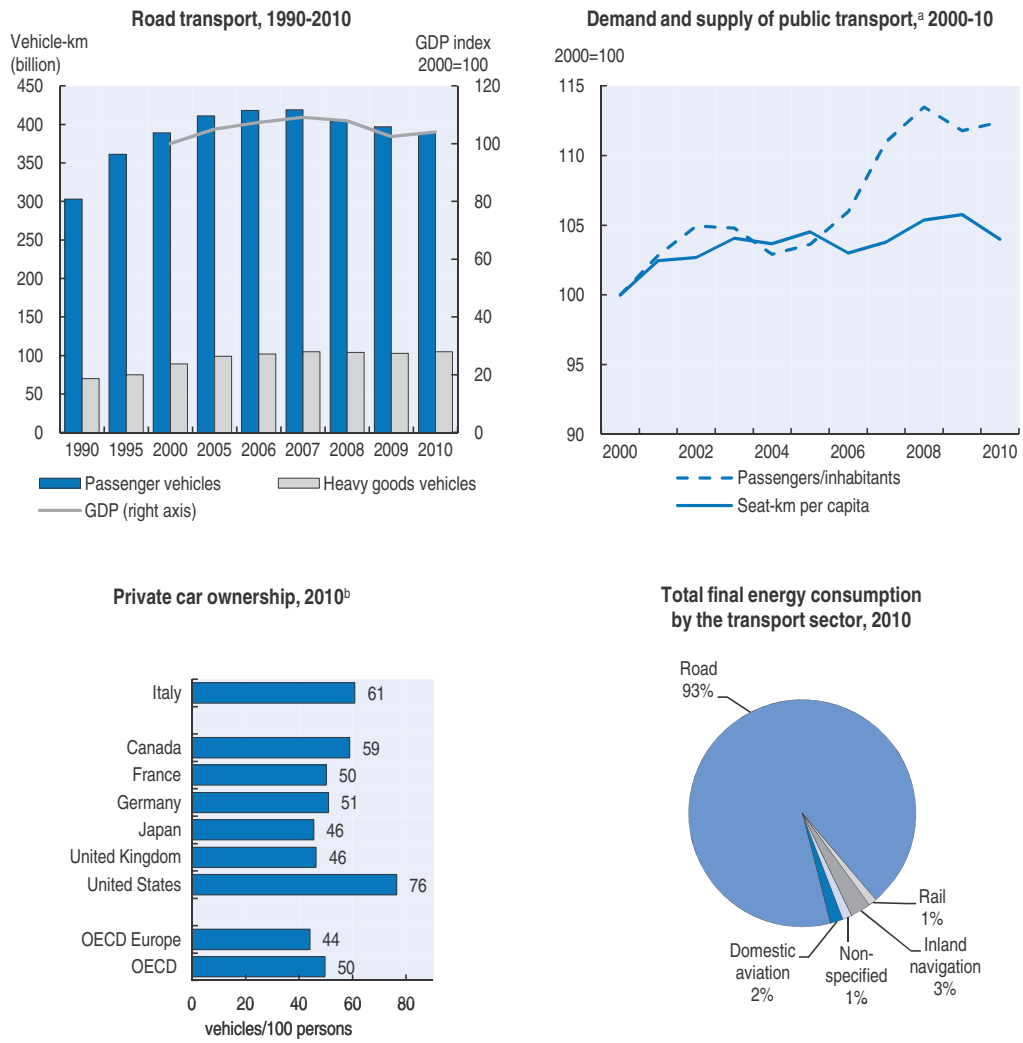
6.1. Key transport trends

Passenger and freight transport activity broadly followed Italy's economic performance in the 2000s, although with some differences among transport modes. In particular, passenger and freight traffic flows by road (measured in vehicle-kilometres) grew between 2000 and 2007 despite high and increasing road fuel prices (Figure 3.2) and have remained closely coupled with the GDP trend (Figure 5.7). Road transport has continued to heavily dominate the modal split. It accounted for more than 90% of inland freight haulage (excluding sea shipping and pipelines) in 2010, well above the European average of 77%. While there has been an increase in use of public transport, especially buses (Figure 5.7), passenger cars accounted for 82% of passenger travel in 2010 compared with some 84% on average in Europe. However, these figures do not include the relatively large share of motorbikes, which account for nearly 20% of the private passenger vehicle

fleet. The stock of both cars and motorbikes has continued to increase (+13% between 2000 and 2010) and Italy remains among the OECD countries with the highest private car ownership rates (Figure 5.7; Reference I.A).

The economic recession of the late 2000s and specific policy measures (see below) were responsible for a slight improvement in the energy efficiency of transport, resulting in a decline of both energy use and associated GHG emissions. This more than compensated for the continued growth of both energy use and emissions between 2000 and 2007. However, transport has remained the main energy end-use, accounting for about 30% of total final energy consumption in 2010, and the second largest source of CO_2 emissions from energy use (Box 5.1; Figures 5.1 and 5.5). Road transport accounted for more than 90% of energy use in the transport sector in 2010 (Figure 5.7).

Figure 5.7. **Transport sector**



a) Public transport includes buses, trams, trolleybuses and metro systems; in provincial capital cities only.
b) Or latest available year. Includes preliminary data.
Source: ISPRA (2012), *National inventory report to UNFCCC 2012;* ISTAT (2012), *Trasporti urbani;* OECD, Environmental Data; OECD (2011), *OECD Economic Outlook No. 90;* OECD-IEA (2012), *Energy Balances of OECD Countries.*

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6.2. Measures to reduce transport-related GHG emissions

Improving the energy efficiency of the transport sector and reducing related GHG emissions should therefore be a priority. The Italian strategy to reduce GHG emissions from the transport sector has focussed on measures aimed at: reducing average CO_2 emissions from the vehicle fleet; increasing the use of biofuels; and developing local public transport infrastructure and services, as well as infrastructure for long distance rail and sea shipping. Measures already approved, and partly implemented, in these three broad categories are expected to reduce emissions by about 20 Mt CO_2 eq in 2020, while planned infrastructure development is estimated to deliver an additional abatement of 3.5 Mt CO_2 eq (Table 5.2). However, while many national transport infrastructure plans have been developed, Italy lacks a comprehensive transport strategy aimed at rebalancing the modal split of both passenger travel and freight haulage.

Emission performance of vehicles

Passenger cars exhibit a good and increasing degree of energy efficiency compared to other European countries. In 2008, energy consumption by the average car in Italy was some 11% below the European average. Moreover, average CO_2 emissions per km of newly registered passenger cars in Italy have traditionally been among the lowest in Europe, and further decreased by 18% between 2000 and 2011 (EEA, 2012). Italy has already reached the EU-set target of an average 130 g CO_2/km by 2015 for newly registered cars (Regulation (EC) No. 443/2009) (Table 5.7). As in other European countries, this is linked to the growing share of diesel cars in the fleet: 38% in 2010 compared with 15% in 2000. The long-standing tax and price differential in favour of diesel fuel is among the major drivers of the progressive dieselisation of the car stock. Despite recent increases, the excise duty on diesel was still 23% below that on petrol in 2011, a difference which is not justified from an environmental point of view as diesel has a higher carbon content and emits more local pollutants than petrol.

Vehicle taxes and scrapping incentives have been the main measures implemented to encourage renewal of the fleet in favour of less emitting vehicles. The provincial vehicle registration tax is reduced for cars with CO_2 emissions below 120 g/km and for electric, hybrid and natural gas fuelled vehicles. The annual regional road tax (*bollo auto*) for cars and motorbikes has been differentiated by engine power and pollutant emission standards since 2007. However, it does not take into account CO_2 emission levels. In addition, taxes applied to freight vehicles are not based on any environmental parameter. Distance-based road tolls have long been in place on the highway network, although they are not linked to environmental criteria. Between 2007 and 2010, scrapping incentives (*ecoincentivi*) based on pollutant and CO_2 emission standards were in effect for cars and light commercial vehicles.[32] According to government estimates, the scrapping programme resulted in cumulative energy savings of about 3 TWh per year and reduced emissions by 1 Mt CO_2 eq in 2010 (ISPRA, 2011; MSE, 2011b). However, this was also the most costly of the energy efficiency measures included in the EEAP (Table 5.6). The trend observed in 2007-10, while the incentives were in place, is not much different from that in previous years, as shown in Table 5.7. It was in line with trends observed in many other European countries. This indicates that the scrapping programme helped renew the car fleet in so far as it sustained car sales at a time of economic crisis. In general, as found in some recent OECD Environmental Performance Reviews, scrapping programmes provide limited economic and environmental benefits in the medium and long term (OECD, 2012b).

Table 5.7. **Emission performance of passenger cars**

	2005	2006	2007	2008	2009	2010	2011
	Composition of the car stock by emission standards[a] (%)						
Euro 0, 1 and 2	62.2	55.5	49.3	44.5	39.7	36.0	. .
Euro 3	29.1	25.3	23.9	22.5	21.7	20.7	. .
Euro 4 and 5	8.7	19.2	26.8	33.0	38.6	43.3	. .
	Average CO_2 emissions of newly registered cars (g CO_2/km)						
Average CO_2 emissions	149.5	149.2	146.5	144.7	136.3	132.7	129.5

a) Cars in use in all provincial capitals, excluding the provinces of Monza, Fermo and Andria-Barletta-Trani.
Source: EEA (2012); ISTAT (2012).

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On the other hand, little has been done to encourage the renewal of the fleet of heavy goods vehicles, which remains relatively energy inefficient. The fleet of freight vehicles is older and uses less of its load capacity than in many other European countries (ENEA, 2011). In 2008, Italian freight haulage required 37% more energy per tonne-km than the European average. In addition, efficiency has worsened: in 2008, an average heavy goods vehicle consumed 39% more energy per tonne-km than it did in 2000. This can be explained by the presence of many small operators, tax deductions on fuel used for commercial purposes, and the authorities' limited capacity to enforce compliance with vehicle emission standards (OECD, 2011a).

