OECD Working Papers on International Investment 2012/01

Corporate Greenhouse Gas Emission Reporting: A Stocktaking of Government Schemes

Céline Kauffmann,

Cristina Tébar Less,

Dorothee Teichmann

https://dx.doi.org/10.1787/5k97g3x674lq-en

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Abstract

CORPORATE GREENHOUSE GAS EMISSION REPORTING: A STOCKTAKING OF GOVERNMENT SCHEMES

by

Céline Kauffmann, Cristina Tébar Less and Dorothee Teichmann*

Abstract

This paper provides an overview of current government schemes promoting corporate reporting of greenhouse gas (GHG) emissions and analyses their main building blocks. It describes the drivers and challenges for governments, companies and investors in dealing with GHG reporting and includes 4 case studies examining in more depth the domestic GHG emission reporting schemes of the UK, France, Japan and Australia. This work is part of a project with UNCTAD, the Climate Disclosure Standards Board (CDSB) and the Global Reporting Initiative (GRI) on consistency of climate change reporting.

JEL Classification: F23, G32, L15, M4, Q56
Keywords: climate change, reporting, greenhouse gas emissions. corporate governance, responsible business conduct, emission trading

* This report was written by Céline Kauffmann (Regulatory Policy Division), Cristina Tébar Less (Investment Division), and Dorothee Teichmann (Corporate Affairs Division), with inputs from Christa Clapp (Climate Change, Biodiversity and Development Division) and Héctor Lehuedé (Corporate Affairs Division). It was submitted for comments to the Working Party of the Investment Committee, the Environment Policy Committee's Working Party on Climate, Investment and Development and the Corporate Governance Committee. It also benefitted from useful suggestions from participants in various stakeholder consultations and workshops held in the framework of this project.

Further information on investment for green growth work at the OECD may be found at www.oecd.org/daf/investment/green

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EXECUTIVE SUMMARY

Corporate reporting of greenhouse gas emissions is steadily increasing

A growing number of companies assess and address the potential threats and opportunities of climate change for their business. They measure the greenhouse gas (GHG) emissions generated by their activity, and assess their exposure to physical climate change impacts as well as changing market conditions and consumer preferences as a consequence of climate change. At the same time, there is also an increasing demand from governments, investors and other stakeholders for corporate climate change-related information. The OECD Guidelines for Multinational Enterprises, updated in May 2011, reflect the increasing stakeholder demand for more corporate transparency by encouraging companies to disclose environmental information with high quality standards, particularly in "the case of greenhouse gas emissions, as the scope of their monitoring is expanding to cover direct and indirect, current and future, corporate and product emissions".

Since the late 1990s, a number of mandatory or voluntary government schemes have emerged, which, together with emerging non-governmental initiatives, require or encourage enterprises to measure and report their GHG emissions. These requirements are part of environmental and other non-financial disclosure requirements; of policy instruments that put in place a carbon price, such as carbon taxes and emission trading schemes; or of listing requirements of stock exchanges. Recent trends show an increasing number of government schemes, with some countries exhibiting a range of schemes operating or under development at both sub-national and national levels. With the growing number of reporting schemes, the number of companies or entities reporting under mandatory or voluntary reporting schemes has also steadily increased. The EU ETS now operates in 30 countries and covers CO_2 emissions from some 11 000 installations. In Japan, in 2009, over 11000 enterprises reported their CO_2 emissions under the mandatory GHG Accounting and Reporting system, accounting for about half of the total emissions of Japan nationwide, and in the U.S. around 6 700 entities reported data in 2010 under the GHG Reporting Program, covering roughly 80% of total U.S. GHG emissions.

Motivations, benefits and challenges of GHG reporting for companies, governments and investors

For governments, the main motivation to request GHG emission information from companies is to induce companies to reduce their GHG emissions, and to facilitate investors' access to this information. The information itself is used for different purposes by governments, for example, to support emission trading schemes, where they exist; as a complement of domestic climate change policies, and to refine national GHG inventories. Most government GHG reporting schemes (in particular those linked to emission trading schemes) mainly ask companies to disclose GHG emissions. Some schemes go further and invite companies to report on emission reduction targets and other climate change related information. In developing and implementing GHG emission reporting schemes, governments face challenges: finding the right balance between collecting meaningful information without putting an excessive burden on companies, achieving the necessary policy coherence and coordination of different pieces of legislation (e.g. integrating carbon reporting with other reporting requests), and putting in place the right incentives to motivate companies to act, in order to reduce emissions.

Investors are key stakeholders in corporate GHG reporting: by scrutinising this information and integrating it into investment decision-making they can act as levers for corporate climate change action. Investors' interest in companies' climate change-related information has increased, but there is little evidence on the actual weight of this information in terms of investment decisions. Indeed, while companies are aware of

this interest by investors, some express their frustration about the fact that this interest does not necessarily materialise in investment decisions that would reward "good reporting".

Besides legal constraints under mandatory government reporting schemes, companies measure and report GHG emissions in order to identify opportunities to reduce emissions and save energy, and to increase awareness about potential and future climate change-related risks. For leading companies, GHG emission reporting to government and non-governmental schemes has become part of the overall business strategy. For other, less motivated companies, government reporting schemes provide guidance on what to measure, how to do it, and how to disclose the information.

Lessons learnt in developing and implementing government GHG reporting schemes

In the past 15 years, government schemes have developed in a number of OECD countries, including (but not limited to) Australia, Canada, France, Israel, Japan, New Zealand, the UK, and the U.S. Some lessons can be gathered from countries' experience in implementing these schemes. First, there are important elements of convergence between the key elements of reporting schemes put in place by different countries. Some aspects in which domestic GHG reporting schemes are converging include measurement practices and the use of terminology. For example, the use of scope 1, 2, 3 to classify emissions as defined by the GHG Protocol has become common language and practice today. Standard measurement methodologies (such as the GHG Protocol and ISO 14064) have also emerged and act as methodologies of reference today, even though some countries originally used different methods, such as France. The Australian efforts to generate a common language and platform of GHG emission information across States also illustrate this growing convergence in GHG reporting practices.

However, other elements remain to a large extent country-specific and are a function of the underlying policy drivers, including the scope of the schemes, reporting practices (e.g. in terms of reporting platforms, reporting periodicity, the recipient of information and publication of collected information) and assurance levels. For example, reporting schemes in France and the UK are seen as complementary to the EU Emissions Trading System (EU ETS), which is limited in terms of scope of information (scope 1), of boundary (facility level) and of companies requested to report (energy-intensive companies). The complementary government schemes put in place in France and in the UK seek to raise awareness and incentivise action by companies that are not covered by the EU ETS (i.e. smaller and less energy-intensive companies), or in relation to emissions that are outside the EU ETS scope (typically scope 2 and scope 3). In Australia, on the other hand, reporting schemes underpin the domestic trading market and other carbon pricing mechanisms. Here, the scope of reporting schemes is more limited and the monetary valuation of emissions is leading to more stringent verification provisions. In Japan, a range of reporting schemes exist; their coverage partly overlaps.

Even between government schemes which share strong commonalities, some significant differences remain. For example in the UK the reporting periodicity is annual, while France provides for a three-year period between inventories. This is linked to the fact that the UK seeks to rely more strongly on investors to induce corporate change: annual reporting of GHG emissions brings it closer to financial reporting. The rationale behind a 3-year periodicity in France is to leave time to companies to achieve emission reductions.

With growing experience, the benefits of more consistency in government reporting are emerging. Over the years, some governments have realised the benefits of streamlining regional or domestic reporting schemes. This is for instance the case in the EU, in relation to the management of the EU ETS. Variations in the implementation of the schemes in individual countries are perceived as leading to undue divergences in administration practices. To address this, phase 3 of the EU ETS foresees more efforts to ensure a consistent approach across member countries. In Australia, in the absence of an early commitment to climate change mitigation at national level initially, regional initiatives developed in different states. These

initiatives used different language and had different reporting requirements, potentially creating additional costs to governments and to business. As part of a broader strategy to deliver more consistent regulation across jurisdictions and address unnecessary or poorly designed regulation, Australia's National Greenhouse and Energy Reporting (NGER) system was implemented to address the inconsistencies of the different reporting schemes. Here, federal regulation acted as a strong driver of consistency across States.

In France and the UK, the development of GHG measurement methodologies and of regulatory schemes has substantially involved and required inputs from business – through a broad consultation process involving various working groups in France and through a company survey in the UK. These experiences clearly show the benefit of broad consultation to underpin effective government reporting schemes. First, companies have the technical knowledge of GHG emissions and are the best placed to measure them and to assess reductions options, as well as potential risks and opportunities. The level of compliance under voluntary schemes, and the level of acceptance of mandatory schemes, is a function of whether companies deem the requirements well balanced and fair. In addition, broad and open consultations are necessary to avoid regulatory capture by specific business interest.

INTRODUCTION

Increasing awareness of the potential impacts of climate change on their activities is leading companies to assess and address the potential threats and opportunities. A growing number of companies measure the greenhouse gas (GHG) emissions generated by their activity and assess their exposure to physical climate change impacts as well as changing market conditions and consumer preferences as a consequence of climate change. Increasingly, the assessment and management of actual and prospective climate change related impacts has become an important element of corporate strategy and risk management.

At the same time, there is also an increasing demand from governments, investors and other stakeholders for corporate climate change-related information. The OECD Guidelines for Multinational Enterprises, updated in May 2011, reflect the increasing stakeholder demand for more corporate transparency by encouraging companies to disclose environmental information with high quality standards, particularly in "the case of greenhouse gas emissions, as the scope of their monitoring is expanding to cover direct and indirect, current and future, corporate and product emissions".[1]

Demand for climate change information from governments translates into mandatory or voluntary government schemes that, together with emerging non-governmental initiatives, require or encourage enterprises to measure and report their GHG emissions. These requirements may be part of environmental and other non-financial disclosure requirements, or of instruments that put in place a carbon price, such as carbon taxes and emission trading schemes. This report focuses on climate change-related information, in particular GHG emissions, at corporate and entity level, reported to government schemes. Reporting requirements are also developing in related fields, such as in relation to the carbon footprint of products. However, these schemes are not addressed in this report.

This report builds on the 2010 OECD publication "Transition to a Low-carbon Economy. Public goals and corporate practices", which surveyed business practices in addressing climate change and summarised policy frameworks, regulations and other drivers of corporate action. It provides an overview of corporate climate change reporting schemes developed by governments, and explores the motivations for governments and investors to demand climate change-related information, and for companies to provide this information. The report also reviews the key elements of government reporting schemes, such as the type and scope of climate change related information that is requested, measurement methodologies, and verification requirements. It analyses these building blocks in a range of voluntary and mandatory government reporting schemes in OECD countries, including Australia, Canada, the European Union, France, Israel, Japan, New Zealand, the United Kingdom and the United States. It also indicates the main areas where divergences and similarities exist. In addition, four case studies analyse in depth the government reporting schemes in place in the UK, France, Japan and Australia, to help better understand their key similarities and divergences.

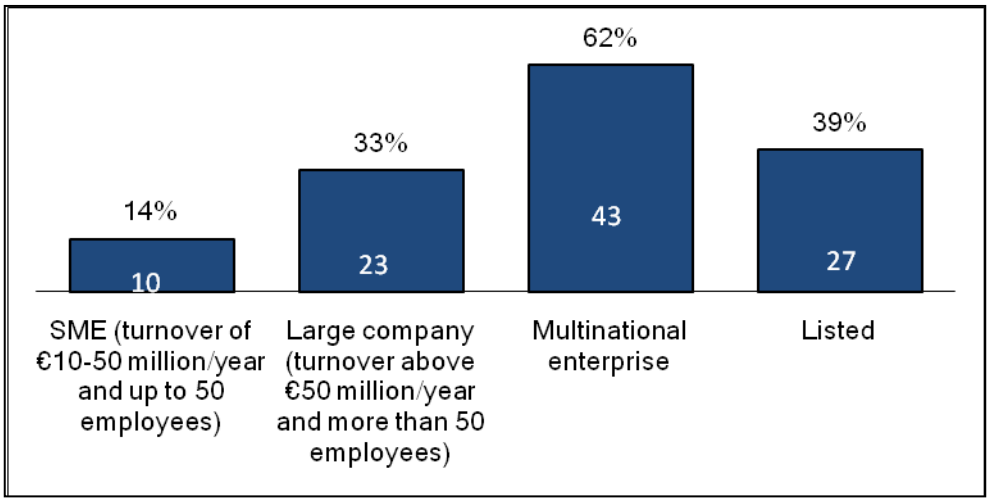
This report has been prepared by the OECD, as part of a project with UNCTAD, the Climate Disclosure Standards Board (CDSB) and the Global Reporting Initiative (GRI) on consistency of climate change reporting. Together with the OECD, these organisations have established an informal working group on

[1] OECD Guidelines for Multinational Enterprises, chapter on disclosure, commentary.

corporate climate change reporting. As part of this co-operation, a range of consultations with companies, governments, investors and other stakeholders have been organised in 2011 and 2012, including a technical workshop at OECD in February 2012, to explore current trends and practices in climate change reporting.[2] Input gathered in these consultations is reflected in this report. The report also reflects findings from a workshop on Climate Disclosure and Investor Behaviour organised in February 2012 by the World Business Council for Sustainable Development (WBCSD, 2012).

In addition, the OECD carried out a company survey to better understand current corporate practices and key challenges in the area of climate change reporting, and to explore companies' expectations on existing or future government measures in this area. The questionnaire was prepared in co-operation with, and distributed by CDSB, CDP, GRI and BIAC. A total of 69 companies from a variety of sectors (including oil & gas, waste, electricity producers, and the financial sector) participated.[3] Most of these companies are experienced with carbon reporting and report under several schemes. Only 15% of the responding companies do not currently report climate change-related information. More than half of the responding companies report climate change related information under more than one reporting scheme. A majority (62%) of responding companies are multinational companies (Figure 1). The main results of the survey are reflected in relevant parts of the report.

Figure 1. OECD survey: types of responding companies



Source: OECD Survey (2012).