Biofuels

Italy has promoted the use of biofuels with the aim of reducing transport-related GHG emissions and complying with the EU biofuel target (Box 5.4). With about 700 000 tonnes of biodiesel and 100 000 tonnes of bioethanol produced each year, Italy is the fourth largest producer of biofuels in Europe. The share of biofuels in transport fuel consumption rose from less than 1% in 2005 to nearly 5% in 2010, resulting in an estimated reduction in GHG emissions of 2 Mt CO_2 eq (Table 5.3) It is estimated that promotion of biofuels will abate emissions by 3 Mt CO_2 eq in 2020 (Table 5.2). As the ENEA's marginal abatement cost curve shows, this comes at considerable cost: EUR 100 per tonne of CO_2 saved, much more than the other emission mitigation measures in the transport sector, some of which are even estimated to yield net benefits (Figure 5.3).

Urban transport systems

Some progress has been made in developing integrated urban transport systems, with the multiple objectives of reducing congestion, curbing emissions of GHG and local pollutants, and improving the economic competitiveness of cities and the quality of life of city dwellers. It is estimated that planned and ongoing work to extend and upgrade the metro systems in the three largest metropolitan areas (Naples, Milan and Rome) will reduce GHG emissions by 1.3 Mt CO_2 eq by 2020 (ISRPA, 2011). The government has channelled large funding (including national and EU funds) to the development of public transport systems, as well as of the railway network (see below), although substantial financing gaps remain.

The passenger carrying capacity of public transport increased by about 10% between 2000 and 2010.[33] The density of cycling lanes in cities also nearly doubled during the 2000s. However, the increase in the supply of public transport services has not kept pace with

demand (Figure 5.7), and supply and demand trends vary greatly across regions and cities. Overall, in most Italian cities and metropolitan areas local public transport systems remain insufficiently developed, in terms of infrastructure and service quality, to provide an adequate alternative to use of private vehicles. This is especially true in the southern regions. For instance, the average speed of surface transit systems in Italian major cities (14.2 km/h) is well below that in other major European cities (between 20-25 km/h). There are several contributing factors, including: poor and differentiated regulation across regions; long lead times for infrastructure development; limited financial resources; the small size of operators; limited competition; and persistent loss-making. In addition, transport plans are rarely integrated with other urban planning instruments; in some regions they have not been systematically reviewed, and in some others they have never been adopted (DPS, 2012; OECD, 2011a; see also Chapter 3).

To reduce use of private vehicles, the development of public transport infrastructure and services needs to be part of sound urban planning and more comprehensive local strategies, and to be accompanied by incentive mechanisms. For instance, the city of Milan established the Strategy for Sustainable Mobility for 2006-11. This foresaw the introduction of a pollution charge (Ecopass) as a one-year trial in 2008, resulting in a 12% reduction of private traffic in the city centre in the same year. In 2012, the Ecopass was transformed into a fully fledged congestion charge system, resulting in an additional 34% traffic reduction (Box 2.2). Other municipalities (e.g. Florence, Turin) have been considering the introduction of similar measures.

However, with the exception of parking pricing, the use of price-based mechanisms to manage transport demand and reduce transport-related emissions has been limited in other cities. While nearly all provincial capitals have increasingly used parking pricing, only a few motorways around major towns apply toll charges. Attempts to extend tolls to some of these motorway stretches have been blocked due to fierce opposition by local authorities. On the other hand, many larger cities, mostly in the North and Centre, have implemented regulations to limit access to urban areas based on vehicles' emission performance (low emission zones).

Medium- and long-distance transport

Progress has been made in promoting sea shipping and in upgrading the railway networks. Italy has established a network of motorways of the sea, as part of the trans-European transport network, and provided financial incentives to road and rail carriers to shift their freight to sea shipping (the so-called "Ecobonus" and "Ferrobonus"). As a result, between 2001 and 2007 the market share of sea shipping more than doubled (Basoli, 2008). However, further infrastructure development is needed, especially to improve railway connections between dockyards and the hinterland.

In the last decade, the Italian railway system has invested heavily in high-speed rail infrastructure for both passengers and freight. As of early 2012, the high-speed network represented 5% of the rail network, largely concentrated in the North and Centre. Completion of the high-speed network, and the resulting modal shift, is projected to reduce GHG emissions by 5.7 Mt CO_2 eq by 2020 (ISPRA, 2011). However, in the second half of the 2000s the volume of passenger and freight transport by rail decreased by nearly 6% and 18%, respectively, also due to the economic recession. This resulted in decreasing shares of rail in the modal split. In the case of freight transport, structural problems have limited the shift from road to rail. These include: the high proportion of small

geographically dispersed enterprises; insufficiently developed integrated logistic nodes; and subsidisation of diesel for commercial use (DPS, 2012; OECD, 2011a).

Extending and upgrading infrastructure will not automatically lead to a modal shift. Efforts are needed to improve the quality of service, for instance in terms of frequency and punctuality. Customer satisfaction with the quality of service remains low (47%) and has decreased, especially in the South. Further liberalisation of service and the definition of a sound and stable regulatory framework, including for financing of service, are therefore needed (DPS, 2012). In this respect, the establishment of a regulatory authority for transport services in 2012, whose competences are temporarily assigned to the AEEG, is an important step forward.

7. Adaptation

Studies indicate that the Mediterranean region is expected to face negative impacts due to climate change over the next decades. Coupled with the effects of anthropogenic stress on natural resources, they make this region one of the most vulnerable parts of Europe. The Italian peninsula appears to be particularly vulnerable, as it is characterised by complex climate patterns due to the presence of high mountain ranges (the Alps and Apennines) and the Mediterranean Sea. The impacts of climate change in Italy include: reduction in water availability and quality; soil erosion and desertification (particularly in the southern regions); erosion and flooding of coastal areas; glacier and snow cover loss; intensification of hydrogeological risk (particularly in the Po River basin and in mountainous areas); and health effects associated with heat waves. Modelling indicates that aggregate economic losses induced by climate change are likely to be small in Italy (in the order of -0.3% of GDP by 2050). However, some economic sectors, namely tourism, agriculture and food production, and the alpine regions will suffer significant economic damage (Carraro and Sgobbi, 2008; Galeotti et al., 2011).

Italy does not yet have a national adaptation strategy, although the process of developing one is ongoing and a timetable for the adoption of such a strategy by 2012 has been set. The MATTM has the main responsibility for preparing an adaptation strategy of national scope, which would ensure the integration (or mainstreaming) of adaptation into sectorial policies as well as regional and local activities. The development of a strategy began in 1999 when the government identified research into Italy's vulnerability to the impacts of climate change as a thematic priority. The 2002 National Strategy for Sustainable Development first highlighted the need to develop national measures for adaptation to climate change, and a process of consultation of all major stakeholders began in 2007 with the National Conference on Climate Change.

The adaptation strategy is expected to build upon the significant progress made in identifying priority areas during several sector-specific assessments. The main country-wide initiatives include:

- The 2011 White Paper on Challenges and Opportunities of Rural Development in Adapting and Mitigating Climate Change, which identified priority risks to agriculture through consultation with and input from decision makers, as well as researchers in the field of agriculture and climate change.
- The National Strategic Plan for Rural Development (2007-13), which, among other things, identifies actions to improve the resilience and adaptation capacity of forestry and agriculture.

- The 2010 National Strategy for Biodiversity, which includes strategic measures to address the pressures of climate change on biodiversity.
- The National Plan for Water Use, approved in 2005, which includes a National Plan for Irrigation agreed with regions, and the 2010 law transposing the EU Flood Risk Directive (2007/60/EC).
- The national surveillance and warning system to prevent the effects of heat waves on human health, and the associated national operative plan, in place since the mid-2000s, which provides a framework for assessing the health risks of extreme weather and preparing national and local emergency plans.

Several other initiatives for adaptation to climate change have been taken at regional level, for example on integrated coastal-zone management, drought, desertification, and health protection.

The national adaptation strategy should focus on further developing a robust and comprehensive evidence base concerning the impacts of climate change in Italy. It should identify, assess and, where possible, monetise the key climate risks and opportunities for the country. Additional economic analysis of the costs and benefits of adaptation can aid in understanding priority areas for action within very constrained budgets, and help indicate the scale of the overall challenge. Considerable expertise with respect to the economic assessment of the impacts of climate change is available in Italy. Climate scenarios and impact assessment have been conducted, for instance, by the Euro-Mediterranean Centre for Climate Change (CMCC), the Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) and the Institute for Environmental Protection and Research (ISPRA). Several other studies have assessed impacts in specific areas, including the Alpine region.

An effective adaptation strategy should aim to embed actions to address the long-term impacts of climate change in all government policy and programmes. It is important, therefore, to involve all relevant stakeholders in developing the strategy: relevant ministries, regional governments, local authorities, scientific institutions, the private sector and civil society. This is pivotal to ensure effective policy harmonisation and coherence in view of Italy's complex multi-tier governance model. The strategy should also include a structured review process to assess progress towards implementation and effectiveness in mainstreaming adaptation into government policies, based on an agreed set of monitoring indicators. Within the framework of its adaptation policy, Italy should also consider updating its 1999 National Action Programme to combat drought and desertification.

Notes

1. As specified in the EU Burden Sharing Agreement (2002/358/CE).
2. The EU Climate and Energy Package is made of complementary pieces of legislation to achieve the so-called "20-20-20" targets by 2020: a reduction in EU GHG emissions of at least 20% below 1990 levels; 20% of EU energy consumption to come from renewable energy sources; and a 20% reduction in primary energy use compared with projected levels.
3. Not included in the EU ETS are the agriculture, residential, commercial, transport, non-energy-intensive manufacturing, and waste sectors. In line with the Effort Sharing Decision (Decision No. 406/2009/EC), Italy, as in the case of other member states, is subject to annual binding emission limits each year between 2013 and 2020 for these sectors.

4. During the EU climate and energy package negotiations, the Ministry of the Environment, Land and Sea argued that the cost of attaining the targets was excessive for Italy. The Senate approved two motions (one in 2009 and another in 2010) challenging climate science and calling for a renegotiation of Italy's EU climate commitments, while businesses often point to the danger that increasing energy prices risks causing carbon leakage from the manufacturing sector (OECD, 2011c).
5. For Kyoto compliance purposes, Italy will receive a removal credit of about 16 Mt CO_2 eq per year of the Kyoto Protocol commitment period for forest management (capped at 10.2 Mt CO_2 eq per year), afforestation and reforestation activities. This will contribute an additional 3% to emission reductions (ISPRA, 2012).
6. The Kyoto Protocol introduced three market-based mechanisms (Emissions Trading, the Clean Development Mechanism or CDM, and Joint Implementation or JI) to help countries with Kyoto commitments to meet their targets by reducing emissions or removing carbon in other countries. Emissions trading enables countries to trade in their allowed emissions (assigned amount units). JI and CDM enable industrialised countries to carry out emission reduction projects with other developed countries or in developing countries, respectively.
7. Fluorinated gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).
8. Demand-based calculations include the emissions embodied (or embedded) in all imports consumed in a country, and exclude emissions embodied in exports.
9. Concurrent legislative power means the regions can enact legislation, provided it does not conflict with the framework principles adopted at state level.
10. The CIPE, which is chaired by the Prime Minister, co-ordinates national economic and investment policies. Among other things, it allocates public budget resources to economic development programmes and major infrastructural projects.
11. Representatives of the ministries responsible for economy and finance, manufacturing, infrastructure and transport, agriculture, education, research, foreign affairs, and regional affairs, as well as representatives of the State-Regions Conference.
12. Building on the National Programme for the Containment of Carbon Dioxide Emissions, which was approved in 1994 with the aim of stabilising CO_2 emissions at the 1990 level by 2000. The programme was updated in 1997 and 1998.
13. The broad measures focused on: promoting energy efficiency and renewables; increasing electricity import capacity; and reducing emissions from the transport sector through infrastructure investment and reformulation of taxes on mineral oils.
14. According to the reference scenario, the existing measures would yield an emission reduction of some 40 Mt CO_2 eq in 2010, bringing domestic emissions to about 540 Mt CO_2 eq in that year, which was more than 10% above the Kyoto target.
15. The Ministry of Economic Development and the ENEA estimated the emission reduction potential of projects co-financed by the European Regional Development Fund in 2007-13. Planned projects in the energy, transport and waste management sectors were estimated to abate emissions by about 10 Mt CO_2 eq in 2020 (DPS and ENEA, 2009).
16. The revolving Kyoto Fund is based on a smaller fund originally established under the Budget Law 2007 and frozen soon thereafter. The loans are to be repaid over a period ranging from 3 to 6 years, but can reach up to 15 years in the case of public bodies; there are semi-annual instalments, with a fixed rate of 0.5% year.
17. The other countries were Ireland, Spain and the United Kingdom.
18. The share of emissions that could be offset by credits generated by the Kyoto Protocol mechanisms (JI/CDM) was 15% of the total allocation (MATTM, 2009).
19. As allowances were grandfathered and the allowance price could be passed through to electricity consumers via price increases, electricity producers across Europe reaped substantial windfall profits in the first and second trading periods. Ellerman et al. (2010) concluded that the rents totalled about EUR 29 billion in Europe, using a modest carbon price estimate of EUR 12 per tonne of CO_2.
20. The tax on petrol was to increase by 7%, that on diesel by 12%, that on coal by 43%, that on natural gas by 2%, and that on heating oil by 52% for residential users and by 61% for industry.

21. This would imply that incentives for renewables would be financed to a larger extent by taxes on transport-related emissions, and not just by electricity consumers.
22. 13% of electricity production was imported.
23. Gross final consumption of energy includes energy use in industry, transport, households, services (including public services), agriculture, forestry and fisheries, as well as consumption of electricity and heat by the energy industry for electricity and heat production, and losses of electricity and heat in distribution and transmission (EU Directive 2009/28/EC).
24. The GC market has experienced an excess supply of certificates every year since 2006.
25. The calculation assumes that incentives to renewables average about 90% of general system costs (AEEG, 2012a). The figures include a minor share of incentives for the so-called "renewable-like sources" (*fonti assimiltate*) that are still benefiting from the old FIT-like incentives called "CIP6". These comprise combined heat and power plants, various forms of energy recovery in industrial plants, and plants using fossil fuels produced in small isolated fields.
26. For instance, before awarding relevant licenses the Ministry of Economic Development (which is responsible for national energy policy) has to wait for the advice of the relevant regional bodies, thereby lengthening the time frame within which a decision can be taken. In theory, the decision of a region can be over-ruled by the Council of Ministers. However, this mechanism is rarely used and regional administrations therefore have a *de facto* veto on licensing of energy infrastructure developments (IEA, 2009).
27. The target for renewable energy sources used for transport is excluded.
28. Smart meters can help reduce peak demand for electricity, thereby reducing the costs of the electricity system. They also provide an incentive for energy efficiency by increasing consumer awareness of tariffs and costs.
29. Electric utilities can obtain an additional 2% rate of return on investment in smart grids for 12 years.
30. As the renewables target is expressed as a share of gross final energy consumption, energy efficiency measures contribute to achieving this target to the extent that they reduce energy consumption.
31. These include: the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the state-owned company Gestore dei Servizi Energetici (GSE), the independent Regulatory Authority for Electricity and Gas (AEEG), the Ministry of Economic Development (MSE), the Ministry of the Environment, Land and Sea (MATTM) and a number of regional authorities.
32. In 2007-08, the scrapping incentives consisted of a discount on the purchase price of the vehicle and an exemption from the annual road tax, provided the new vehicle met the Euro 4 or 5 emission standards, emitted less than 140 g CO_2/km (130 g CO_2/km for diesel cars) and replaced a Euro 0 or 1 vehicle. In 2009, the incentive was renewed and was not made conditional on scrapping an old vehicle.
33. Passenger carrying capacity is a measurement of the supply of public transport services. It measures total available seat-kilometres in buses, trams, trolleybuses and metro systems.

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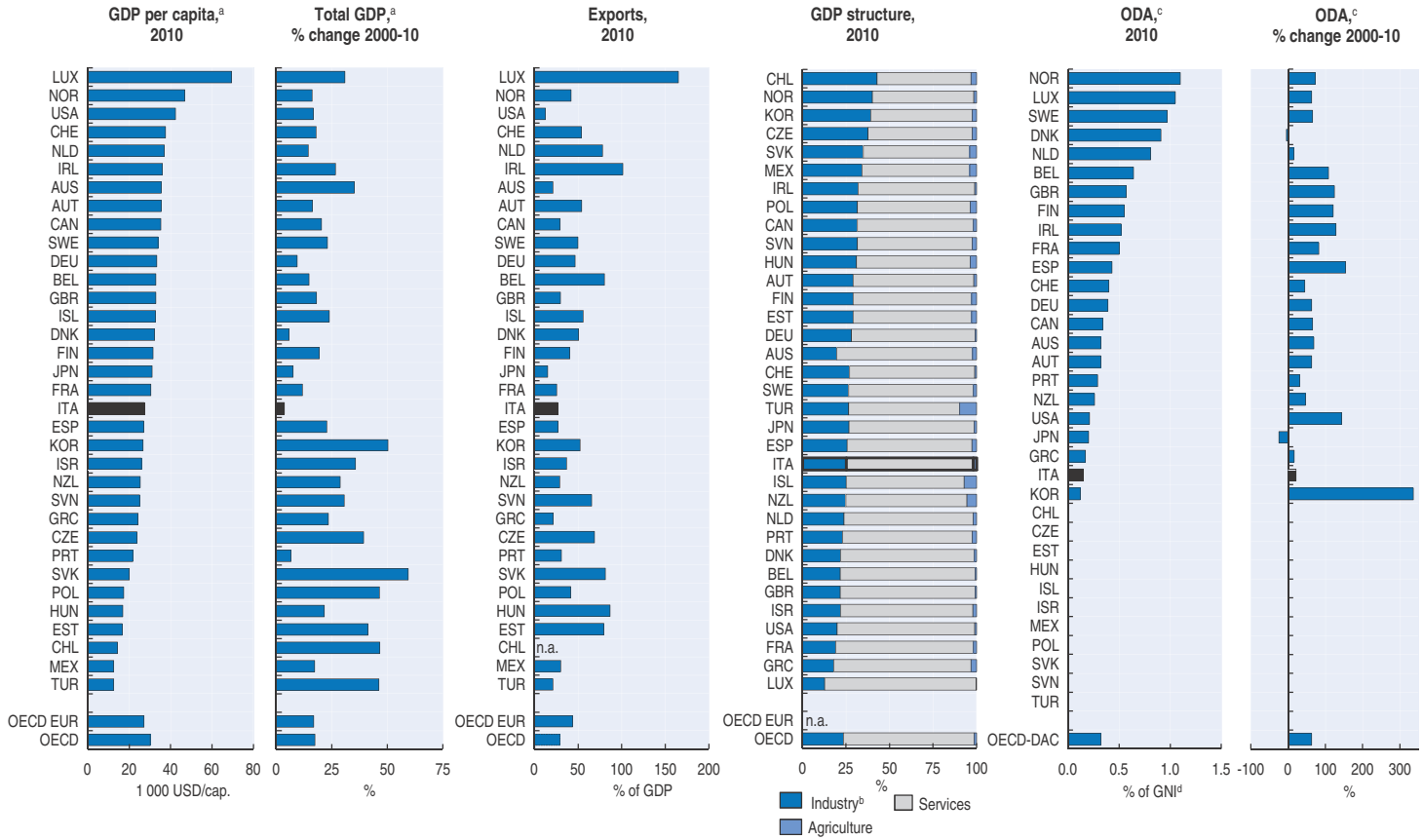
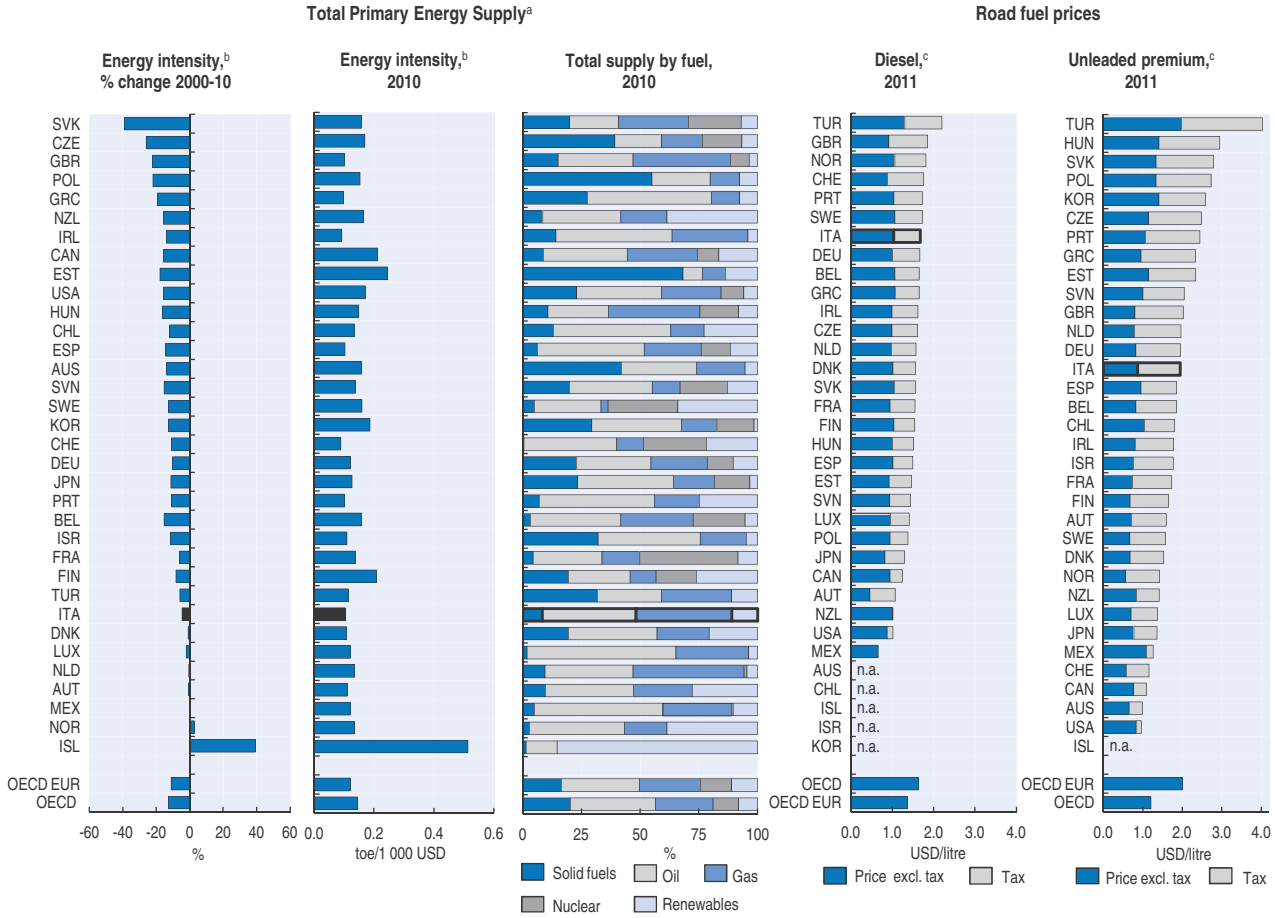
Reference I.A. **Selected Economic Data* – Economic context**