[2] These consultations included a session on climate change reporting at the October 2011 meeting of the Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR) (www.unctad.org/en/Pages/MeetingsArchive.aspx?meetingid=20484), a workshop at the OECD on 15 February 2012 (www.oecd.org/document/6/0,3746,en_2649_34893_49513158_1_1_1_1,00.html) and a workshop at UNCTAD on 16 March 2012 www.unctad.org/en/Pages/CalendarMeetingDetails.aspx?meetingid=49

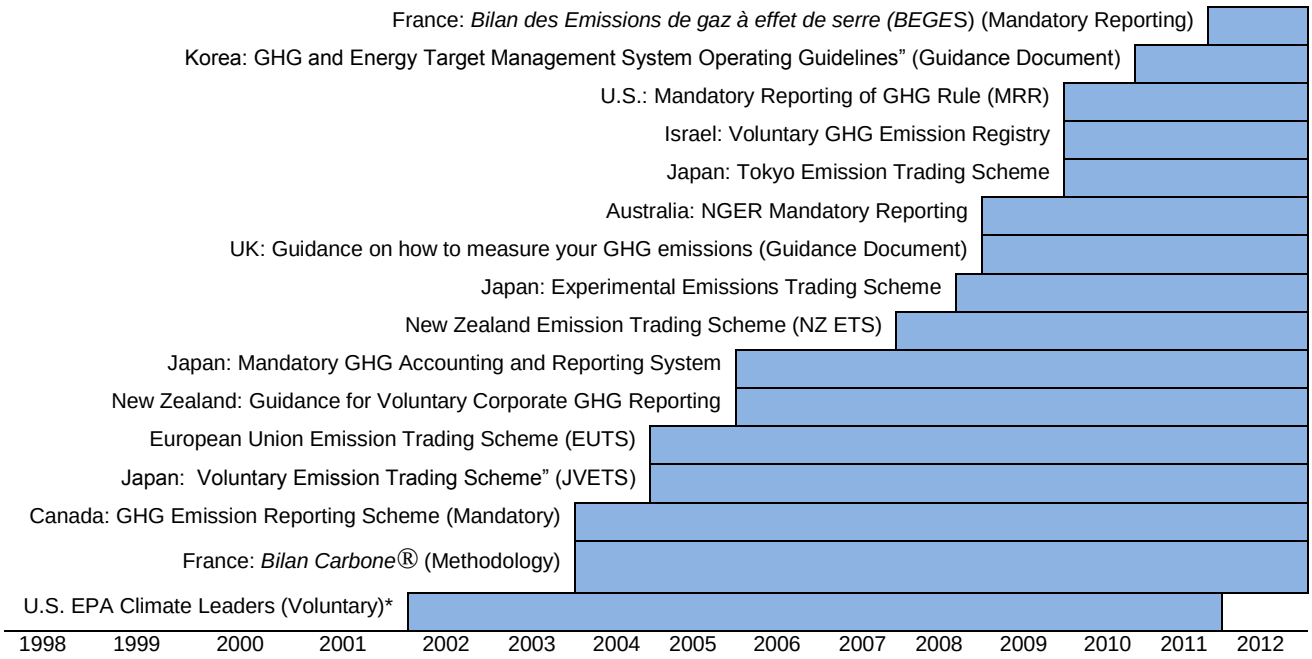
[3] Similar to the survey undertaken by the OECD in 2010 in the context of the project "Transition to a Low-carbon Economy. Public goals and corporate practices", the company sample was not meant to be representative of all companies, but rather to capture the challenges and difficulties of frontrunners in dealing with GHG reporting.

OVERVIEW OF CORPORATE CLIMATE CHANGE REPORTING

Recent developments in climate change reporting

Over the past 15 years, a number of governments have established voluntary or mandatory GHG carbon measurement and reporting schemes under which enterprises report GHG emissions and, in some cases, also other climate change-related information. At present, governmental mandatory and voluntary climate change reporting provisions, emission requirements that underpin carbon pricing mechanisms, as well as guidance on measurement and reporting of emissions have been introduced in Australia, Canada, the EU, France, Japan, Israel, Korea, New Zealand, the UK and the U.S. (Figure 2 and Box 1).[4]

Figure 2. Emergence of government reporting schemes



*U.S. EPA Climate Leaders program was phased out in 2011.
Source: Authors.

With the growing number of reporting schemes, the number of companies reporting their GHG emissions has also steadily increased. The EU ETS now operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein and Norway) and covers CO_2 emissions from some 11 000 installations (power stations, combustion plants, oil refineries and iron and steel works, as well as factories making cement, glass, lime, bricks, ceramics, pulp, paper and board). Nitrous oxide emissions from certain processes are also covered. Between them, the installations covered account for almost half of the EU's CO_2 emissions and 40% of its total GHG emissions.[5] In Japan, in 2009, over 11 000 enterprises reported their CO_2 emissions under the mandatory GHG Accounting and Reporting system (643.5 million tonnes CO_2-e),

[4] This list is not exhaustive. Norway for example had an emission trading scheme which was later integrated with the EU ETS. In some countries, e.g. in India and South Africa, GHG reporting falls under more general non-financial reporting regulations. More detailed analysis of these schemes can be found in IEA (2010) and CDSB (2011).

[5] See http://ec.europa.eu/clima/policies/ets/index_en.htm

accounting for about half of the total emissions nationwide (about 1.27 billion tonnes).[6] In January 2012, the U.S. Environmental Protection Agency (EPA) released GHG data collected under the GHG Reporting Program,[7] showing 2010 data from industrial facilities and from suppliers of certain fossil fuels and industrial gases. The data set includes GHG reports from 6 700 entities, covering roughly 80% of total U.S. GHG emissions.[8]

Box 1. Selected government climate change reporting schemes

In **Australia**, under the National Greenhouse and Energy Reporting (NGER) Act, corporations emitting more than 125 000 tonnes CO_2 equivalent per annum started to report on their energy and greenhouse gas emissions to the Government in October 2009 for financial year 2008/2009 (www.cleanenergyregulator.gov.au/National-Greenhouse-and-Energy-Reporting/Pages/default.aspx).

In **Canada**, under the Canadian Environmental Protection Act of 1999, all facilities that emit more than 50 000 tonnes or more of GHG (in CO_2 equivalent units) annually are required to submit a report to Environment Canada, starting in 2005 for 2004 emissions. In 2010, the threshold was lowered from 100 to 50 kilotons of GHG (www.ec.gc.ca/ges-ghg); In **France**, Law *"Grenelle II"* requires companies with 500 employees and more to make GHG inventories according to modalities defined by a decree published in July 2011. The deadline for the first inventory is December 2012; inventories must be updated every three years. The GHG measurement methodology is based on the GHG Protocol, ISO 14064-1 as well as the French *Bilan Carbone®* methodology (www.developpement-durable.gouv.fr/IMG/pdf/09003_PLAN_CLIMAT.pdf).

Japan introduced annual mandatory reporting of GHG emissions in 2006 under the Act on Promotion of Global Warming Countermeasures. Companies already required to report energy usage under the Act on the Rational Use of Energy must report their CO_2 emissions from energy consumption. For other types of GHG, companies with more than 20 full-time employees are required to report the aggregate amounts of their emissions by type at each business site where emissions exceed 3 000 tons of CO_2 equivalent. The scheme covers 11 358 facilities and 1 382 transportation companies (www.japanfs.org/en/pages/026377.html).

In **Korea**, the Basic Act on Low Carbon Green Growth includes mandatory rules that require energy-intensive companies and/or companies emitting GHGs over a certain amount to report their emissions and energy consumption to the Government with effect as of 14 April 2010. Based on the information collected, the Government will decide over the cap of the forthcoming cap-and-trade scheme and allocate GHG emissions limits to major facilities. On March 16, 2011 the government confirmed the 'greenhouse gas, energy target management system operating guidelines' (Notification No.2011-29 of the Ministry of Environment). The controlled entities were to submit their first GHG emission statement to the ministry in charge by the end of May, 2011 (http://eng.me.go.kr/board.do?method=view&docSeq=9168&bbsCode=new_infocus).

In the **UK**, a number of companies already report their GHG emissions under Climate Change Agreements (voluntary mechanism) or the Carbon Reduction Commitment (a mandatory cap and trade scheme on energy use emissions started in April 2010 that requires some 5 000 organisations to record and monitor their carbon emissions and an additional 15 000 organisations to disclose their electricity usage). The Climate Change Act of 2008 requires the Government to take a decision by April 2012 on whether to introduce regulations on the reporting of GHG emissions. In anticipation, the Government published in October 2009 guidance on the measurement of GHG emissions to assist organisations with the reporting of emissions and carried out in 2010 a review to evaluate the contribution that reporting on GHG emissions is making to the achievement of Government's climate change objectives. As of April 2012, the decision on whether to introduce a mandatory scheme in the UK had not been announced yet (www.defra.gov.uk/environment/economy/business-efficiency/reporting).

The **US** Environmental Protection Agency (EPA) issued in September 2009 a rule for mandatory reporting of GHG for suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and in general facilities that emit 25 000 metric tons or more of GHG emissions per year, starting in September 2011 (for year 2010). On January 11, 2012, EPA released for the first time GHG data reported from large facilities and suppliers across the U.S. economy for the year 2010 (www.epa.gov/climatechange/emissions/ghgdata/index.html).

[6] Data for 2009 were communicated directly by the Ministry of Environment, those for 2008 are available at www.env.go.jp/en/headline/file_view.php?serial=380&hou_id=1449.

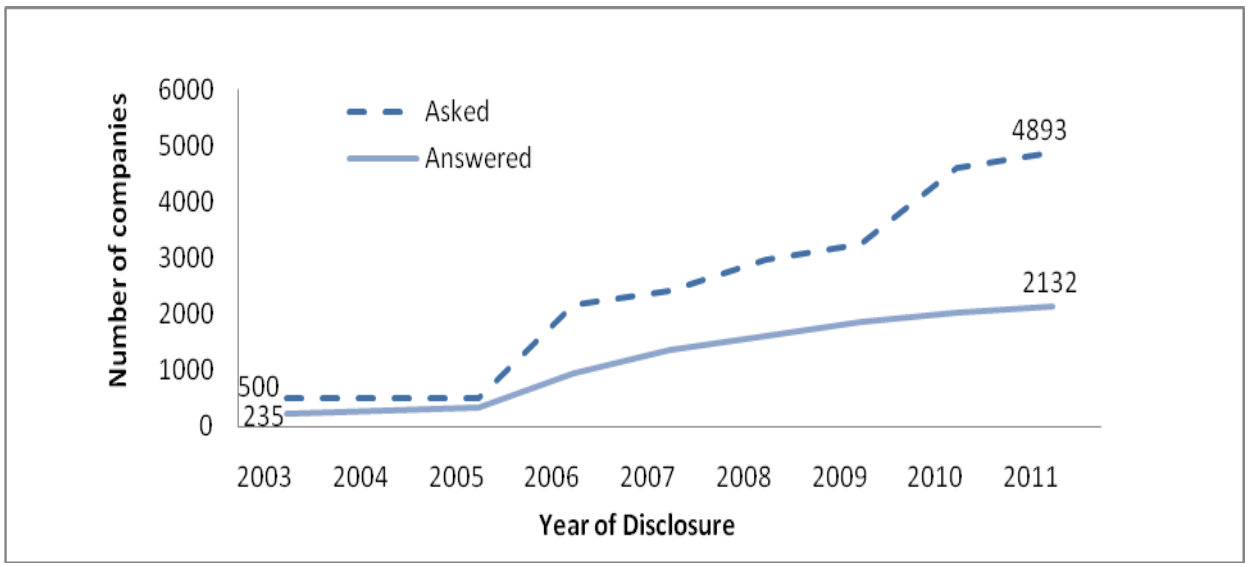
[7] See www.epa.gov/climatechange/emissions/ghgdata/index.html

[8] See www.epa.gov/climatechange/emissions/ghgdata/faq.html

Israel's Ministry of Environmental Protection established in July 2010 a voluntary Greenhouse Gas Registry, which now includes organisations accounting for 60% of the country's total emissions and includes financial institutions, supermarkets and Israel's electricity utility company. Another initiative is the Ministry of Environmental Protection's decision to establish a mandatory Pollutant Release and Transfer Register (PRTR) which will include information and activities on the energy use and inventory of pollutants and GHG emissions. According to the law, this registry will require 400 installations to report, beginning in April 2013. General Reporting Protocol and Reporting Guidelines ("Israel GHG Protocol") were published in December 2011 after a stakeholder consultation process, in order to provide guidance on measurement and reporting for companies participating and to create a clear methodology for the establishment of baselines in case emission reduction targets become compulsory. www.sviva.gov.il/Enviroment/Static/Binaries/ModulKvatzim/IL_GHG_Registry_Synopsis_Report_12-2011_1.pdf).

Beyond government reporting schemes, other initiatives by non-governmental organisations or the private sector have aimed to increase the transparency of climate change data in the public realm. Increasingly, companies report under non-governmental voluntary schemes, in addition to, or in the absence of government schemes. For example, the number of companies that supply climate change-related information in response to the Carbon Disclosure Project (CDP) questionnaire has increased from 235 in 2003 to 2132 in 2011 (CDP, 2012).

Figure 3. Voluntary Corporate Climate Change Disclosure (2003-2011)

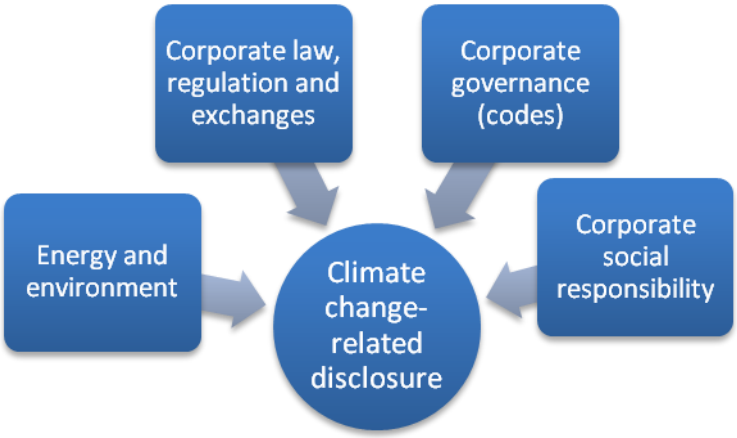


Source: CDP (www.cdpproject.net) .

Types of climate change reporting provisions

Climate change-related disclosure requirements arise from several sources and relate to information demands driven by different policy communities, including energy and environment, investment and finance, securities regulations, corporate governance and corporate social responsibility, among others (Figure 4).

Figure 4. Types of climate change disclosure provisions



Source: Authors.

A range of reporting schemes have been put in place by public authorities in the area of ***energy and environment*** (Environment or Energy Ministries, environment protection agencies and regulators). Mandatory emissions measurement and reporting is typically part of *emission trading schemes*, such as the EU ETS, for which specific Monitoring and Reporting Guidelines apply. In Japan, mandatory reporting is part of the 2005 Act on Promotion of Global Warming countermeasures. Other countries require (or encourage) reporting to raise awareness among companies about the need to contribute to climate change action and energy savings, and to make emission-related information available to other stakeholders, notably investors. Examples are the US EPA mandatory reporting system or Israel's voluntary Greenhouse Gas Registry.

Some evidence points to the fact that creditors and investors, as well as market analysts are starting to factor climate change information into their assessment of companies and their perspectives for sustainable development, although this remains a limited practice (see section below on Motivations for investors). In this context, both risks and opportunities created by climate change can add to or subtract from a company's valuation or credit worthiness. Investors aim to receive data that are essential to making informed investment decisions as well as to create pressure and engaging companies that do not report adequately. They tend to focus mostly on carbon-intensive sectors. In line with this, increasingly ***corporate law and securities regulations*** adjust to investors' demands by adding new requirements of disclosure and encouraging increased transparency, particularly within the field of risk management, while aiming to maintain such requirements sufficiently flexible, so that they will elicit appropriate disclosure of new matters.

A number of ***stock exchanges*** are also including climate change-related information as part of their listing requirements, particularly when the public authorities have not addressed investors' demands in the laws or the securities regulations. The Australian Stock Exchange (ASX) Listing Rule 3.1 requires disclosure of information "that a reasonable person would expect to affect materially the price or value of an entity's securities." ASX Corporate Governance Council's Corporate Governance Principles and Recommendations (2nd Edition), Principle 7 states that companies should establish a sound system of risk oversight and management. Commentary on Recommendation 7.1 states that material business risks may include operations, environmental and sustainability risks. In non-OECD member countries, stock exchanges are important drivers for climate change reporting in the absence of governmental climate change reporting provisions. For example, the Shenzen and Shanghai (China), Bovespa (Brazil) and

Johannesburg (South Africa) stock exchanges are playing an important role in requiring more transparency and disclosure of sustainability performance of companies (see Box 2).

Box 2. GHG reporting at Bovespa (Brazil)

Bovespa is the third largest exchange in the world by market cap: with 466 listed companies, about USD billion 13.5; and over 611 000 individual and corporate investors. It is Latin America's leader in equities, other securities and derivatives. Bovespa has made particular efforts to promote transparency and increased socio-environmental performance of listed companies. It has developed sustainability indices (general and sectoral), with special listing segments for markets for clean technology companies, carbon credits and other goods and services. It provides minimum listing criteria and has developed guidelines and recommendations for management and disclosure. In 2012 it created the NOVO VALOR ("New Value") Program to act as an umbrella of Bovespa's sustainability actions with the aim to promote the sustainable development of BM&FBOVESPA and capital markets, involving various audiences: investors, companies, brokers, etc. Also in 2010, it launched ICO_2 a "Carbon Efficient Index" Stock index together with the Brazilian Development Calculation, based on companies' free floats and emission coefficients. The Index is weighted by companies' GHG emissions. The starting point is the portfolio of IBrX-50, which was launched at COP 16, in Cancun (2011). Adherence to the index is voluntary. Of the 60 firms that were invited to adhere, 49 did. Approximately 74% of the companies on the IBrX-50 now report emission data for scope 1 and 2.

Source: Presentation by S.C. Favaretto , www.unctad.org/meetings/en/SessionalDocuments/1.1dite_edb_SoniaFavaretto_en.pdf.

Corporate governance and extra-financial reporting provisions, which are generally developed by supervisory authorities or ministries, explicitly or implicitly require organisations to disclose climate change-related information in annual securities, company reports or financial filings, particularly in relation to risk management and strategies. In the UK, the Companies Act 2006, section 417 incorporates into law the provisions on environmental reporting under the EU Accounts Modernization Directive. Listed companies (except those qualifying as small companies) are required to report in their Business Review (equivalent to the management commentary) information on environmental matters and their impacts to the extent necessary for an understanding of the business. In the U.S., since 2010 the Securities and Exchange Commission has provided companies with "interpretive guidance" to decide when and whether to disclose matters related to climate change, particularly in relation to instances where companies could be helped or hurt by climate-related lawsuits, business opportunities or legislation.[9] Many of these corporate governance reporting requirements are still at initial stages of development, in part as a reflection of the degree of evolvement of risk management and reporting in general, particularly due to the lack of a more uniform approach to risk disclosure generally (see Box 3).

Box 3. Corporate governance and risk

Risks can be classified in many different ways and will affect individual companies in unique ways that will vary over time. This makes risk management both vital and challenging. The recent financial crisis uncovered extremely deficient risk oversight and management practices even in highly sophisticated corporations. In many cases risk was not managed on an enterprise basis and not adjusted to corporate strategy, as risk managers were often kept separate from management and not regarded as an essential part of implementing the company's strategy. Moreover, boards were in a number of cases ignorant of the risk facing the company. With risk poorly disclosed within companies, there was little that shareholders could have done to prevent some of the collapses. As it has been pointed out by ACCA (2011), "it is hard to believe that the risk of excessive sub-prime lending and the lack of forecast of flat-lining property prices were transparently disclosed, as these issues might have affected a company's share price. If annual reports are to achieve their objective of giving the reader a view of the company 'through management's eyes' this information should have been disclosed." (ACCA, 2011, p. 3)

[9] See www.sec.gov/rules/interp/2010/33-9106.pdf

Risk oversight and management is integral to corporate strategy not just in companies avoiding losses but also in being able to seize new opportunities. The OECD Principles of Corporate Governance ask the board to set the degree of risk that the company is willing to embrace (both from an appetite and a tolerance point of view) in pursuing its goals, as well as to oversee how the management handles day-to-day risks in line with those guidelines. In a large number of jurisdictions these issues are dealt with in national corporate governance codes, as it is the case with the NYSE code, the UK's combined code and the French AFEP-MEDEF code. Internationally, professional institutes and associations also offer their advice. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) published and internal control – integrated framework guide in 1992, and an enterprise risk management (ERM) – integrated framework guide in 2004. In 2009, the International Organization for Standardization issued its standard for implementation of risk management principles, ISO 31000, which has become de-facto the world standard. The purpose of ISO 31000 is to provide principles and generic guidelines on risk management that could achieve convergence from a variety of standards, methodologies and procedures that differ between industries, subject matters, and countries.

Despite the move towards convergence, corporations developing their risk management and oversight practices still face challenges, such as linking risks to strategy; better defining risks; developing corporate responses to risks that manage to address all five key dimensions (strategy, people, detail, tasks, and drivers); effectively considering stakeholders and gatekeepers concerns; and addressing all these issues from a whole-enterprise perspective (Anderson, 2009). These are all difficult issues that require practice and cumulative knowledge.

Principle V.A.6 of the OECD Principles of Corporate Governance calls for disclosure of material information on foreseeable risk factors and the annotations go on to note that "disclosure about the system for monitoring and managing risk is increasingly regarded as good practice". Research about the major economies of the OECD suggests that the readability of risk disclosures is difficult or very difficult and that there is generally no consistent global set of generally accepted risk management accounting principles and additional guidance available for risk disclosures in the annual report (Van Manen, 2009).

Often reporting of climate change-related information shares the same structure as other forms of non-financial disclosure, i.e. disclosure of environmental, social and governance (ESG) issues, and is part of ***corporate social responsibility*** reports. According to international corporate reporting standards, as reflected in the *OECD Principles of Corporate Governance*[10] and the *OECD Guidelines for Multinational Enterprises*,[11] enterprises should ensure that timely and accurate information is disclosed "on all material matters regarding their activities, structure, financial situation, performance, ownership and governance." The Guidelines further state that disclosure policies should include "material information on … foreseeable risk factors" (OECD Guidelines for MNEs, Chapter III, Disclosure). The Commentary to the Disclosure chapter explains that "the Guidelines also encourage a second set of disclosure or communication practices, in areas where reporting standards are still evolving, such as for example, social, environmental and risk reporting". This is particularly the case with GHG emissions, as the scope of their monitoring is expanding to cover direct and indirect, current and future, corporate and product emissions…"

Denmark is among the few countries which make reporting of corporate responsibility policies mandatory. Under Section 99a of the Danish Financial Statements Act, large companies with balance sum above EUR 19 million, revenues above EUR 38 million and more than 250 employees, are required to report on their policies on corporate social responsibility, if they have any such policies. Approximately 1100 companies are subject to this law. The reporting is to be done in the management review, supplementary review to the annual report or business web site, individual report, UN Global Compact or Principles for Responsible Investment (PRI) report. The reporting requirements concern the contents of CSR policies, their implementation and results (self-evaluation). Company policies for reducing the company's impact on

[10] See www.oecd.org/document/49/0,3746,en_2649_34813_31530865_1_1_1_1,00.html

[11] See www.oecd.org/department/0,3355,en_2649_34889_1_1_1_1_1,00.html

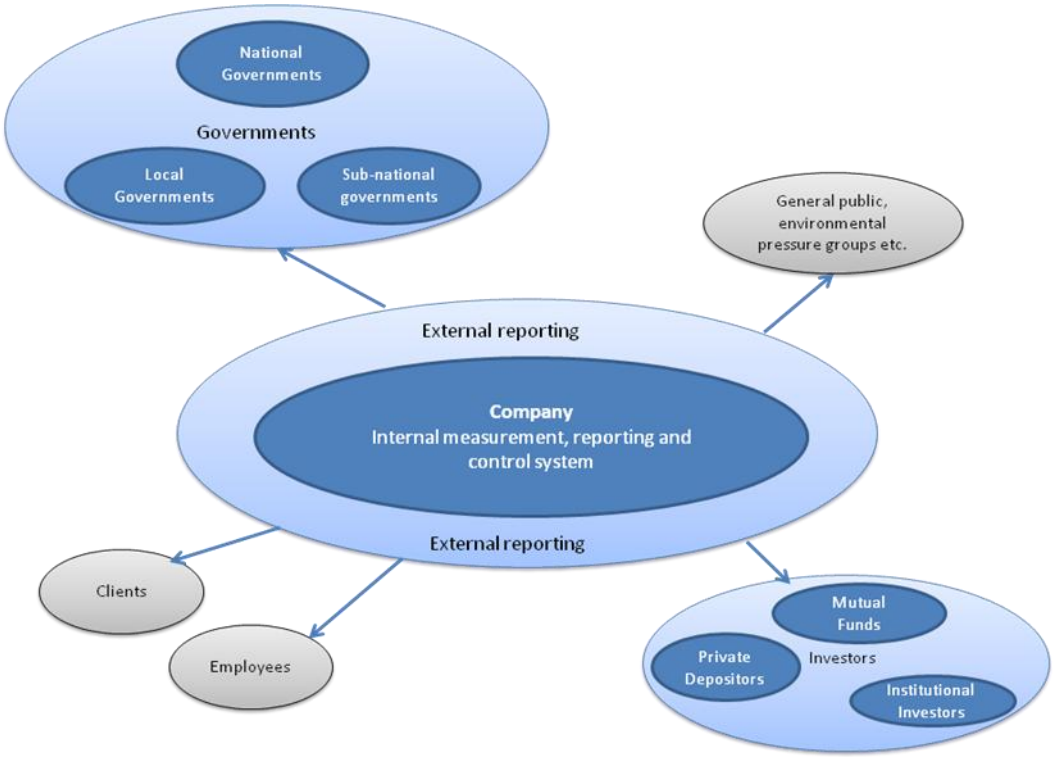
climate change has recently been introduced as a new mandatory issue on which companies have to report (Kirkelund, 2012).

In some cases, various reporting demands may overlap, and a case can be made about the need for coordination at the domestic level between the different entities responsible for these requests. Access to information needed for environmental or energy policy making purposes could be facilitated if requested in coordination with the securities regulations' scope and timing for corporate reporting, making the same disclosure relevant for different stakeholders. In New Zealand, for instance, there is an effort to consolidate ex-post the GHG reporting requirement coming from the NZ ETS and the GHG inventory requirement by examining how this information might be shared so that only one return is required.

MOTIVATIONS FOR CLIMATE CHANGE REPORTING AND ASSOCIATED CHALLENGES

Across the range of government and non-governmental climate change reporting schemes, the main actors involved in reporting, synthesising and using GHG information are governments, companies and investors. These three groups are far from homogeneous (Figure 5), and their motivations for participating in reporting schemes may arise from different informational needs which are examined in this section. Additional actors may also be involved, such as employers, civil society, (e.g. environmental pressure groups); customers and clients.

Figure 5. Key actors in corporate climate change-related reporting



Source: Authors.