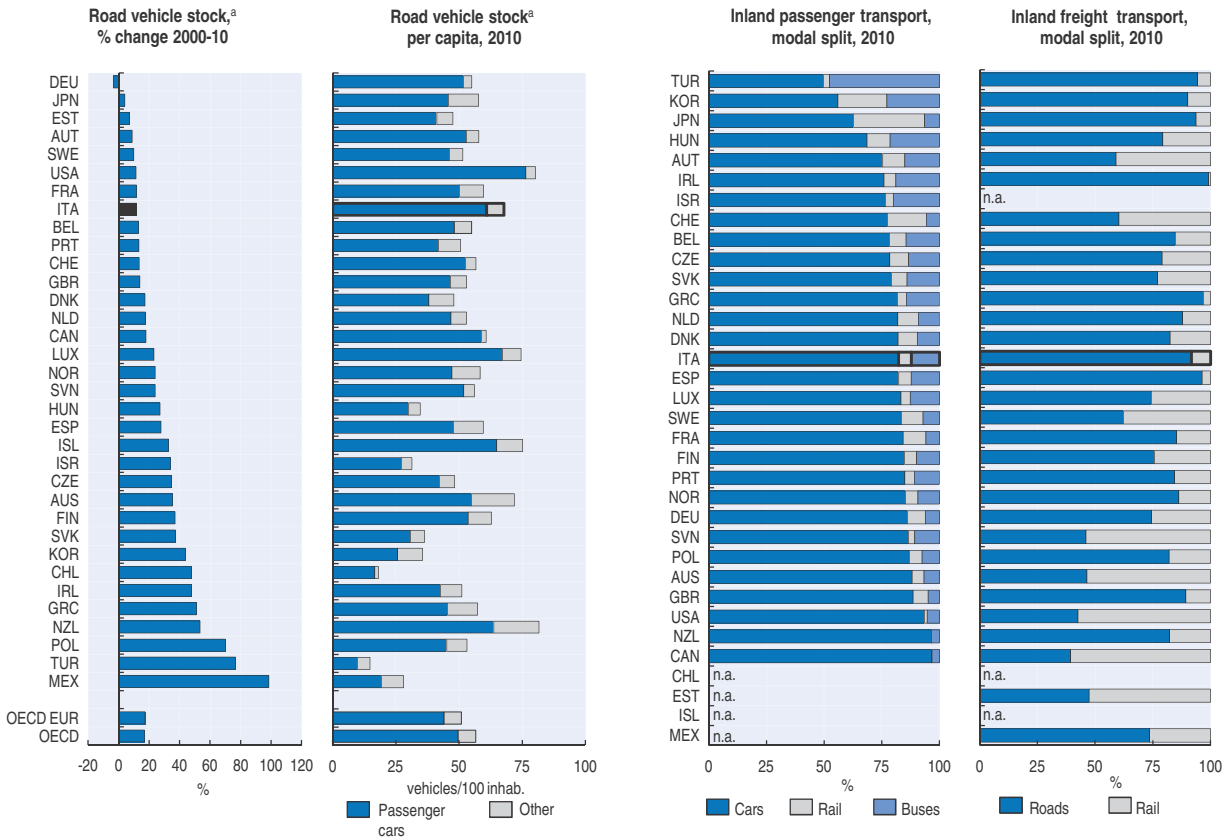
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) GDP at 2005 prices and purchasing power parities.
b) Includes mining and quarrying, manufacturing, gas, electricity and water, and construction.
c) Official development assistance by member countries of the OECD Development Assistance Committee. Total net disbursements at constant 2010 USD.
d) Gross national income.

Reference I.A. **Selected Economic Data* – Energy**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Excluding international marine and aviation bunkers.
b) Total primary energy supply per unit of GDP expressed at 2005 prices and purchasing power parities.
c) Diesel fuel: automotive diesel for commercial use, current USD; Unleaded petrol: unleaded premium (RON 95): USD at current prices and purchasing power parities; JPN: regular unleaded; ISR: 2010 data.
Source: OECD Environmental Data.

Reference I.A. **Selected Economic Data* – Transport**

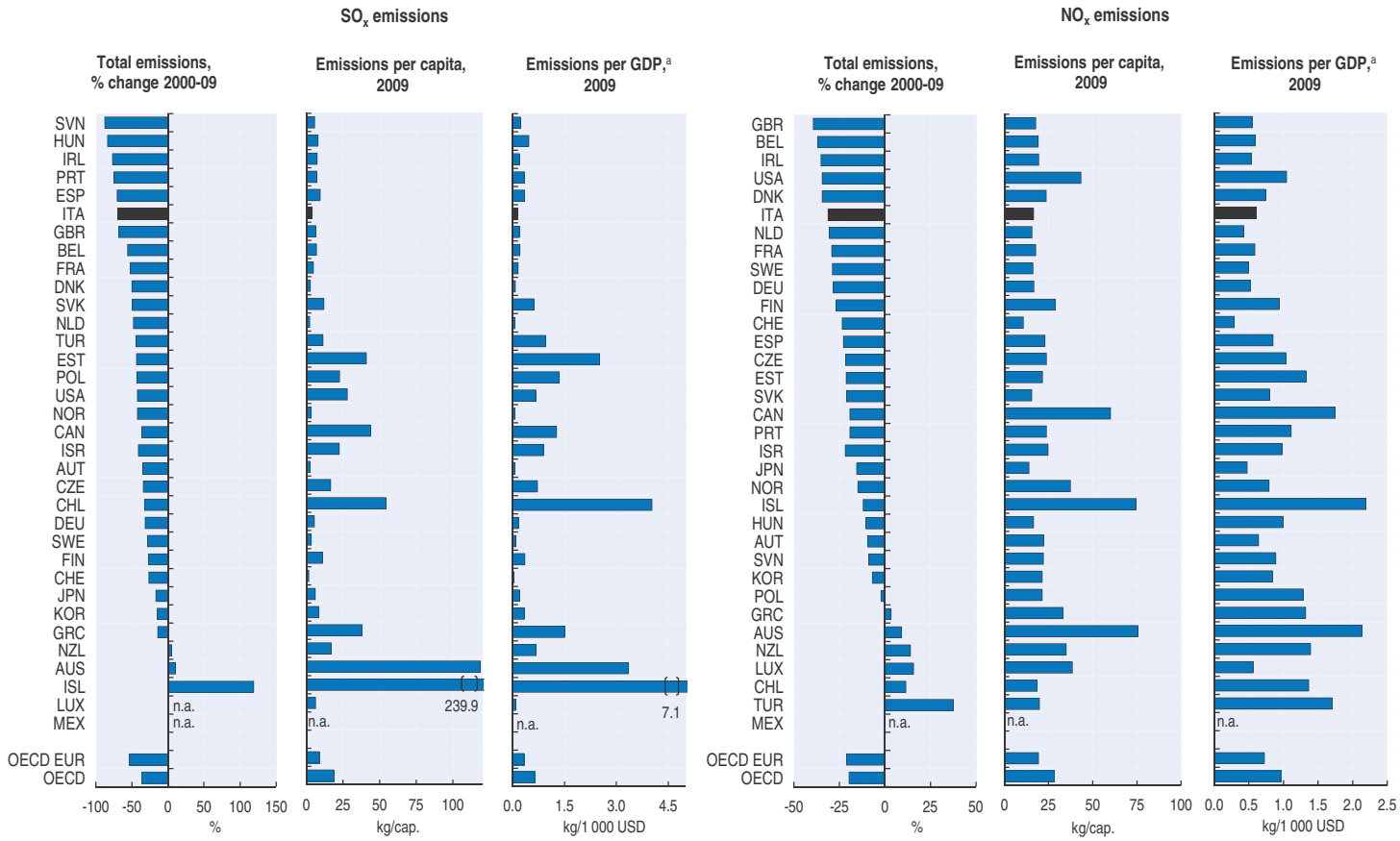


*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Motor vehicles with four or more wheels.
Source: OECD Environmental Data.