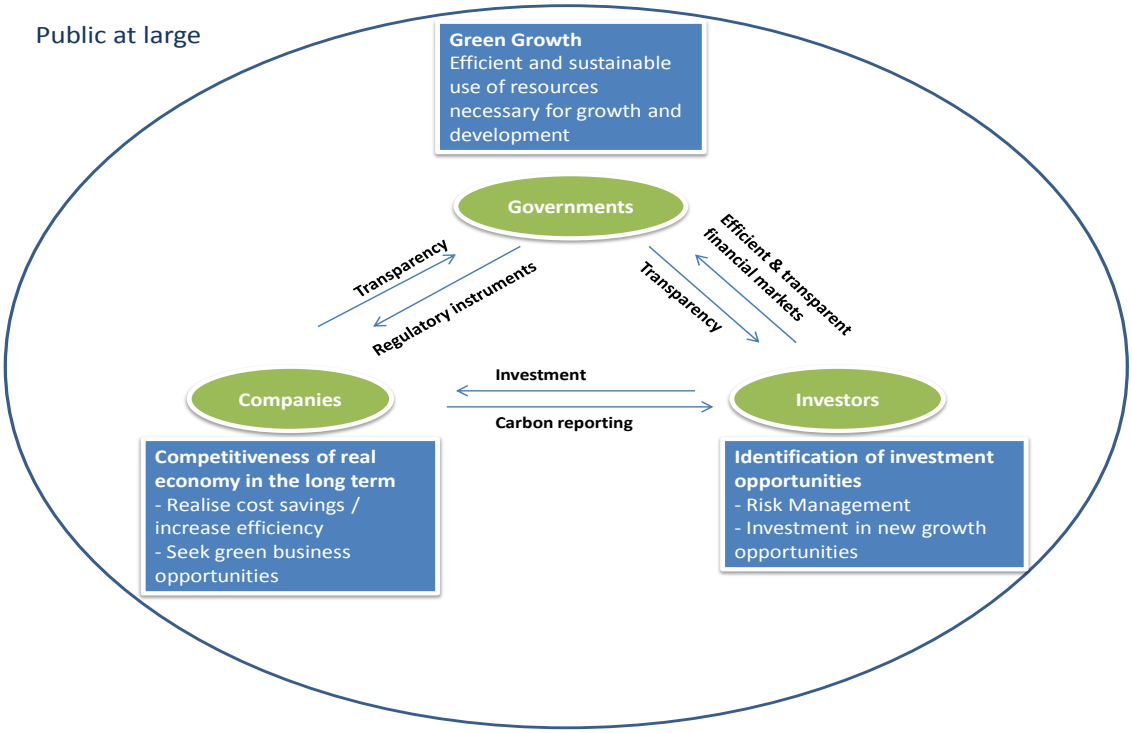
Governments have a key role to play in developing the necessary public policies to address existing market failures which result in insufficient action to take the "price of carbon" into account. One tool is to request companies to be more transparent on their use of energy and emissions produced in their operations.

Companies put in place internal GHG emissions measurement, reporting and monitoring systems in order to respond to their internal information needs and to satisfy a variety of stakeholders who demand access to this information, including shareholders, regulators, commercial partners, investors and financial institutions, and consumers.

Investors are often seen as a "key point of leverage", because of their strategic role in the broader field of corporate governance and social responsibility and, in particular, because of their monitoring function

(Kolk, Levy, & Pinkse, 2008). An indication of this is the fact that the number of investor initiatives promoting climate change disclosure has steadily increased over the last 20 years. In particular, the following initiatives encourage companies to render climate change-related information public: the UN-backed initiatives UNEP Finance Initiative (launched in 1991), the Principles for Responsible Investment (PRI, launched in 2006), the independent not-for-profit organisation Carbon Disclosure Project (CDP, founded in 2000), CERES' Investor Network on Climate Risk (INCR, launched in 2003), the Investor Group on Climate Change (IGCC) and the Institutional Investors Group on Climate Change (IIGCC).

Figure 6. Multiplicity of motivations and needs for corporate climate change-related information



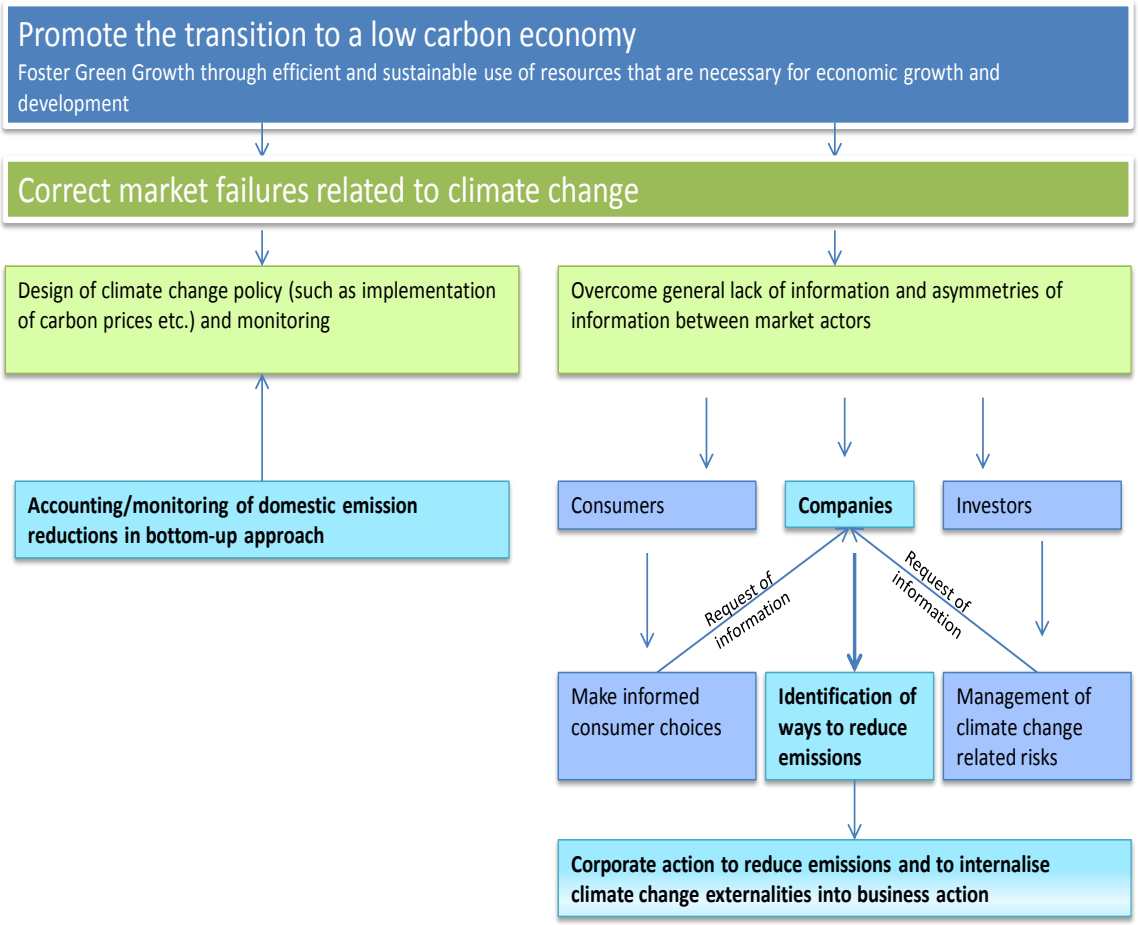
Source: Authors.

Motivations for governments to request corporate GHG information

Addressing market failures

The OECD Green Growth Strategy highlights the market failures that prevent actors from taking climate change into account in their decision-making and strategic behaviour. The market failure manifests itself in the absence of any means to quantify or monetise the costs and benefits of mitigation and/or adaptation to climate change and in information asymmetries between market actors. In a situation of imperfect information, the medium to long term risks and value drivers are likely to be either over- or under-evaluated by the different market actors, undermining the effective functioning of market. The 2007 report on the Economics of Climate change (the "Stern report") highlights that even when measures to reduce emissions are cost effective, there may be barriers preventing action, such as lack of information, transaction costs and organisational inertia. Therefore, complementary policy is needed alongside pricing instruments to ensure cost-effective emissions reduction.

Figure 7: Government drivers to promote disclosure of corporate climate change-related information



Source: Authors.

A lever for action

One important tool for governments to encourage actors to reduce emissions in general and to use energy and other resources efficiently is to increase transparency and awareness about the way in which corporate and consumer behaviour affects and will be impacted by climate change. Requesting companies to report GHG emissions and related information is one way to achieve this. The UK qualifies this "lever" effect in the impact assessment of alternative regulatory options carried out in 2011 (DEFRA, 2011a): "GHG emissions contribute to damaging climate change, but those responsible do not face the full cost of that damage (…). The aim of encouraging GHG reporting is to achieve behaviour change by giving organisations the information and tools to reduce emissions, and, by encouraging consistency in disclosure, to provide investors and shareholders with relevant information." Similarly, one of the aims of the mandatory GHG Accounting and Reporting System of Japan is to "publicly announce and visualize information on GHG emissions to encourage and motivate the general public and business operators in general to take voluntary actions" (Japan, Ministry of the Environment, 2012).

Carbon reporting schemes can thus be used as a lever to incite action on the part of businesses. Once a company has identified the level and sources of its emissions (a prerequisite to reporting), it has a more

reliable basis on which to decide whether and how to reduce them, if economically efficient (OECD, 2010). A review carried out by the UK government to evaluate the contribution of GHG emissions reporting to the achievement of the Government's climate change objectives confirmed the existence of a lever effect.[12] In practice there seems to be a strong link between GHG emission reporting and the development of a corporate climate change strategy. In many cases prerequisites for corporate climate action are, however, senior management commitment, corporate target setting, a belief that it is an ethical imperative, and brand building.

Governments do not only put in place carbon reporting provisions in order to directly incentivise companies to identify ways to reduce emissions, but to do so also indirectly, by incentivising other market actors, such as customers and investors, to request companies to disclose their climate change-related information. For US EPA, the GHG emission information published in the GHG Reporting Program database can "be used by communities to identify nearby sources of greenhouse gas emissions, help businesses track emissions and identify cost- and fuel-saving opportunities, inform policy at the state and local levels, and provide important information to the finance and investment communities."[13] Japan has similar motivations ("provide information to investors and people, promote life-style improvement").

Design of Climate Change Policy

Governments also develop carbon reporting provisions to compare and assimilate data to inform future policy (PWC & CDP, 2010). While they are generally not used to aggregate emissions at national level, corporate emission data can prove an important source of information for the development of climate change policies. In particular governments wishing to implement carbon taxes or energy taxes can use corporate information on direct and indirect carbon emissions to estimate tax bases of carbon and energy levies. In Korea, the Basic Act on Low-Carbon Green Growth requires energy-intensive companies and/or companies emitting GHGs over a certain amount to report their emissions and energy consumption to the government. Based on the information that is collected, the government will decide over the cap of the forthcoming cap-and-trade scheme and allocate GHG emissions limits to major facilities (UNEP, 2010). According to US EPA, the GHG Reporting Program "serves as a useful tool to improve the overall accuracy of the US GHG inventory".[14]

Challenges for governments

One of the main challenges for governments is to ensure that the information provided by companies is timely, reliable and relevant, in order to be credible to external shareholders (typically consumers and investors), and that reporting schemes are widely applied. According to GRI (2011), a critical mass of sustainability information is needed to properly inform markets and enable performance benchmarking and analysis**.** Also, a**s** long as only a minority of companies report, there is a risk that sustainability information is not taken seriously and that its quality remains low.

In this context, government reporting requirements have the benefits of levelling the playing field for all companies involved and of clarifying government's expectations in terms of targeted companies, requested information and methodology. At the same time, any regulation has costs (e.g., administrative costs of rolling out the regulations and ensuring enforcement) and risks of implementation failure. Countries are increasingly aware of, and taking into account, regulatory costs and risks when developing new

[12] This evaluation was part of the requirements placed on the Government before deciding whether to put in place mandatory reporting schemes by April 2012 or not (DEFRA, 2010). See PWC & CDP (2010).

[13] See http://epa.gov/climatechange/emissions/ghgdata/faq.html

[14] See http://epa.gov/climatechange/emissions/ghgdata/faq.html

requirements. Typical regulatory policy tools include regulatory impact assessment that identifies and quantifies the expected costs and benefits from rolling out a specific regulation and consultation with stakeholders.[15] Those generic tools (used by governments in any policy area) have been intensively used by the UK government (DEFRA) in relation to the decision of whether to make carbon reporting mandatory or not. Consultations with companies were organised in the summer of 2011.[16]

This experience and others show that governments face several scenarios with different benefits and risks, and various trade-offs, when considering the development of disclosure requirements. Governments have to decide whether to implement voluntary or mandatory reporting frameworks (e.g. the mandatory NGER reporting framework in Australia or the former voluntary US EPA Climate Leaders Program) or whether they simply want to provide guidance on reporting methodologies (e.g. the UK's "Guidance on how to measure and report your GHG emissions"). In voluntary schemes enforcement and compliance may be rather weak. The incentives that corporations face to reveal or conceal emissions in voluntary reporting schemes (i.e. under- or over-reporting) depend largely on their expectations of future policies (OECD, 2010). Typically, expectations of future regulations that will reward early-actors may provide incentives for disclosure. By contrast, unclear messages from government on future regulations or major changes in reporting methodologies may discourage early movers from investing in a specific reporting infrastructure (methodology, information gathering processes…) and generate a *wait-and-see* attitude on the part of companies.

Other variables in the development of government reporting schemes are the coverage of the scheme (type of organisations covered, GHG emission threshold, boundaries) and scope of information requested (scope of emissions, additional climate change information). Here there is a trade-off between the comprehensiveness of the information that is requested, the costs for companies to gather this information, and for administrations to process it. In the case of emission information for which the methodology is not fully stabilised, or for which there is an issue of control or influence of the company (typically the case of scope 3 emissions), the challenges of ensuring the quality of reported information may still be too great to justify the benefits of a mandatory scheme.

Governments need to make sure that reporting does not constitute an excessive burden on companies. Under the New Zealand ETS (NZ ETS), regulations set out how participants must measure their emissions. After wide consultations in 2006-2009 the methodologies and approaches developed in these regulations became much simpler and aligned with the IPCC methodologies (in most cases). The NZ ETS only started operating very recently (stationary energy and industrial processes are only in the 2nd year of participation). However, a few unanticipated operational issues have already appeared. For example, some companies are required to submit two returns to the government, with almost exactly the same information in each return. One is for the GHG inventory purpose, and the other is for the NZ ETS. The government is currently examining how this information might be shared so that only one return is required, as part of a wider effort to minimise the burden for businesses reporting information to government.