Reference I.B. **Selected Social Data* – Social context**

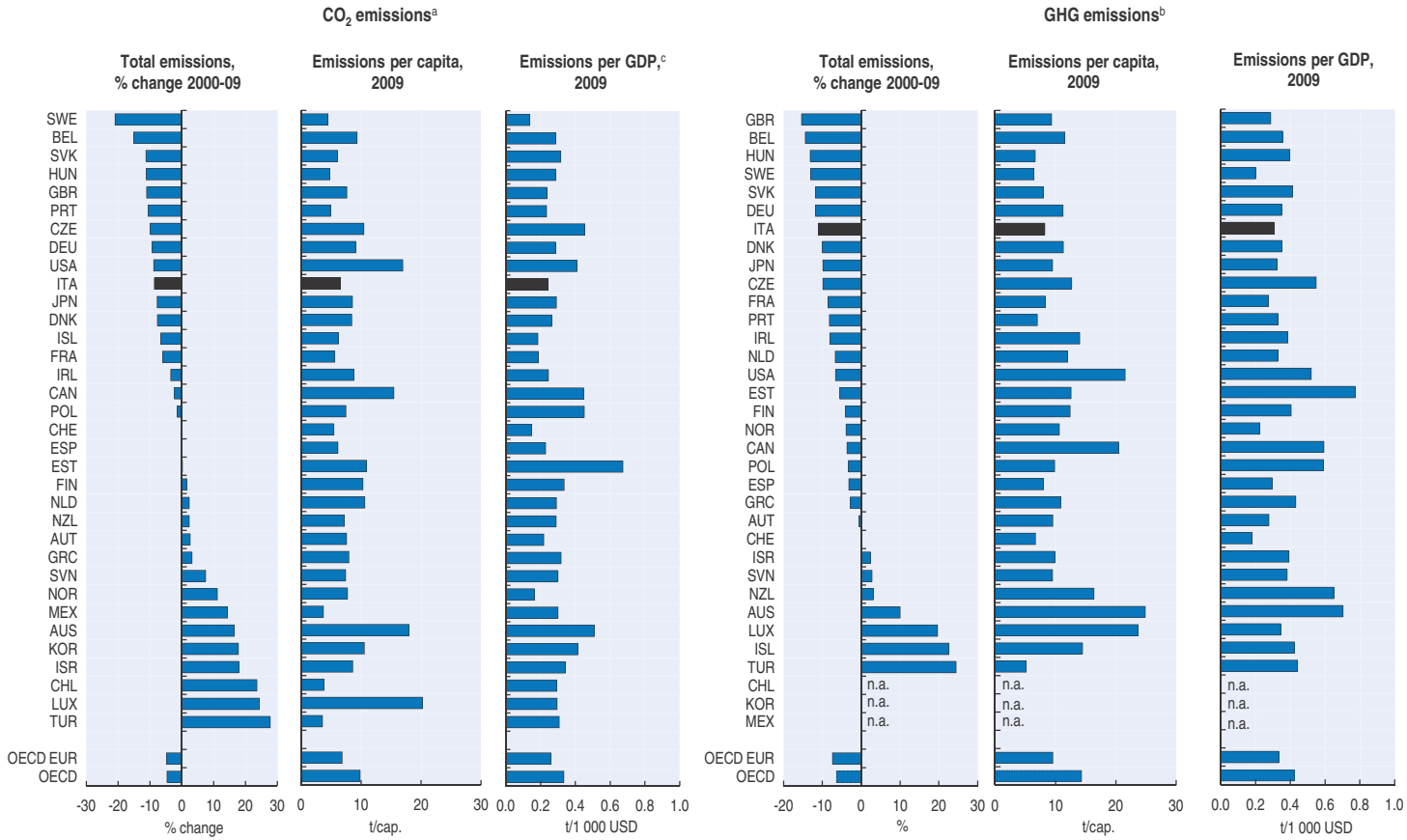
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Share of population with an income under 50% of the median income.
b) Ranging from 0 (equal) to 100 (inequal) income distribution; figures relate to total disposable income (incl. all incomes, taxes and benefits) for the entire population.
c) Share of population aged 25-64 years with at least upper secondary education. OECD: average of rates.
d) Harmonised unemployment rates; MEX, ISL, TUR: commonly used definitions.
Source: OECD Environmental Data; OECD Factbook Statistics.

Reference I.C. **Selected Environmental data* – Air**



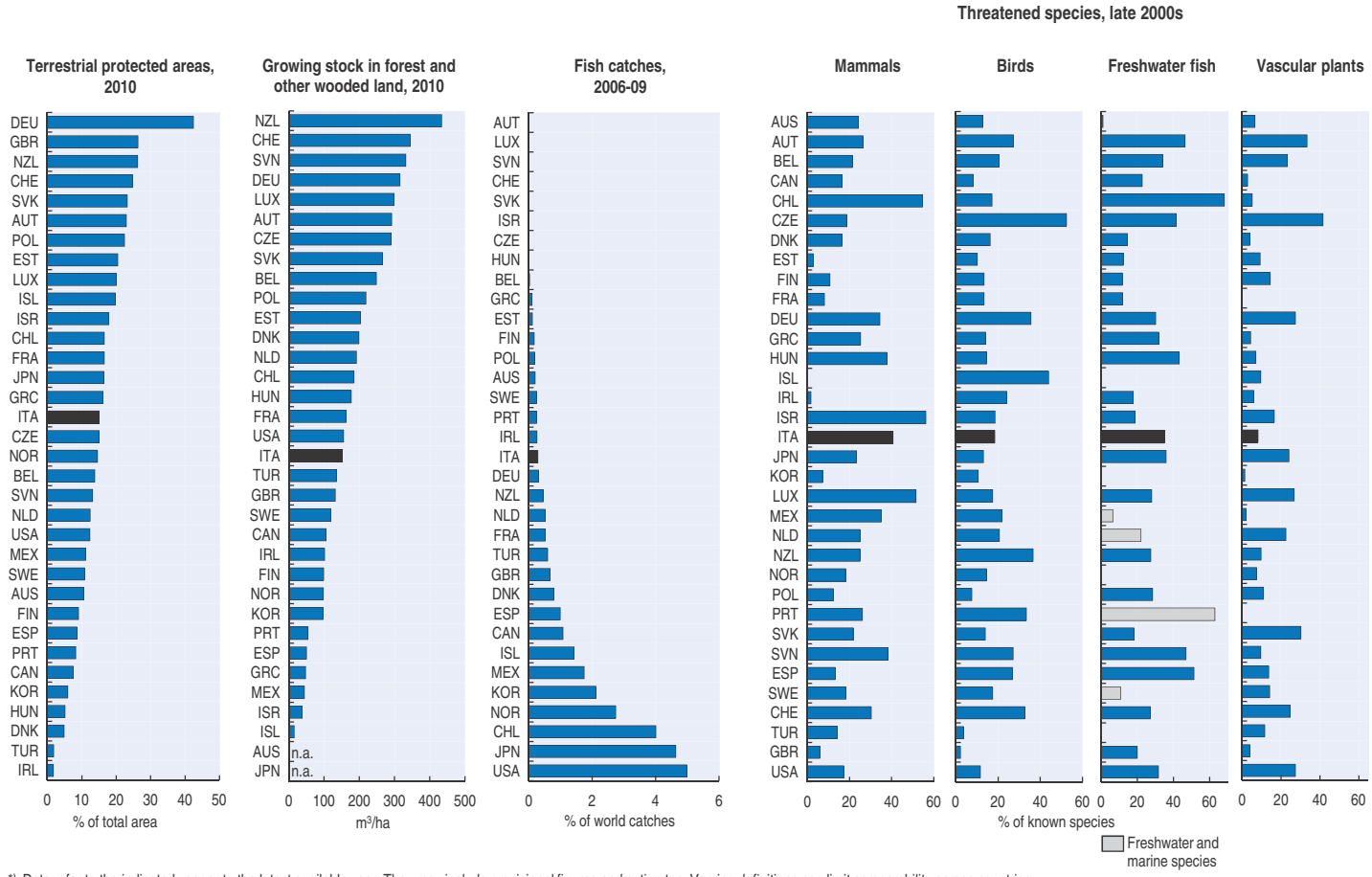
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.
a) GDP at 2005 prices and purchasing power parities.
ISL: SO_x emissions include emissions from geothermal energy (190 kg per capita in 2009). MEX: data refer to 1999 and 2005.
Source: OECD Environmental Data.

Reference I.C. **Selected Environmental data* – Climate**



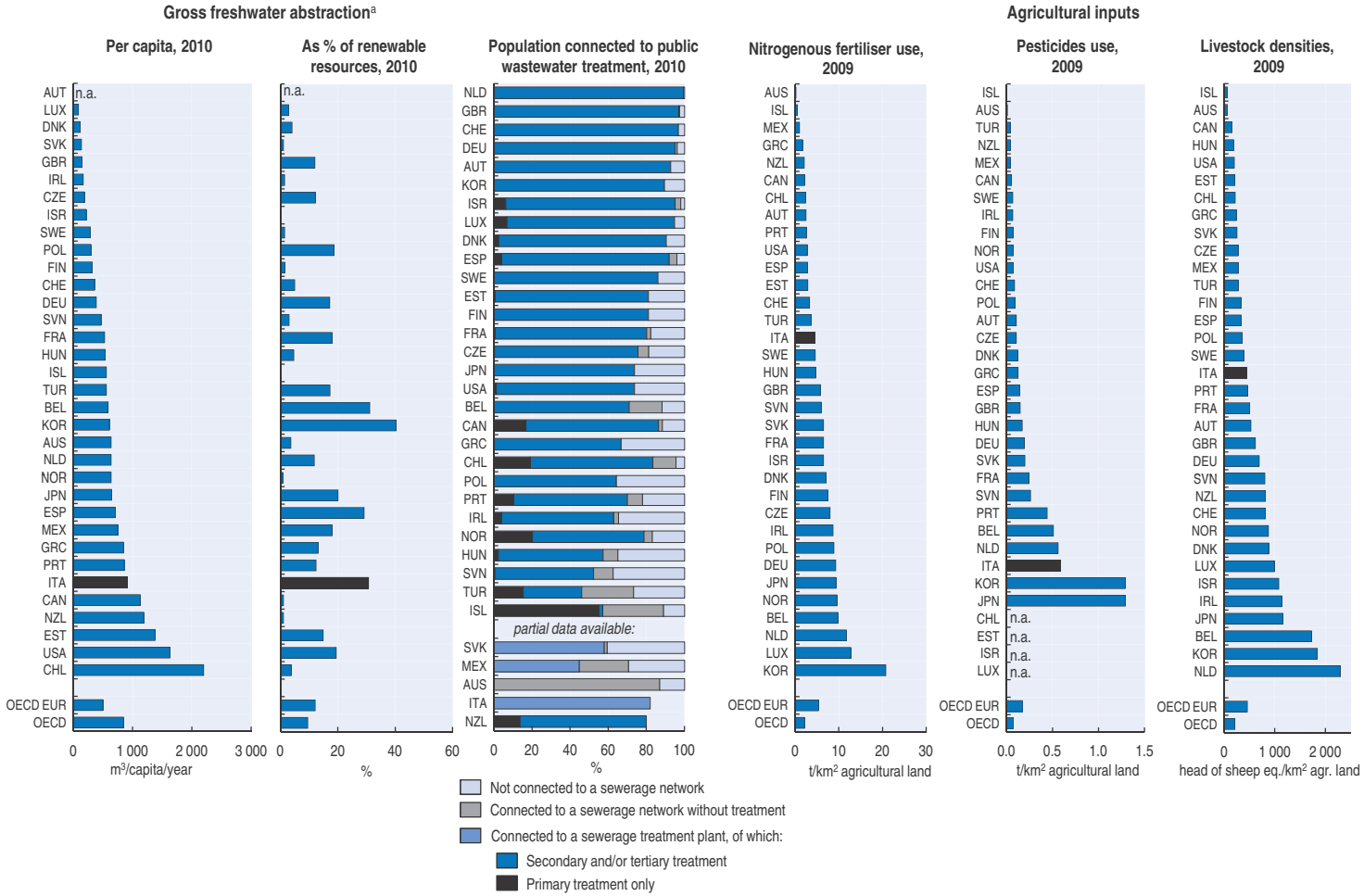
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.
a) Emissions from energy use only; excluding international marine and aviation bunkers; sectoral approach.
b) Exluding emissions/removals of the land use, land-use change and forestry sector. ISR: 2000 data exclude F-gases.
c) GDP at 2005 prices and purchasing power parities.
Source: OECD Environmental Data.

Reference I.C. **Selected Environmental data* – Biodiversity conservation and sustainable use**



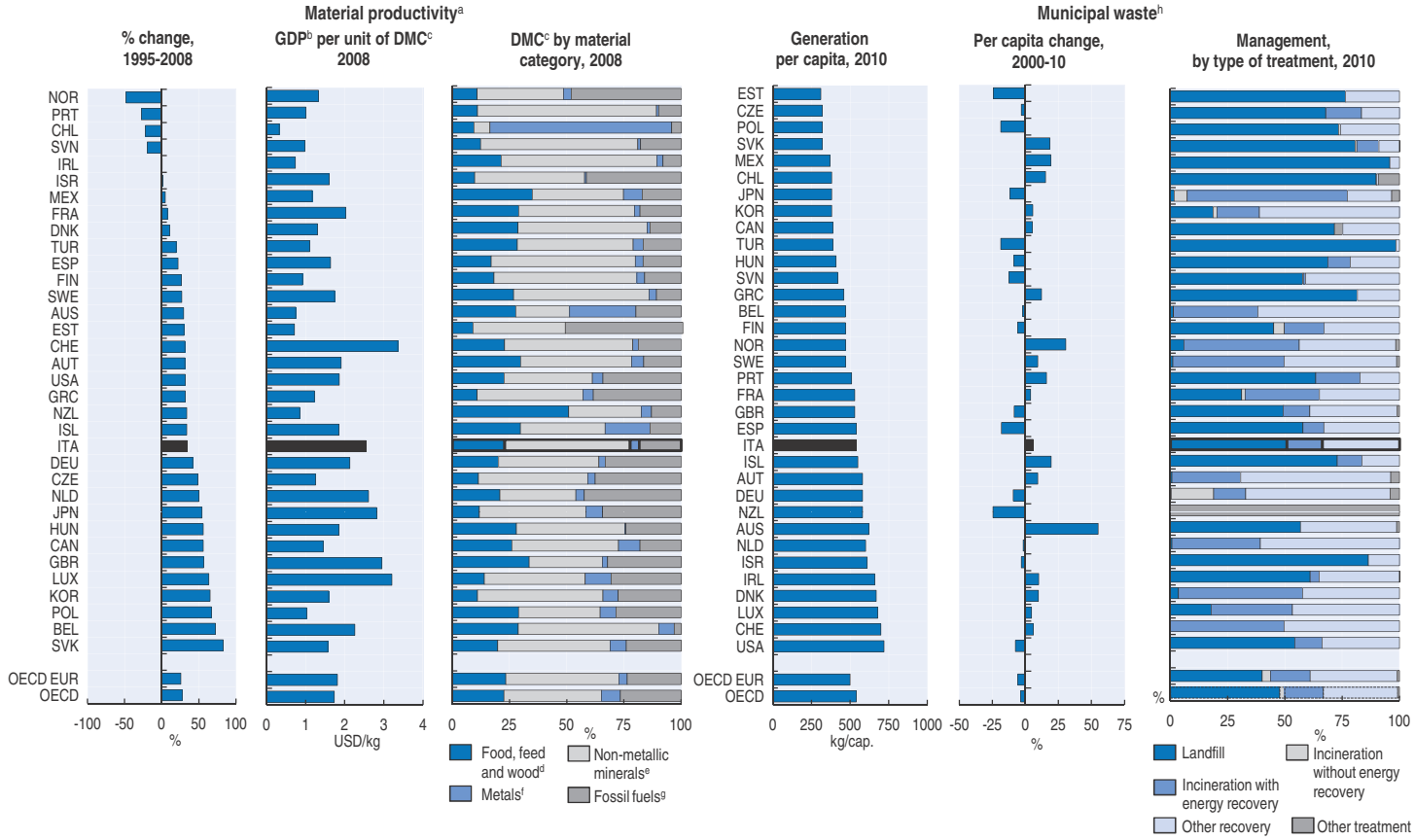
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries.
a) Designated terrestrial protected areas. Includes different level of protection ranging from IUCN categories I to VI. National classifications may differ.
NLD: Threatened fish species: marine fish only.
Source: OECD Environmental Data.

Reference I.C. **Selected Environmental data*– Water and land**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries.
a) For some countries, data refer to water permits and not to actual abstractions.
GBR: Water abstraction and public wastewater treatment: England and Wales only; pesticides use: Great Britain only.
Source: OECD Environmental Data.

Reference I.C. **Selected Environmental data* – Material productivity and waste**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.

a) Amount of GDP generated per unit of materials used, ratio of GDP to domestic material consumption (DMC).

b) GDP at 2005 prices and purchasing power parities.

c) DMC equals the sum of domestic (raw material) extraction used by an economy and its physical trade balance (imports minus exports of raw materials and manufactured products).

d) Domestic production from agriculture, forestry and fisheries, plus trade of raw and processed products from these sectors.

e) Domestic extraction and trade of minerals used in industry and construction, plus trade of derived processed products.

f) Domestic extraction of metal ores, plus trade of metal ores, metal concentrates, refined metals, products mainly made of metals, and scrap.

g) Coal, crude oil, natural gas, peat and traded derived products.

h) Waste collected by or for municipalities; it includes household, bulky and commercial waste, and similar waste handled at the same facilities. CAN: household waste only and total incineration: NZL: landfilled waste only.

Source: OECD Environmental Data.

REFERENCE II

Actions taken on selected 2002 OECD review recommendations

Recommendations	Actions taken
	Policy-making environment
• Streamline the legal environmental framework and facilitate its implementation through setting clear environmental policy targets and implementation deadlines.	The Environmental Code (Legislative Decree 156/2006) adopted in 2006 consolidated the numerous acts that regulated separate environmental domains (waste, water, air), established a number of specific targets (such as 45% of municipal waste subject to separate collection in 2008 and 65% in 2012), and provided specific procedures in regard to issues that had not been previously regulated such as liability for contaminated sites. Rapid development of EU requirements stimulated sector- and media-specific initiatives. The 2005 Water Use Plan provided an important stimulus for improving water-use efficiency, while the 2007 Energy Efficiency Strategy was critical to setting targets and identifying policies and instruments to reduce energy use. The 2010 Biodiversity Strategy was an important response to Italy's commitments under the EU Biodiversity Strategy and the UN Convention on Biological Diversity.
• Mainstream sustainable development policy into institutional arrangements and decision making at all levels (central, regional and local).	The Commission for Sustainable Development (CSD), established in 2000, was instrumental in developing and adopting the Environmental Strategy for Sustainable Development and designing programmes to respond to Italy's commitments to multilateral environmental agreements such as climate change and desertification. However, the Commission's activities slowed down after 2002 and have since remained virtually non-existent. Inter-departmental co-ordination has been also carried out through task forces and steering committees, such as the Steering Committee for preparing the National Action Plan for Green Public Procurement and the Inter-Ministerial Technical Committee for Emissions of GHGs. Co-ordination of policies between the national and subnational levels has been ensured through a system of "permanent conferences" which include the State-Regions Conference and the State-Local Authorities Conference. The Unified Conference brings together the two conferences on issues pertinent to implementation of the 2001 reform of the Italian Constitution.
• Complete the establishment of ARPAs and strengthen their role as the main monitoring and inspection bodies.	Establishment of 19 Regional Environmental Protection Agencies (ARPAs) and two provincial agencies for the Autonomous Provinces of Trento and Bolzano (APPAs) was completed in 2006. The planning and regulatory activities of the ARPAs/APPs were strengthened, including monitoring and inspections which they carry on behalf of provinces and municipalities. The Italian Network of Environmental Agencies, comprising the ISPRA and all ARPAs/APPAs, promotes implementation of national objectives at the regional level and the development of harmonised methodological and operational guidance for the ARPAs/APPAs.
• Raise the level of investment in environmental infrastructure by fully disbursing funds allocated to MATT and by seeking additional private funding; increase the rates of environmental charges, non-compliance fines and inspection fees and generalise their use.	Investment trends have differed across environmental sectors. Investment in waste management rose during the decade to catch up with delays in the development of waste treatment facilities. Investment in the water sector declined, especially in the case of wastewater infrastructure, mainly due to decreased investment by public entities specialised in provision of environmental services (i.e. local government units and non-profit institutions). Utilities have played a growing role in providing and financing environmental services, as well as more market-oriented and less subsidy-dependent provision of these services. Some environment-related charges have been increased, such as those related to waste collection, wastewater and domestic water supply. Non-compliance fees and fines are better linked to the gravity of offences and have been effectively applied in a growing number of cases by the Carabinieri Corps for environmental protection and the State Forest Corps.
• Evaluate the cost-effectiveness of the mixes of policy instruments in place (economic, regulatory, voluntary, land-use planning).	Some progress has been made in applying *ex-post* evaluation of environmental policies, including Regulatory Impact Assessment, Strategic Impact Assessment, and evaluations of selected policies by the Court of Auditors. The cost-effectiveness of mixes of policy instruments has been evaluated outside the administration, mostly by university researchers and independent experts. Some *ex-post* evaluations of cost-effectiveness have been applied in the disbursement of structural funds.