In the case of other types of information (scope 1 and 2 emissions for instance) where the methodology is becoming more and more mainstreamed, a further decision for governments is whether to impose verification requirements and, if so, at what level (self certification, external verification…). Again, on the one hand, credibility of the information will increase with the level of assurance, but so will the costs. In particular, there are costs associated with the administrative burden of developing the necessary verification protocols and inspection capacity, although there are ways to manage administrative costs for

[15] On general trends in the use of regulatory policy tools, see OECD (2011c).

[16] The results are available at www.defra.gov.uk/consult/2011/05/11/ghg-emissions). An impact assessment assessing the costs and benefits of different regulatory scenarios was carried out and is available at www.defra.gov.uk/consult/files/110511-ghg-emissions-ia1.pdf

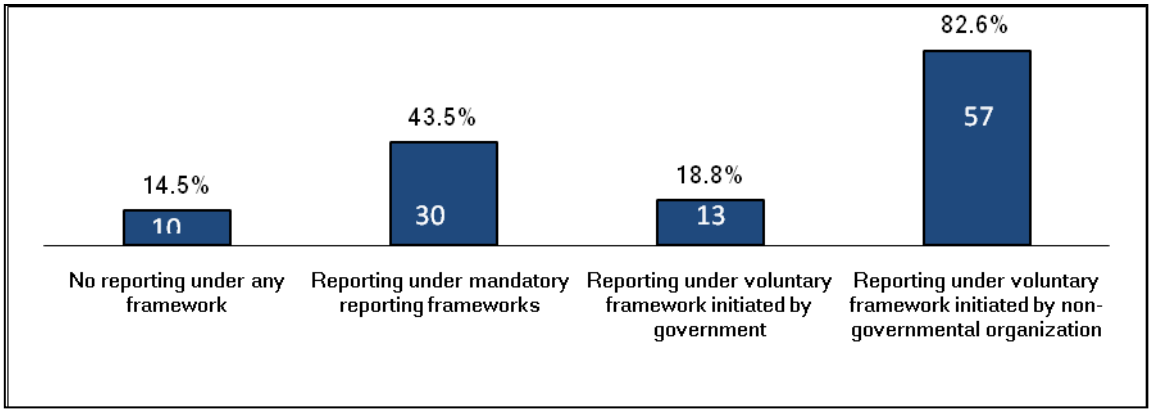
verification of data e.g. through the use of data sampling, as in the case of US EPA. However, assurance may be mainly needed when the level of emissions needs to be very accurate (for monetary valuation of emissions for instance, as in the case of a trading market such as the EU ETS which requires third party verification, or in the case of carbon taxes). In the case of voluntary programmes, countries may still seek to incentivise the highest level of assurance, as is the case in Israel, where the voluntary GHG Registry is expected to provide different levels of award certificates for participants based on whether the reported emissions have been verified (Israel Ministry of Environment, 2011).

Finally, underpinning this discussion is the use of the corporate information by the government. Important challenges are to ensure the efficient use of the information received from companies, and the coordination between the different government agencies involved in different carbon reporting schemes.

Motivations for companies to measure and report GHG emissions

In the absence of mandatory reporting requirements, companies may still be incentivised to collect climate change information, in order to identify business risks, areas of potential costs savings and new business opportunities. The 2012 OECD company survey reflects this trend: 83% of responding companies report under voluntary measures, while only 44% report under mandatory schemes (Figure 8). This may indicate that reporting under voluntary reporting schemes can provide first-mover advantages and other benefits to companies, as well as a good opportunity to prepare for expected regulation.

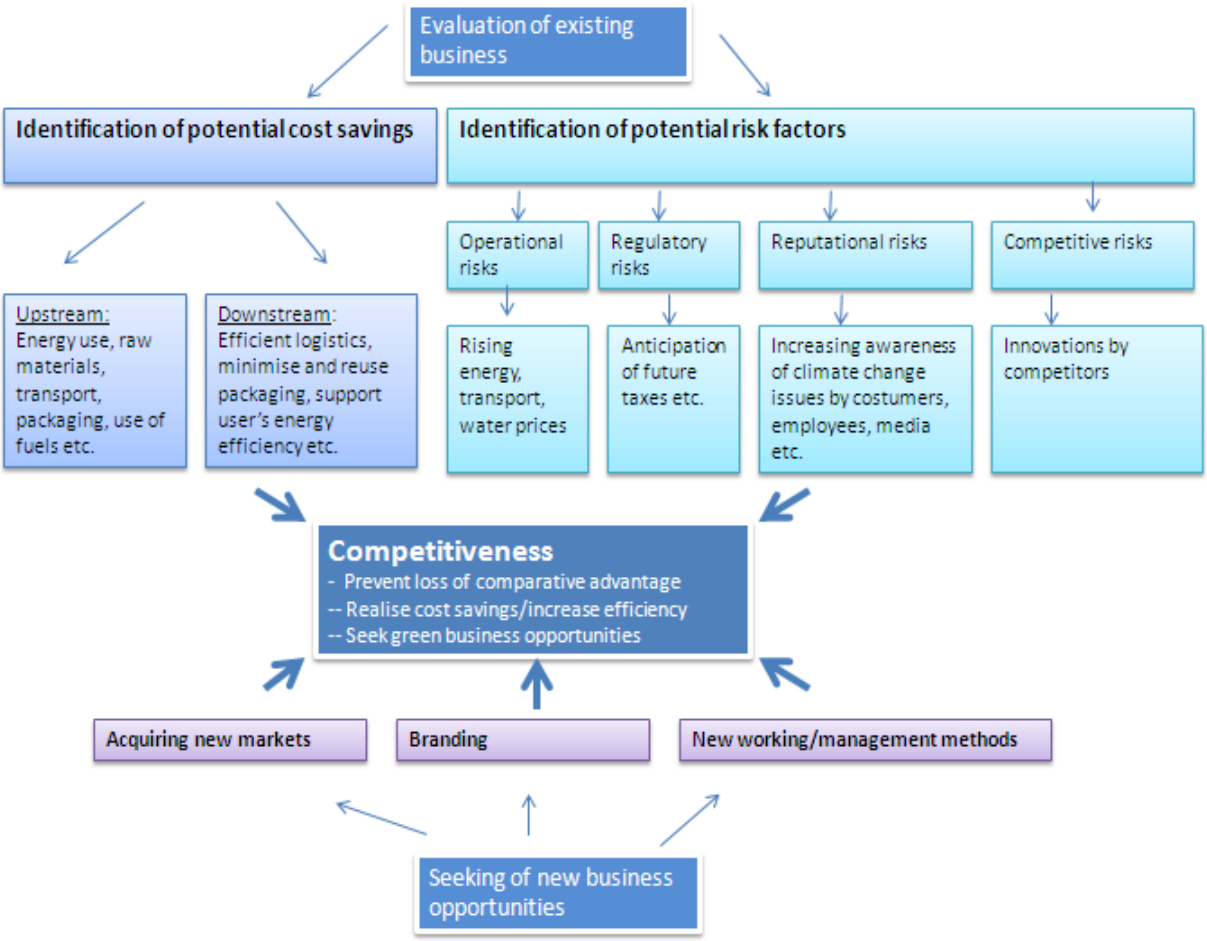
Figure 8. Carbon reporting frameworks



Source: OECD Survey (2012).

For companies, the motivations to address climate change and report on their actions depend on their size, location and sector. Ultimately, however, companies seek to increase or maintain their competitiveness in changing markets, i.e. address risks and costs, while searching for new business opportunities and niches. Figure 9 illustrates these three dimensions in relation to GHG emissions: identification of potential costs savings, identification of potential risk factors and seeking of new business opportunities.

Figure 9. Companies' motivation to measure and report climate change-related information



Source: Authors.

Identification of potential cost savings

Identifying opportunities for energy saving is a major driver for preparing carbon inventories in the absence of regulatory pressure (OECD, 2010). In its analysis of environmental disclosure practices of companies listed on the London Stock Market and FTSE All-Share, a market capitalization weighted index, the Environment Agency finds that for the majority of companies the most significant share of GHG emitted is carbon dioxide from energy consumption (The Environment Agency, 2011). Measuring and reporting energy use and the resulting CO_2 emissions is thus often a starting point for companies' efforts to identify sources of GHG savings and reduce emissions.

Depending on the industry, other cost savings may be realised upstream and downstream of the corporate value chain. Upstream saving potentials include those associated with raw materials, transport, packaging and manufacturing. Ways to realise them are to find substitute materials, use recycled content, optimise transport, change transport modes, use alternative fuels, and reduce packaging. Downstream possibilities are efficient logistics, minimisation and reuse of packaging, support of the users' energy efficiency, use of recyclable material, and promotion of recycling (OECD, 2010).

Identification of potential risk factors

Growing concerns in relation to the risks that climate change may carry for business is reflected in the responses to the OECD 2010 survey, with 59 of the 63 respondents assessing the risks that their company faces in relation to climate change. The survey also provides an indication that the most important risk factors that companies assess are (in this order): operational risks (i.e. risks from impacts on operations of rising energy and transport prices, change in demand and consumption pattern), regulatory risks (i.e. the risks related to the tightening of national and international regulations), reputational risks related to consumer perception, and competitive risks from loss of advantages *vis-à-vis* competitors. The assessment of these risks is important to develop internal strategies to protect the business activity against them (Agrawala *et al*, 2011). External reporting is also essential to inform investment and consumption decisions.

Seeking new business opportunities

Climate change-related regulatory requirements or societal demand on companies are not always considered by companies to be constraints. Some companies see them as new opportunities to reorganise the way they conduct their business and to acquire new market shares and niches. New commercial opportunities are associated with the development and marketing of 'green' products and the green branding of existing products, which is estimated necessary in order to respond to changing consumer preferences. This implies a transition to low emission production processes. Moreover, customers consider it increasingly important to establish a secure and reliable, and therefore climate-resilient, supply chain (CDP, 2010). CDP observes "a shift in emphasis from an approach dominated by risk to one that also embraces opportunity, with nearly nine in every ten respondents identifying significant opportunities arising from climate change, whether as a result of regulatory, physical or commercial drivers" (CDP, 2010).

Challenges for companies

Companies putting in place and maintaining carbon disclosure systems also face costs that may in some cases not be outweighed by the benefits. As the 2012 company survey shows, the main costs for companies are those to set up the measurement system (75% of the responding companies identified this aspect to be important), staff costs (70%) as well as costs associated with the maintenance of a reporting system (65% of respondents). Costs and benefits of carbon reporting depend very much on the size of the company, the level of emissions and the degree to which climate change issues are material within the particular business context of a company. Depending on these factors costs related to carbon reporting may be regarded as more or less excessive or even prevent companies from reporting (for example in the case of SMEs, see Box 4). The OECD survey shows that most reporting companies do not carry out a cost-benefits analysis of measuring and reporting GHG emissions (72%). This is most likely attributable to the complexity of quantifying these costs and benefits. As a consequence, the business case for corporate reporting remains elusive, mainly based on a qualitative assessment of the materiality of GHG, and largely driven by individual leadership within companies.

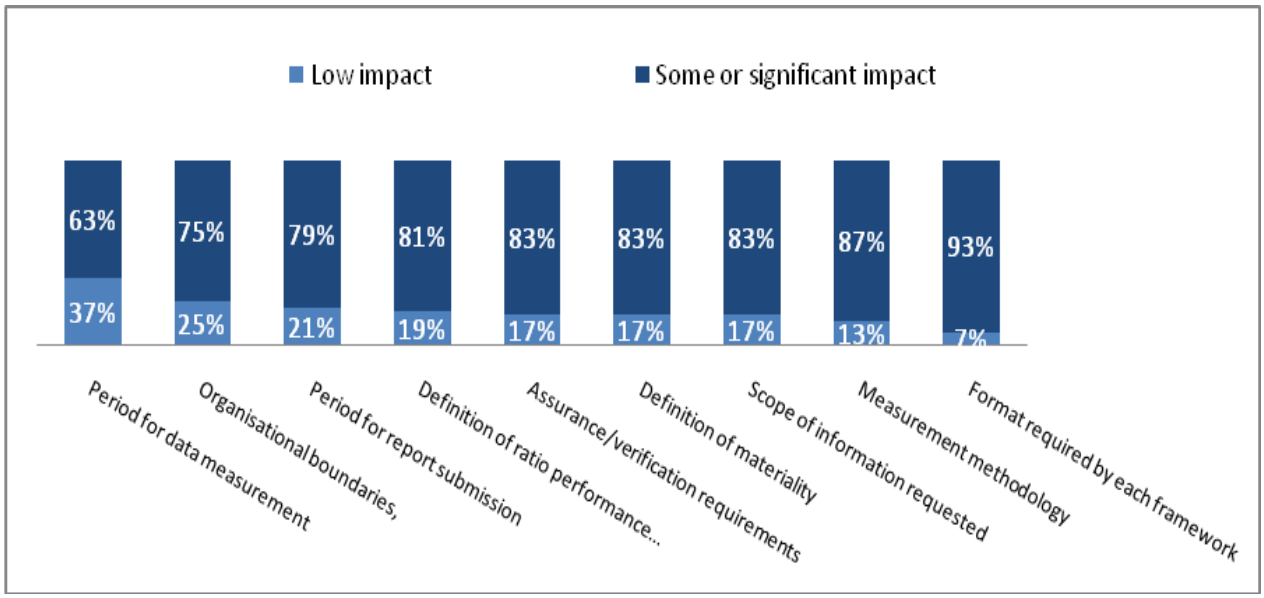
Box 4. Why some companies do not report

PWC & CDP (2010) found that the main reason for companies not to report is the lack of adequate infrastructure to gather data across different parts of the business operations. This is especially the case for small companies and those that share premises with other organisations. SME also often face a lack of resources, time and know-how. Another barrier to reporting is the lack of consistency between reporting schemes as well as between existing methodologies. Companies may also have doubts about the advantages reporting can bring to the organisation, especially if competitors or customers do not report either.

Furthermore, companies may prefer other ways of communicating on environmental issues. They may also fear that the company's reputation could take damage or that legal implications could arise from it. Reporting may also "wake up sleeping dogs" (such as environmental organisations)" Kolk (2010).

Out of 69 responding companies in total, 6 companies which responded to the 2012 OECD company survey declared that they currently do not report their GHG emissions. Among these, 4 companies indicated that lack of know-how was the reason for not reporting; 3 companies mentioned the fact that climate change does not impact their business in a material manner.

Figure 10. Impacts of divergences between existing schemes



Source: OECD company survey (2012).

Companies also struggle with the assessment and the use of generated climate change-related information because of the uncertainty that exists regarding the stringency and scope of future regulation, the relative absence of widely recognised risk assessment models, and the uncertain use of this information by investors and shareholders. Inconsistencies between existing methodologies and reporting requirements in different schemes around the globe may also create additional costs for companies. This is potentially an issue for multinational enterprises (UNCTAD, 2010, 2011). The 2012 OECD company survey asked those companies that report under different reporting schemes to rank the impact of the different sources of inconsistency. The responses indicate that the highest impacts are linked to the different formats required

by different reporting frameworks, different measurement methodologies, and differences in the scope of requested information (see Figure 10).

Some companies have expressed their frustration about the fact that their efforts to measures GHG emission and collect other climate change related information, and invest time and resources in reporting has no real impact on investors' evaluation of their performance. It is also argued that some investors are more concerned about the existence of a report than about its content, and assume a check-the-box approach to GHG reporting by investee companies. Accordingly, companies would also be commended if their report is detailed and "professional looking", regardless of whether it is actually influencing the business decisions of the company and its risk management or not. As a result, it is often difficult for those in charge of sustainability within a company to maintain the interest of the Board in the issue. Another important challenge for companies is to know what type of information investors actually need, and to understand how they use it. Most government reporting mechanisms require companies to report on their GHG emissions. Investors however seem to seek mainly information to assess the company's performance, as well as climate change related risks and opportunities (WBCSD, 2012).

There are also internal challenges, such as those related to the most efficient use of climate change-related information within their corporate governance structure. This implies, in particular, that the information is used by the decision makers, typically at CEO level, when defining the overall strategy of a company. In general, the CEOs of companies that are subject to a carbon price through regulation (such as those companies in the electricity and industrial sector under the EUTS) or have calculated an internal shadow carbon price, seem to take into account this information in their decision-making. However, according to experts participating in the OECD workshop organised in preparation for this report, on average companies have not internalised the preparation and use of climate change information into their corporate governance frameworks yet. This information is not often considered to be an indispensable item for informed executive or board decision making, despite the implications it can have in the long term value of the company (OECD 2012 workshop). Nevertheless, good practices in terms of corporate governance have started to emerge in recent years, as reflected in Box 5.

Box 5. Use of climate change-related information and corporate governance principles

CERES, a network of investors, environmental organisations and other public interest groups working with companies with the mission to integrate sustainability into capital markets, has analysed and developed guidance for the use of material information within corporate governance structures. In particular, CERES has developed a corporate framework for climate change governance. One factor is that the board has explicit oversight responsibility for environmental affairs, including climate change, conducts periodic review of climate change targets and monitors progress in implementing strategies. Assigning a board member or committee to oversee climate change risks and strategies increases the likelihood of a proactive response to the potential regulatory, financial, reputation and legal risks posed by climate change, as well as the effective exploitation of business opportunities.

This is in line with the OECD Principles of Corporate Governance, which define among the key responsibilities of the board the review of and provision of guidance on the corporate strategy and the setting of the degree of risk the company is willing to accept in pursue of its goals. The OECD Principles also stipulate that the board must ensure the integrity of the company's accounting and financial reporting system, as well as compliance with relevant laws and standards. To do so, the board needs to ensure that there is appropriate oversight by management, for example, through an internal audit system that reports directly to the board.

In terms of the role of management, CERES proposes that a sound climate change reporting system involves a Chairman/CEO who is in charge of articulating the company's views on climate change and GHG control measures; key executive officers who monitor climate change and manage response strategies; and compensation schemes that are somehow linked to attainment of environmental goals and GHG targets.

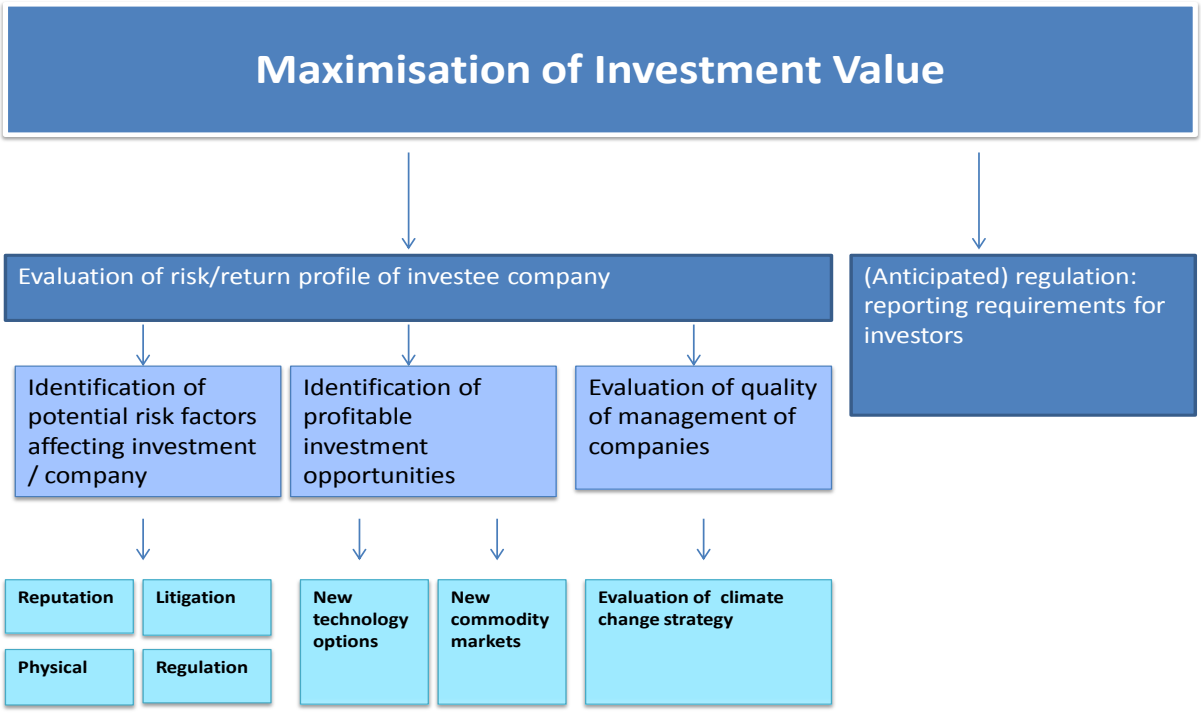
Source: CERES (2006, 2008)

Figures on board and management level involvement in climate change plans vary. Of the 63 companies from the technology and consumer sectors reviewed by CERES (2008), only 15 had tasked board-level committees with environmental oversight and 7 had their CEO taking leadership roles on climate change initiatives. According to CDP (2010), 80% of responding companies among the Global 500 have a board level executive responsible for climate change. A 2009 survey by Goldman Sachs of 800 global companies revealed that around 60% of the companies have established board or senior management responsibility of their companies' climate change performance (UN Global Compact; Goldman Sachs, 2009). Examples of company frameworks include Nike's Corporate Responsibility Committee, Applied Materials' strong CEO leadership in the internal steering committee on sustainability and climate change and Dell's Sustainability Council led by the Corporate Sustainability Director (OECD, 2010). Rio Tinto, a mining and resources group, has set up a Climate Change Leadership Panel which includes board and senior executive members as well as a system for board or senior management level remuneration linked to its GHG emission and energy use efficiency (UNCTAD, 2011).

Motivations for investors

The ultimate objective for investors is to maximise their shareholder value. Increasingly investors consider that climate change has an impact on the companies in which they invest or consider investing, either because of the climate related risks to which the company is exposed (reputational, litigation, regulation and physical risks as discussed in the previous section), or because of the existence of profitable investment opportunities (such as new technology options and new product markets) as well as the quality of their management (Figure 11).

Figure 11. Investors' motivations to demand climate change-related information from companies



Source: Authors.

It is difficult to assess how investors actually use climate change related information, as information on investors' practices is scant, and sometimes contradictory. On the one hand, there is a general view that investors are increasingly interested in climate change factors for their investment decision-making (OECD 2012 workshop, WBCSD, 2012). While "niche" sustainability investors have been the main investor group analysing corporate climate data, there is a growing interest by mainstream investors in sustainability data for assessing corporate risk and opportunity. On the other hand, many companies do not have the impression that the climate change related information they produce is used by investors (WBCSD, 2012).

There is some evidence that a correlation between carbon reporting activity and company success exists. An analysis of the companies included in the Global 500, an index composed of the top 500 corporations worldwide as measured by revenue, carried out by CDP (2011) shows that companies that use climate change-related information for the definition of their internal strategy had returns from January 2005 to May 2011 that doubled the average of those in the index. Even though a clear causality cannot be established, this can be seen as an indication that the best performing companies consider climate change to be an important element of their business strategy.

As to what type of information investors use, there is also a variety of views. Investor climate risk assessments go beyond a company's measurement of GHG data to management's ability to recognise that climate change is happening; foresee the business implications of climate impacts and adaptation; take the appropriate steps to integrate climate risk and opportunity into business strategy; and to implement climate change in asset allocation strategies more broadly. Analysis therefore includes a combination of many sources, including Carbon Disclosure Reports (CDP), annual/sustainability reports; ratings; external research, etc. (WBCSD, 2012). Many investors (especially large ones) also request information directly from companies, either through specific requests, or through questionnaires (OECD workshop).

Regulation regarding investors' reporting requirements is emerging. In France, the Law *Grenelle II* requires that open-end investment funds and fund managers disclose the social and environmental criteria governing their investments. This is to be outlined in their annual report and in any other documents for their investors or shareholders.

Challenges for investors

Recent studies have found limited evidence of investors taking climate change-related information into account in their investment decisions (Haigh & Shapiro, 2011 and DEFRA, 2010). A study carried out by UNEP FI (Fischer, 2012) analysed the behaviour of 20 selected asset owners and found that they use climate change information if they invest in theme-typed funds (carbon leadership funds) or if they are investors that practice direct engagement policies. The integration of climate change-related information into investment decision making is therefore far from having become mainstream investor practices. Based on a literature review DEFRA (2010) identifies three broad categories of challenges that investors face: scope of information, quality of information and investor behaviour and incentives.

Another important issue for investors is the *materiality* of climate change information produced by companies. The OECD Principles of Corporate Governance (OECD, 2004) define material information "as information whose omission or misstatement could influence the economic decisions taken by users of information". In this regard, some investors argue that the information disclosed by companies does not allow assessing the financial implications for companies. Others claim not to have access to the information that really goes to the core of a company's business and focus rather on reputational issues (WBSCD & UNEP Finance Initiative, 2010). Some investors regard the reported information as "not forward looking". Moreover, as information is often provided for a multitude of stakeholders, it does not always fulfil the specific needs of investors (Sullivan, 2006).

Investors may not be able to correctly evaluate climate change risks. Reasons for this are significant uncertainties associated with the accounting and modelling of such risks, technological uncertainties, and uncertainties attached to government policies in the long run (UN Global Compact *et al*., 2009). The reliability of information may also be reduced in voluntary reporting schemes that do not require verification, such as CDP (DEFRA, 2010). Lack of reliability may also result from a lack of comparability of the data.

Investors' incentives to consider reported climate change-related information also depend on their investment horizon. Investors are a heterogeneous group of economic agents and are also unequally concerned about climate change. In a study analysing how investors consider climate change-related issues, ADEME (2011) distinguishes between the three types of investors: institutional investors, like insurance companies and pension funds, that invest on behalf of their clients in long-term assets (more than 5 years); mutual funds managed by asset managers that invest in short term assets (less than 1 year), and private investors (short or long term).

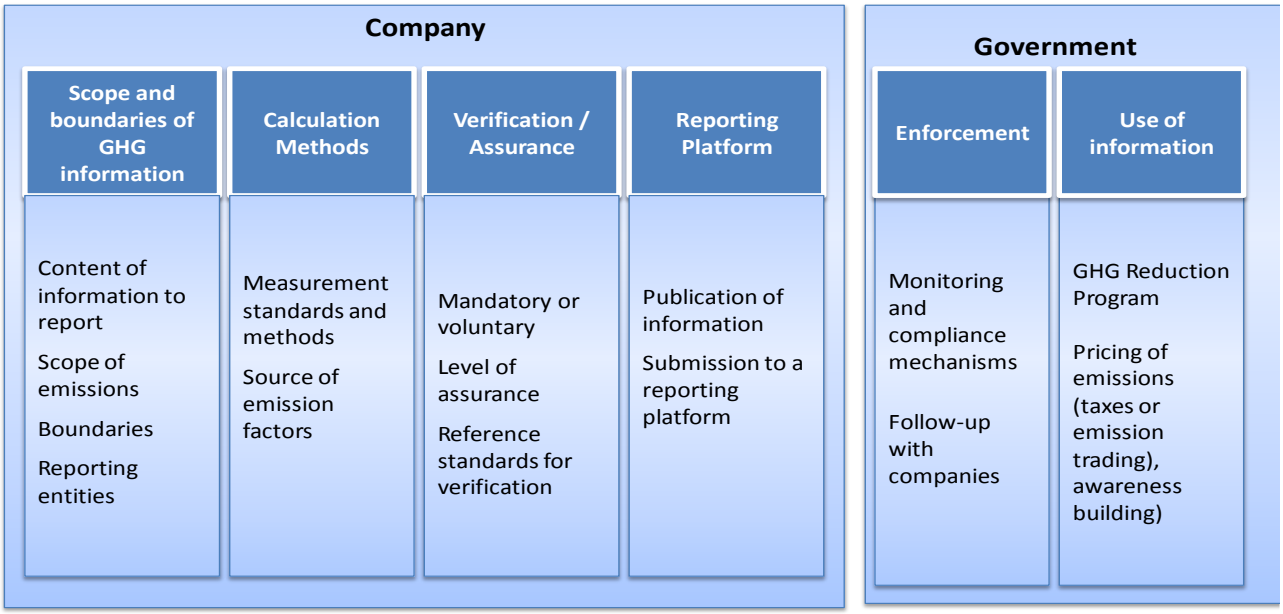
Short-term investors, i.e. those investors that hold their assets for less than a year (often even on a monthly or weekly basis) do not assume their assets to be affected by climate change over their holding period. A factor to consider is that average holding periods by institutional investors have declined around the world to under one year on average (OECD, 2011d). Climate change information is, in principle, most relevant for long-term investors, as climate change impacts on investment assets (including from carbon price and GHG regulation) are expected to occur in the medium and long-term.