Recommendations	Actions taken
• Expand the use of Strategic Environmental Assessment (SEA).	Following a trial application of the use of the EU Structural Funds in 2004, SEA was introduced in Italian legislation in 2006 as part of the Environmental Code. The provisions were revised several times in 2008 and 2010 to better harmonise procedures with the requirements of the EU SEA Directive (2001/42/EC). Around 60% of the regions have introduced their own SEA legislation and all have adopted other instruments that enable SEA, such as special forms, guidance documents and trial procedures.
• Further strengthen national Environmental Impact Assessment (EIA) procedures and develop regional EIA procedures and IPPC permitting.	Requirements for EIA of projects have been revised several times since they were first introduced in 1986. These changes shifted the early, fully centralised EIA process carried out under the strict supervision and responsibility of the Ministry for the Environment, Land and Sea (MATTM) towards a decentralised system in which regional and provincial administrations carry out EIA procedures for a number of projects identified in legislation. After a slow start in early 2000s, 2 230 integrated (IPPC) permits were issued in 2007 for existing installations, less than 50% of those required to be issued by the IPPC deadline. The number increased to 3 989 in 2008. As of June 2012, 4 879 permits had been issued, including 141 issued by central authorities for the largest installations and 4 738 issued by the regions. Information about integrated permits is available on the MATTM web site, with details concerning inspections and their results. Most recently, IPPC permitting was combined with the EIA procedures with the view to reduce duplication in investigative and evaluation activities.
• Strengthen environmental information systems through extended and improved monitoring, economic coverage (e.g. concerning environmental expenditure) and integration of information from various sources.	Italy has strengthened the collection and presentation of environmental data, which is managed under the comprehensive SINANet system. A number of topic-focused data bases, registries and inventories which feed into the SINANet have been upgraded or completed. The system is supported by a network of national topic centres, reference institutions and regional focal points. The SINANet itself was upgraded and now contains an interactive geoportal based on the GIS technology.
• Further inform the public about its rights to environmental information, facilitate public access to environmental information, and encourage public participation in decision making.	Access to environmental information was strengthened in 2005 by the adoption of Legislative Decree 195/2005, which adjusted the terms and conditions for accessing environmental information in light of the EU Directive on public access to environmental information (2003/4/CE). The decree was followed by the creation of the Office for the Relationship with the Public (URP) at MATTM in 2007. Responding to the results of a permanent working group on improving URP operations, a call centre, front office, database and e-mail address were created to facilitate responding to public enquiries. ISPRA has its own URP, which co-ordinates environmental information collected by regional agencies. Environmental information has been presented in regular state-of-the-environment reports and a number of supporting reports focusing on aspects of the environment, such as waste, climate and biodiversity. To facilitate decision making and public access, the reports are presented in a more concise and accessible format. Several ARPAs/APPAs also produce annual or biannual yearbooks and focus reports. The reports and databases are available on Internet, where large municipalities present "near-to-real" time information concerning environmental problems, especially air quality. Revisions of the EIA procedures and the introduction of SEA in 2006 were accompanied by a widening of possibilities for the public to access the results of the assessment. Project proponents were also required to publish project information and the results of evaluations, including non-technical synthesis, in national or local newspapers and websites. Consultative referenda have been used for environment-related matters at the national and local level.
Towards green growth	
• Finalise adoption of the Environmental Strategy for Sustainable Development, with quantitative targets and time limits, based on full consultation with various stakeholders.	The Environmental Strategy for Sustainable Development (ESSD), adopted in 2002, defined Italy's priority areas for the 2000s, including specific objectives, targets, indicators, and monitoring and participation procedures. The ESSD was approved by the Inter-Ministerial Committee for Economic Planning (CIPE), Italy's main body responsible for co-ordination and horizontal integration of economic policies. The decision to revise the ESSD and bring it in line with the EU Sustainable Development Strategy was taken by the government in 2007, but this decision has not been implemented.
• Further integrate environmental concerns within agriculture, energy and transport policies, as well as health and tourism policies.	For much of the last decade, environment has not been effectively mainstreamed into economic and sectoral policies, as Italy has lacked a medium- or long-term framework for sustainable development and green growth. The National Reform Programme (NRP), prepared in the framework of the Europe 2020 Strategy, became the only document providing some indications of government strategic priorities in regard to the environment. Since 2011, the NRP has been part of the annually approved Economic and Finance Document (DEF), which is the government's core economic policy document and sets the agenda for the following three years. The 2012 DEF broadens the focus from meeting the 2020 EU climate and energy goals to greening the economy. It sets five broad priorities for 2012: energy efficiency, renewables and green technologies ("switching to a low-carbon economy"); integrated water cycle management; prevention of hydrogeological risk; recovery and re-use of decommissioned industrial sites; and protection and enhancement of natural areas as tourist destinations. It also renews the commitment to adopt a national energy strategy.
• Further promote capacity building (e.g. EU Structural Funds task-force) in project and financial management, and in implementation of the Environmental Strategy for Sustainable Development, at both regional and local levels.	The Italian Network of Environmental Agencies and a separate National Network of the Environmental Authorities and the Programming Authorities of the Community Structural Funds have provided assistance to southern regions which benefit from the EU funding. A number of environmental projects have been undertaken within the system of "permanent conferences" (the State-Regions Conference and the State-Local Authorities Conference), such as a programme for co-financing regional environmental education, information and training programmes. In parallel, the horizontal Conference of the Regions and Autonomous Provinces meets regularly and frequently discuss environment-related issues of mutual interest.

Recommendations	Actions taken
• Review existing environmentally related taxes (e.g. transport taxes, taxes on energy products) with a view to restructuring them in the light of a green tax reform.	Some efforts to review environmentally related taxes were made by 2005, such as the increase in tax rates on various energy products to take account of the carbon content of fuels. The 2011 "Salva Italia" fiscal consolidation package raised energy and vehicle tax rates. The comprehensive fiscal reform proposal presented in April 2012 (and under parliamentary discussion at the time of finalisation of this report) explicitly includes an environmental component for the first time.
• Review the economic efficiency and environmental effectiveness of incentive schemes granted in terms of subsidies, tax rebates or exemptions to various economic sectors.	In 2010, the Ministry of Economy and Finance launched the first comprehensive review of tax expenditure, with a view to improving the transparency of the tax system and providing the basis for subsequent reforms or removing special tax treatment that is not justified on economic, social and environmental grounds. The April 2012, fiscal reform proposal paves the way for such a revision.
• Foster implementation of cost recovery schemes in waste management and extend such schemes to water management; set charges at levels that create incentives and are in accord with the user and polluter-pays principles, and explore the potential for pollution trading mechanisms.	Particular efforts have been made to increase fees applied for irrigation. Some progress has been made in increasing water supply and wastewater charges. The switch from the local waste tax to the waste tariff, which was expected to allow for full cost recovery and promote waste reduction, has been slow: in 2011, after more than ten years of implementation, only about one-third of Italy's population lived in municipalities that had switched to the tariff. The composition of the tariff varies across municipalities. Only a few municipalities apply the pay-as-you-throw approach. Pollution trading mechanisms were applied through the EU Emissions Trading System (EU ETS), which covers CO_2 emissions from more than 1 000 industrial installations and large power plants in Italy, and about 40% of total emissions.
• Reinforce efforts to reduce regional disparities in access to environmental services through development programmes (e.g. environmental infrastructure) in the South.	Sustainable use and promotion of environmental and natural resources are among the key funding priorities in the 2007-13 programming period of the regional development and cohesion policy. About EUR 9 billion in EU and national matching funds was allocated to environment- and energy-related investment. This represents 15% of the total allocation of EU and national matching funds, which is higher than the share of funds earmarked for environment-related investment in the previous programming period (2001-06). Allocation of regional development funds in the 2007-13 programming period has been based on sounder analysis of investment needs and more extensive use of statistical information and indicators than in the past. Italy has implemented innovative, more results-oriented procedures for the disbursement of structural funds, including making disbursement conditional on a number of criteria including completion of specific sectoral planning. In addition, a performance-based mechanism (the "Obiettivi di Servizio") has been implemented to provide additional funding in the southern regions as a reward for achieving predefined targets for urban waste and water services by 2013.
• Promote the creation of environment-related jobs (e.g. at local level, in organic farming, in small enterprises).	The environmental goods and services (EGS) sector in Italy has grown since the early 2000s in terms of output, turnover and employment. An increased policy focus on renewable energy sources and energy efficiency in the second half of the 2000s resulted in an investment boom in these sectors, which led to growing turnover and employment in the "clean energy" sectors. In 2010, more than 108 000 people were directly or indirectly employed in the renewable energy sector, making Italy the third largest employer in the EU. Italy is among the top EU countries in all renewable energy sectors. Italy is one of the European leaders, with 8.6% of its total utilised agricultural area occupied by organic farming. It has the largest certified crop area and highest number of operators in Europe.
• Increase the amount of official development assistance towards the Rio commitment of 0.7% of GNP.	Since 2000, Italy's net official development assistance (ODA) has increased by 60% in real terms, to reach USD 3.99 billion in 2011. Despite the important increase, Italy's ODA as a percentage of its gross national income (GNI) reached 0.19% in 2011, well below the DAC average of 0.31% and the target of 0.7% ODA/GNI by 2015.
Multi-level environmental governance: Water	
• Implement legislation according to the new EU Water Framework Directive and strengthen the role of river basin authorities.	The 2006 Environmental Code formally introduced the WFD requirements into Italy's legal framework. Part III of the Code defined water environmental standards and conditions for water resources management. The Code divided the Italian territory into eight river basin districts (Serchio, Padano, Eastern Alps, Northern Apennines, Central Apennines, Southern Apennines, Sardinia and Sicily) and defined environmental and public health standards for water resources. Due to the difficulties with an introduction of a new governance system, the River basin District Authorities were not created. To fill the gap and avoid non-compliance with the WFD the task of developing the first river basin management plans were assigned to six existing national river basin authorities and the regions in which the authorities operated.
• Mobilise public and private investments to upgrade urban waste water collection and treatment infrastructure, in the context of the framework programme agreements between the State and the regions.	The prices of a cubic metre of water and of wastewater services, adjusted for inflation, have increased in recent years. While expenditure on water and wastewater has remained stable (at constant prices), the share of investment has decreased, particularly in regard to wastewater infrastructure. This trend has been reinforced by limited, though growing, involvement of private operators and a limited role for other means of financing water and wastewater infrastructure, such as equity or debt financing. The drop in investment has contributed to increasing obsolescence in infrastructure, a rise in network leakages and a decline in service levels, including disruptions in supplies to end-users.
• Speed up implementation of the Galli Act (e.g. application of user and polluter-pays principles, consolidation of municipal water and waste water services within optimal management areas).	By 2004, 87 out of 91 ATOs had been created and 66 had developed water supply and sanitation plans. In 2012, all but one of the ATOs were operational and most had completed their planning. Following these reforms, the number of bodies in charge of providing water supply and sanitation services was reduced from over 8 000 in the late 1990s to 115 in 2009. In many ATOs the reform resulted in streamlining and better co-ordination of service provisions. However, some ATO authorities experience serious weaknesses, such as lack of expertise and authority in regard to service providers as well as conflicts of interest and influenced decision making.
• Implement statutory water quality objectives introduced by Legislative Decree 152/1999.	The 2006 Environmental Code and subsequent amendments unified a vast number of emission thresholds and concentration limits concerning water quality and pollution, as envisaged in the legislative Decree 152/1999. They are applied in a uniform way throughout Italy, though regional administrations may make the requirements more stringent in order to adapt them to the local environmental context.

Recommendations	Actions taken
• Prepare watershed management plans, including both water quantity and water quality planning, in close consultation with the various stakeholders. • Strengthen prevention and mitigation measures concerning flood management; complete hydrogeological risk plans for all river basins. • Complete delineation of areas vulnerable to nitrate and pesticide pollution from agriculture.	The delay in identifying river basin districts and in attributing competences to the district authorities reduced the time available for developing river basin management plans (RBMPs) before the WFD deadline of December 2009. To avoid non-compliance procedures by the EU, Italy established a legal framework, with strict timetables, which would allow the competent authorities (national river basin authorities and regions) to develop the RBMPs. The first versions of eight RBMPs were adopted by the end of July 2009 and submitted for Strategic Environmental Assessment (SEA), as required by national legislation, and for public consultation, as foreseen by the WFD and the SEA procedures. All eight RBMPs were approved in 2010. In addition, hydrogeological plans for soil protection and hydro-geological risk were developed for all river basins and delineated areas vulnerable to nitrate and pesticide pollution from agriculture.
Climate change	
• Implement, monitor and develop the national programme of greenhouse gas emissions reductions to meet the Kyoto target.	Further to ratification of the Kyoto Protocol, a national action plan for reducing GHG emissions in the period 2003-12 was approved in 2002. It included a "reference scenario" which incorporated the impact of a range of measures to be implemented. Based on this reference scenario, indicative sectoral emission targets and a net distance to the Kyoto target of nearly 31 Mt CO_2 eq were identified. The plan was partially revised in 2007 to update projected emissions to 2010 and the Kyoto target. In 2012, MATTM submitted to the CIPE a new draft plan for achieving the Kyoto target, as well as the 2020 targets of the EU Climate and Energy Package. It integrates the measures foreseen in the national plans for renewables and energy efficiency, as well as regional actions supported by EU and national funds for regional development.
• Further develop and implement a long-term strategy and medium-term action plan to create alternatives to road transport in long distance freight movements and in urban mobility, and to ensure an appropriate focus on transport infrastructure development.	The Italian strategy to reduce GHG emissions from the transport sector has focused on measures aimed at: reducing average CO_2 emissions from the vehicle fleet; increasing the use of biofuels; and developing local public transport infrastructure and services, as well as infrastructure for long distance rail and sea shipping. However, while many national transport infrastructure plans have been developed, Italy lacks a comprehensive transport strategy aimed at rebalancing the modal split of both passenger travel and freight haulage. Progress has been made in promoting sea shipping and upgrading railway networks. Italy has established a network of motorways of the sea, as part of the trans-European transport network, and provided financial incentives to road and rail carriers to shift their freight to sea shipping (the "Ecobonus" and "Ferrobonus"). The passenger carrying capacity of public transport increased by about 10% between 2000 and 2010. The density of cycling lanes in cities also nearly doubled in the 2000s. However, the increase in the supply of public transport services has not kept pace with demand, and supply and demand trends vary greatly across regions and cities.

Source: OECD, *Environmental Performance Reviews: Italy*, 2002; OECD, *Environmental Performance Reviews: Italy*, 2013.

REFERENCE III

Abbreviations

AATO	Authority within an ATO
AEEG	Regulatory Authority for Electricity and Gas
AIR	Regulatory impact assessment
APPA	Provincial environmental protection agency
ARPA	Regional environmental protection agency
ATO	Optimal Territorial Area for managing water services
AUA	Single environmental permit
C6SS	Commission for Sustainable Development
C&D	Construction and demolition
CCS	Carbon capture and storage
CCTA	Carabinieri Corps for Environmental Protection
CFS	State Forestry Corps
CH_4	Methane
CHP	Combined heat and power
CIACE	Inter-Ministerial Committee for European Community Affairs
CIPE	Inter-Ministerial Committee for Economic Planning
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMCC	Euro-Mediterranean Centre for Climate Change
CO_2	Carbon dioxide
COFOG	Classification of the Functions of Government (United Nations)
CONAI	National Packaging Consortium
CNEL	National Council for Economy and Labour
CNG	Compressed natural gas
COVIS	Commission for the Assessment of Environmental Planning, Management and Investment
COVIRI	Water Resources Surveillance Committee
CSR	Corporate Social Responsibility
CTE	Technical Committee for Emissions of GHGs
DAC	Development Assistance Committee (OECD)
DEF	Economic and Finance Document
DMC	Domestic material consumption
EEA	European Environment Agency
EEAP	Energy Efficiency Action Plan

EGS	Environmental goods and services
EIA	Environmental impact assessment
EMAS	Eco-Management and Audit Scheme (EU)
ENEA	National Agency for New Technologies, Energy and Sustainable Economic Development
ESCO	Energy service company
ESSD	Environmental Strategy for Sustainable Development
EU ETS	European Union Emissions Trading System
EUAP	European Union Action Plan
FDI	Foreign direct investment
FIT	Feed-in tariff
GC	Green certificate
GDP	Gross domestic product
GFCF	Gross fixed capital formation
GHG	Greenhouse gas
GNI	Gross national income
HFC	Hydrofluorocarbon
INFEA	National Environmental Information, Training and Education programme
IPPC	Integrated pollution prevention and control
IRSA	National Water Resource Institute
ISO	International Organization for Standardization
ISPRA	Institute for Environmental Protection and Research
ISTAT	Italian National Institute of Statistics
IUCN	International Union for Conservation of Nature
LPG	Liquified petrolem gas
MATTM	Ministry of the Environment, Land and Sea
MEF	Ministry of Economy and Finance
MFA	Ministry of Foreign Affairs
MIPAAF	Ministry of Agricultural, Food and Forestry Policies
MIT	Ministry of Infrastructure and Transport
MS	Ministry of Health
MSE	Ministry of Economic Development
Mt CO_2 eq	Million tonnes of carbon dioxide equivalent
MTN	"Normalised method" used in the water tariff system
Mtoe	Million tonnes of oil equivalent
N_2O	Nitrous oxide
NCP	National contact point
NEC	National emission ceilings (for certain atmospheric pollutants)
NIMBY	"Not in my back yard"
NMVOCs	Non-methane volatile organic compounds
NOE	Units of the CCTA
NPISHs	Non-profit institutions serving households
NRP	National Reform Programme
NSRF	National Strategic Reference Framework
ODA	Official development assistance
ONOG	National Observatory for Organisation and Management of ARPAs/APPAs
PAC	Pollution abatement and control

PM	Particulate matter
POPs	Persistent organic pollutants
PPP	Purchasing power parities
PV/CSP	Photovoltaic/concentrated solar power
RAM	Department of the Marine Environment of the Italian Coast Guard
RBMP	River basin management plan
REAP	National Renewable Energy Action Plan
RES	Renewable energy sources
RIA	Regulatory impact assessment
SACE	Italian Export Credit Agency
SCI	Site of (European) Community Importance
SCIA	Notification procedure for SMEs
SEA	Strategic impact assessment
SICP	Sino-Italian Co-operation Programme for Environmental Protection
SINAnet	Italian National Environmental Information System
SINTAI	National Information System for Italian Water Protection
SMEs	Small and medium-sized enterprises
SO_2	Sulphur dioxide
SPA	Special Protected Area
SUAP	Authority for unifying permitting procedures and granting simplified permit.
TARs	Regional Administrative Courts
TFC	Total final energy consumption
TPES	Total primary energy supply
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
URP	Office for the Relationship with the Public (MATTM)
VIA	Environmental impact assessment
VIR	*Ex post* regulatory impact evaluation
WFD	Water Framework Directive (EU)
WWF	World Wildlife Fund (often just WWF)

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