There seems to be a general understanding that more needs to be done to increase awareness and understanding of sustainability among mainstream investors, and that more dialogue is needed between companies and investors to bring the relevant GHG and sustainability information to the attention of investors, and that they should not wait for them to ask for it. Moreover, this information needs to be presented in language investors understand, i.e. in terms of how it will drive business growth and address risk and opportunity (WBCSD, 2012).

BUILDING BLOCKS OF GHG REPORTING SCHEMES

All climate change reporting schemes are composed of similar elements or "building blocks", but there are sometimes significant differences in the content of these blocks. For the purposes of this analysis, a distinction is made between the reporting requirements affecting companies and those which require action by governments. The first category includes the following building blocks: scope and boundaries of GHG requirements; the methodologies to calculate emissions, requirements to verify the information to be reported, and the reporting platform to which the information is submitted. The second category includes mechanism used by governments to monitor compliance with reporting requirements and to follow up with companies; and the use that governments make of the reported information. The building blocks are described below. A table summarising the information for a number of government schemes and providing concrete examples can be found in Annex 1.

Figure 12. Building blocks of reporting schemes



Source: Authors.

Reporting requirements affecting companies

Scope and boundaries

Content *("What to report")*: The government schemes considered in this report request companies to report their GHG emissions. All of them require to report CO_2 emissions; some schemes also include other GHG (some of, or all the 6 "Kyoto gases"). Other types of information to be provided by companies include:

- a description of any plans or targets the reporting organisation has introduced to reduce or manage GHG emissions, as well as progress achieved toward these targets.

- information on the way in which the reporting organisation's business is affected by climate change and the strategies adopted to respond to the risks and opportunities it creates, including the resources and governance structures allocated to addressing climate change;

- the assessment of the risks and opportunities realised or anticipated by the reporting organisation as a result of climate change. This includes a description of the significant actions and plans that the reporting company is taking to manage them.

Scope of emissions and boundaries ("*How much to report*"). Regarding the scope of emissions, all systems require reporting of scope 1 (or direct) emissions, some also scope 2 emissions (emissions from energy use), and a few voluntary schemes encourage reporting of scope 3 (indirect) emissions.[17] Regarding geographical scope, these can be domestic (mandatory schemes are generally limited to emissions directly emitted in a specific territory) or broader (generally voluntary schemes require companies to report on corporate-wide emissions, including on scope 3 which can involve emissions produced outside of the country). The choice of organisational boundaries for GHG accounting has raised some debates. In trading schemes, measurement is typically done at facility level. In reporting schemes developed by countries to incentivise corporate action – typically the French *Grenelle II* scheme and the UK's regulatory scheme under consideration –, the measurement and reporting are done at corporate level. When accounting is promoted at company level, different possibilities for consolidating GHG emissions exist: operational boundaries, financial control or based on equity share.

Reporting entity and thresholds *("Who reports").* In general the different schemes require entities above a certain size (usually determined by number of employees or level of emissions) operating in certain sectors to report. Traditionally, only large emitters were required to report – this is the case in the EU-ETS, the first NRE Regulation in France, and the Japanese scheme. Most recent schemes, however, tend to favour a broader approach and include criteria related to the size of the companies. Under the French *Grenelle II* Law, for instance, all companies above 500 employees are requested to submit a GHG inventory.

Calculation and measurement methodology *("How to measure emissions")*

Another important building block is the methodology used to calculate emissions. While a wide range of standards, protocols, codes, principles and guidance on GHG emission measurement, reporting and verification have been developed by private and public sector initiatives around the world, the most widely used methodology is are the GHG Protocol and the ISO standard 14064-1 on which many other schemes rely. [18]

[17] Scope 1 GHG emissions are direct emissions from GHG sources owned or controlled by the company. Scope 2 GHG emissions do not physically occur from within the company reporting boundary and are therefore "indirect" emissions. Scope 2 emissions are caused by the organisations consumption of electricity, heat, cooling or steam. This category is often called "purchased electricity" because it represents the most common source of Scope 2 emissions. Scope 3 GHG emissions are a company's indirect emissions other than those covered in Scope 2, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc. They are from sources that are not owned or controlled by the company, but which occur as a result of its activities.

[18] www.ghgprotocol.org

Box 6. The GHG Protocol and ISO 14064-1: global standards with room for discretion

The GHG Protocol was developed in partnership between the WRI and the WBCSD and published in 2001. While it provides an accounting framework for GHG standards, programs and inventories prepared by individual companies, the GHG Protocol was built to be consistent with IPCC Guidance on National Greenhouse Gas Inventories, the current accounting framework at the aggregated national level.

The ISO standard 14064-1 (Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals), adopted in 2006, was developed to be consistent and compatible with the GHG Protocol. There are now several ISO standards that cover measurement, reporting and verification of various scopes of GHG emission data. There are also sectoral initiatives that are based on the GHG Protocol and the ISO standards and provide additional guidance for specific methodological challenges due to technological and other particularities of certain sectors. For example, the WBCSD Cement CO_2 Protocol provides, among others, parameters and proposed data sources for calculation of direct CO_2 emissions specific to this sector.

In some areas the GHG Protocol leaves room for discretion, which may result in differences in which companies measure their emissions:

- It covers the 6 GHG of the Kyoto Protocol. In addition, companies may also provide emissions data for other GHGs (e.g., Montreal Protocol gases).
- When setting organisational boundaries, companies can choose between either the operational control or financial control criteria to consolidate GHG emissions.
- Companies are asked to separately account for, and report on scopes 1 and 2 at a minimum. Scope 3 is an optional reporting category.
- Companies are advised to choose as a base year the earliest relevant point in time for which they have reliable data.
- The GHG Protocol recognises the importance of a quality management system to ensure that an inventory continues to meet the principles of the GHG Protocol Corporate Standard and outlines five accounting principles that set an implicit standard for the faithful representation of a company's GHG emissions.

Source: GHG Protocol, www.ghgprotocol.org.

Verification and assurance

The primary aim of verification is to provide confidence to users that the reported information and associated statements represent a faithful, true and fair account of a company's GHG emissions. Reporting schemes usually define whether information to be reported is subject to verification and assurance or not, and provide details on the level of verification that is required.[19] Several modalities are possible from self-certification to third party verification. As shown in OECD (2010), approaches to verification vary across countries. In particular, the level of verification is not always related to the mandatory nature of reporting schemes, although in schemes linked to a carbon pricing system, such as emission trading schemes, verification and assurance are important elements to determine a monetary value for emissions. By contrast, schemes aimed mainly at awareness-raising and mobilisation of company action do not usually require verification – e.g. the UK's voluntary reporting system or the French *Grenelle II* scheme.

[19] The term "verification" normally applies to a mandatory scheme, whilst "assurance" normally applies to a voluntary scheme. Often, the terms "verification" and "assurance" are used interchangeably.

The level of assurance that can be requested is intrinsically related to the capacity of governments and other stakeholders to ensure, read and trust the provided information. As of today, GHG disclosure remains a field where verification standards are still under development and the body of auditors / verifiers is still thin.[20] Given the technical uncertainties involved in GHG assurance statements, auditors may only be able to provide a limited assurance on GHG inventory. In this context, some countries have pursued a mix of approaches to incentivise companies to seek the highest level of information, combining verification requirements with compliance mechanisms (see below) and capacity building initiatives. US EPA, for instance, provides a multi-step data verification process. The EPA data entry tool (e-GGRT) used by facilities conducts data checks and provides feedback to reporters during the data entry phase before the data is submitted to EPA. Once the data has been submitted, EPA conducts a variety of automated data checks that include ensuring that reports are internally consistent, checking the data against expected ranges for similar facilities and industries, and statistical analysis. Based on the results of the automated checks EPA conducts a staff review of the reported data, and follows up with facilities to resolve any mistakes that may have occurred.

Reporting platform *("How/where to report?")*

Among the different reporting schemes, there can be significant differences on how the information is to be disclosed and reported. In certain cases, a specific reporting framework is put in place for a particular purpose, for example, reporting schemes under emission trading systems have a specific reporting platform. Other schemes require the disclosure of collected data from participating companies on a centralised public platform, such as the US EPA's online data publication tool that contains data collected under the mandatory GHG Reporting Program. In Japan, companies submit the reported information to the competent ministers who compile it and notify it to the Ministry of Environment and the Ministry of Economy, Trade and Industry, who in turn disclose it to the public. Under some schemes, companies may be simply encouraged to report this information in their annual report, in sustainability reports or on their website. In its Guidance for voluntary reporting, DEFRA specifies that "organisations which do not publish such external reports [i.e. annual report / business review or separate corporate responsibility / sustainability report] may wish to publicly disclose this information on their website".

Elements of reporting schemes requiring action by governments

Enforcement and follow up

An important element to support the success and credibility of a reporting scheme are the mechanisms put in place to enforce reporting obligations, and follow up with companies. Mandatory schemes generally include enforcement mechanisms. Under the UK Carbon Reduction Commitment Programme, the Environment Agency conducts third party audits of 20% of participants every year. Penalties are applied in case of non-compliance. Japan does not require verification of information under its (mandatory) reporting system, but entities which submit a falsified report or fail to submit a report as prescribed are subject to an administrative fine of up to JPY 200 000. On the other hand, voluntary schemes aimed basically at raising awareness and incentivising companies to decide on emission reduction action have little or no enforcement or follow-up mechanism, as is the case with the reporting scheme under the French *Grenelle II* Law.

[20] The ISO 14064-3 standard specifies principles and requirements and provides guidance for those conducting or managing the validation and/or verification of GHG information. The International Auditing and Assurance Standards Board is developing a standard on assurance engagements on carbon emissions information. The project concerns professional accountants' responsibilities with respect to assurance engagements on carbon emissions information. It considers what specific guidance is necessary beyond the general requirements of ISAE 3000, Assurance Engagements Other than Audits or Reviews of Historical Financial Information. (OECD, 2010)

Use of the information

The uses that governments make of the reported information depend on the policies and drivers underlying the reporting schemes. Where the information is collected as part of emissions reductions policies, such as ETS or carbon taxes, the information is used by the authorities to determine the contribution due by the individual companies under the scheme. Where the driver is to raise awareness and/or mobilise companies to reduce emissions – in the absence of a carbon price, the government does not make any specific use of the information, beyond potentially publishing it and carrying out analytical work.[21] Finally, corporate reporting schemes can as well be used to complement national GHG inventories (Box 7).

Box 7. GHG reporting programmes can complement national GHG inventories

GHG information collected from emitting entities can be considered complementary to national GHG inventory data. Whereas GHG data is reported from specific emitting sources in a bottom-up manner, national inventory data are developed through a top-down approach. Reporting programmes tend to cover only the largest sources of GHGs in specific sectors, e.g. large power generators and industrial supply companies, and request data calculated according to the specific operations of a company. In contrast, national GHG inventories aim to provide a complete picture of national emissions, through the estimation of emissions at an aggregate level by sector, using internationally-recognised methodologies of the Intergovernmental Panel on Climate Change. Within each country, the specific data collected from companies through reporting programmes can then help inform the more aggregate national GHG inventory data.

Beyond domestic reporting, parties to the UNFCCC then report their national inventory data to the Secretariat for international dissemination to help provide a global picture of GHG emissions. In addition, the EU has proposed a regulation for member states to report on their GHG emissions, to help assist the EU and its member states in meeting their mitigation targets and implementing the climate and energy package.

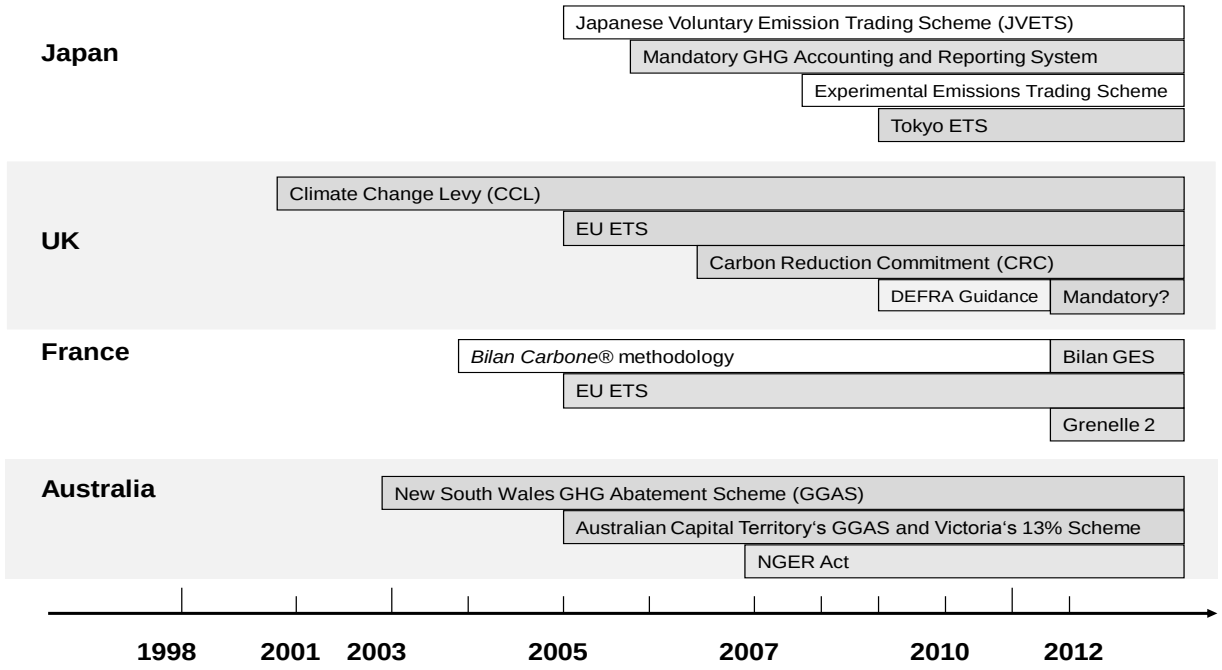
Sources: US EPA (2012); EU (2011).

[21] See for example, ADEME www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=12622 and DEFRA www.defra.gov.uk/publications/2012/03/27/pb13718-company-reporting-ghg-emissions

LEARNING FROM GOVERNMENT EXPERIENCE: COUNTRY CASE STUDIES

This section analyses government GHG reporting schemes in four countries (the UK, France, Japan and Australia). These schemes have developed over the last 15 years (see Figure 13). Each case study describes the country's corporate GHG reporting mechanisms, and highlights their main characteristics. The case studies also describe efforts made by the different governments in the design and implementation of the schemes, including efforts to rationalise and simplify the schemes, and consultations with business. Where available, they present the experience in using reporting schemes to promote countries' energy saving and GHG reduction objectives.

Figure 13. Carbon reporting provision in Japan, the UK, France and Australia

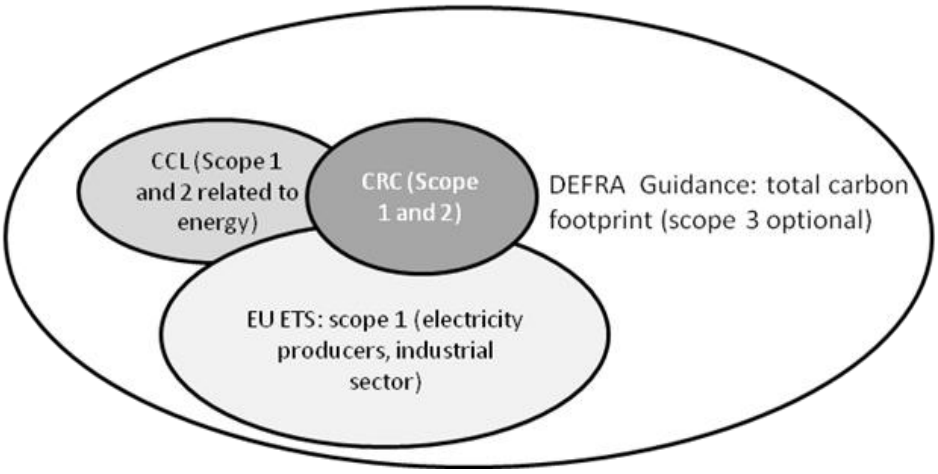


Abbreviations: CRC: Carbon Reduction Commitment; DEFRA: UK Department for Environment, Food and Rural Affairs; GGAS: Greenhouse Gas Abatement Scheme; NGER: National Greenhouse and Energy Reporting Act; Bilan GES: Bilan des Emissions de Gaz à Effet de Serre.
Source: Authors.

UK: levering corporate action through peer and investors' pressure

In the UK, four governmental schemes are in place that require or incentivise companies to report on their GHG emissions: the EU Emission Trading Scheme, the Climate Change Levy, the Carbon Reduction Commitment and the voluntary "Guidance on how to measure and report your GHG emissions". These schemes cover different sources and scope of emissions but also overlap in some cases (Figure 14).

Figure 14. Emission coverage of different UK GHG measurement and reporting provisions



Source: Authors, based on DEFRA (2010). Abbreviations: CCL= Climate Change Levy; CRC=Carbon Reduction Commitment; EU ETS= European Union Emission Trading Scheme; DEFRA= Department for Environment, Food and Rural Affairs.

The first UK government provision that rendered the measurement and reporting of corporate direct and indirect GHG emissions related to energy consumption compulsory was the **Climate Change Levy (CCL)**, introduced under the Climate Change Levy Agreements in 2001. The motivation to introduce the CCL was to encourage businesses to become more energy efficient and reduce their GHG emissions and to ultimately help the UK meet its targets for reducing GHG emissions. The Climate Change Levy (CCL) is a tax on the use of energy in industry, commerce and the public sector. It focuses primarily on energy use and energy efficiency rather than CO_2 emissions and does not cover non-CO_2 GHGs. All revenue raised through the levy is recycled back to business through a 0.3 percentage point cut in employers' national insurance contributions and support for energy efficiency and low carbon technologies. Under Climate Change Agreements (CCAs),[22] energy-intensive industries can obtain a 65% discount from the Climate Change Levy, provided they meet energy efficiency improvement or carbon emissions reduction targets. To comply with CCAs, sites must monitor, report and verify CO_2 emissions, but there is no requirement for this information to be disclosed publicly. Approximately, 500 companies are covered by CCAs (DEFRA, 2011).

The **EU Emission Trading Scheme** implemented in the European Union in 2005 (see Box 8) requires British companies in the energy and industrial sectors to report their direct (scope 1) GHG emissions. For the UK the total verified EU ETS emissions in 2009 was 231.9MtCO_2, around 48% of total UK CO_2 emissions (DEFRA, 2011b).

In April 2010, the UK launched the **Carbon Reduction Commitment (CRC),** a mandatory cap-and-trade scheme on energy use emissions for around 2800 non-energy intensive businesses and public sector organisations not covered by the EU ETS or the Climate Change Agreements. The Scheme requires companies to report scope 1 and 2 emissions. It is estimated that the scheme covers 54MtCO_2, i.e. around 10% of total UK CO_2 emissions, 90% of which from the private sector (DEFRA, 2011). Organisations over the threshold 6 000MWh fall under the scheme, and face financial and other penalties in case of non-compliance. The Environment Agency, the administrator for the scheme, publishes an annual performance league table that ranks participants on energy efficiency performance. The government expects this to

[22] See www.decc.gov.uk/en/content/cms/emissions/ccas/ccas.aspx

encourage companies to develop energy management strategies that promote a better understanding of energy usage and to reduce energy consumptions and GHG emissions.[23]

Box 8. The EU Emission Trading System (EU ETS)

The EU ETS, implemented in 2005, constitutes the European Union's primary policy instrument to reduce industrial CO_2 emissions in Europe. It contains therefore also the most significant mandatory requirement in terms of company GHG reporting within the EU (European Commission, 2010). The EU ETS covers companies in energy-intensive sectors, i.e. energy production, production of ferrous metals, cement and lime, ceramics, bricks, glass, pulp and paper. The ETS currently covers more than 10 000 installations with a net heat excess of 20 MW in the energy and industrial sectors, which produce approximately 40% of EU-27 scope 1 (direct) CO_2 emissions (European Commission, 2010). The scheme focuses on CO_2 emissions although N2O is also to be included in the third trading period. Installations falling under the ETS Directive are required to measure their scope 1 emissions each year for the period commencing on 1 January and ending on 31 December. These data must result in the drafting of an emissions report, which must then be verified by an accredited verifier and submitted to the Competent National Authority by 31 March of the following year. Once verified and approved by the Competent Authority, operators must surrender the equivalent number of allowances by 30 April of the same year.

The third phase of the EU ETS that will start in 2013, as foreseen by the Climate and Energy Package adopted in December 2008, will implement significant changes. Stronger emission reductions will be imposed and additional GHG and sectors (such as aviation) will be included in the system. The coverage of direct CO_2 emissions by the EUTS is expected to increase to around 43% in Phase 3.

In line with the EU ETS Directive, the Commission has adopted guidelines for the monitoring and reporting of GHG emissions. The original guidelines were adopted in 2004 for the first trading period (2005-2007) and revised in 2007 for the second trading period (2008-2012). For the third trading period (2013-2021) and onwards, EU ETS MRV will be required to comply with two new Commission Regulations, one specific to monitoring and reporting and the other verification and accreditation.

When Phase 3 of the EU ETS starts, the Commission will also strive to establish more consistency and administrative efficiency by harmonizing the approach in Member States. The Commission will publish a set of guidelines for the purposes of both the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation, including a user manual, electronic templates and exemplars for monitoring reporting and verification activities.

Beyond the reporting of scope 1 emissions as measured within the boundaries of installations of the EU ETS, the European Commission is currently developing a methodology for the measurement of a global carbon footprint of organisations in all sectors, in line with its 2011 Resource-Efficiency Roadmap. It is expected that the Commission establishes in 2012 a common methodology for Member States and the private sector to assess the environmental footprint of companies. The Commission is also developing a technical guide for the calculation of the environmental footprint of organisations. The methodology will build on the Reference Life Cycle Data System Handbook (ILCD Handbook), as well as other existing methodological standards and guidance documents (Global Reporting Initiative, WRI GHG Protocol, CDP Water Footprint, ISO 140064, DEFRA guidance on GHG reporting, ADEME *Bilan Carbone*®, etc).

Sources: http://ec.europa.eu/clima/policies/ets/index_en.htm; http://ec.europa.eu/environment/climat/emission; and http://ec.europa.eu/environment/resource_efficiency/index_en.htm.

The **Climate Change Act of 2008** requires the UK Government to take a decision by April 2012 on whether to introduce regulations on the reporting of GHG emissions or to justify to parliament if it chooses not to regulate. The Climate Change Act also required the Government (Department for the Environment, Food and Rural Affairs – DEFRA) to publish in October 2009 guidance on the measurement of GHG emissions to assist organisations with the reporting of emissions. The guidance is applicable to all sizes of business and for public and voluntary sector organisations in all sectors, and provides no threshold. It recommends the reporting of scope 1 and 2 emissions. Reporting of scope 3 emissions is considered

[23] See www.environment-agency.gov.uk/business/topics/pollution/126698.aspx

optional. The measurement, calculation and reporting methodology is based on the GHG Protocol and the ISO standard 14064-1. A yearly reporting period is suggested, similar to financial reporting. As it is a purely indicative document in support of voluntary GHG accounting, it contains no mention of levels or standards of assurance. The information is neither collected centrally, nor used in any kind of aggregation exercise. In addition to the general guidance, the Government also provides specific guidance for small business and for freight transport operators and companies wishing to report emissions from their work-related travel.[24]

Table 2. UK GHG emission reporting schemes: Overview

Name	Year	Legal framework	Responsible authority	Mandatory / voluntary	Sectors	Methodology
Climate Change Agreements	2001	Climate Change Levy	DECC	The levy is mandatory, the climate change agreements are voluntary	Energy-intensive industry	
The Carbon Reduction Commitment (CRC) Program	2007	Climate Change Act 2008 and the CRC Energy Efficiency Order 2010	DECC	Mandatory	Large non-energy intensive organisations	
Guidance on how to measure and report your GHG emissions	2009	Climate Change Act 2008	DEFRA	Voluntary	All sectors	Based on GHG Protocol, ISO 14064-1

Sources: www.decc.gov.uk/en/content/cms/emissions/ccas/ccas.aspx; www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx; and www.defra.gov.uk/publications/files/pb13309-ghg-guidance-0909011.pdf

In order to inform the decision by April 2012 on whether to introduce regulations on the reporting of GHG emissions, DEFRA was tasked to evaluate the contribution that reporting on GHG emissions is making to the achievement of Government's climate change objectives.[25] It also carried out a consultation to companies and others in the summer of 2011. The consultation document (DEFRA, 2011a) presented four possible regulatory options: voluntary approach, mandatory reporting for i) all listed companies, ii) all large companies, or iii) all companies whose UK energy consumption exceeds a threshold. The consultation showed that the majority of responding companies[26] would prefer that mandatory rules are put in place, as they expect this to lead to more predictability of the requirements in terms of reporting as well as better reliability of data. The consulted companies also opted for the most comprehensive scheme – the scheme that included the highest number of companies. This reflected their concern that any new regulation would need to preserve the level playing field and not distort competition. Respondents which were against mandatory reporting put forward concerns regarding the regulatory burden and cost of regulation (Whitehead, 2012).

[24] See www.defra.gov.uk/environment/economy/business-efficiency/reporting

[25] See The contribution that reporting of greenhouse gas emissions makes to the UK meeting its climate change objectives, A review of the current evidence: http://archive.defra.gov.uk/environment/business/reporting/pdf/corporate-reporting101130.pdf

[26] Out of 2018 responses, 208 were submitted by companies.

From the government's point of view, corporate GHG reporting is seen as a lever for corporate action: directly – companies are only able to manage what they know – and indirectly – through increased pressure coming from investors to better manage GHG related risks. In particular, the government expects "a requirement for companies to report on GHG emissions would provide them with the information needed to manage their emissions, and would also provide shareholders/investors with comparable information that would enable them to judge whether a company's strategy adequately took account of the risks and challenges presented by climate change" (DEFRA, 2011b). This is in line with previous legislation, namely the obligation contained in the Companies Act 2006 for companies to report information on environmental matters in their business review (to the extent it is necessary for an understanding of the development, performance or position of the company's business).

Table 3. Main characteristics of UK reporting schemes

Name	Scope and boundaries	Calculation methods	Verification	Reporting platform	Enforcement mechanisms	Government use of GHG information
The Carbon Reduction Commitment (CRC) Program	**Geographical scope**: UK **Reporting entities**: 2800 non-energy intensive businesses and public sector organisations not covered by the EU ETS or the Climate Change Agreements **GHG to report**: Only CO_2- all on site fuels, process CO_2 and imported electricity / heat paid for directly **Boundary:** financial control boundary; **Scope:** 1 and 2; **Threshold:** 6 000 MWh electricity/annum (approx. 3 240 tCO_2e/annum) with half-hourly meters installed	**Source of emissions factors**: CRC specified factors	No assurance level specified	**Frequency:** yearly **Recipient of information:** Environment Agency	Penalties if no compliance UK Environment Agency will conduct third party audits of 20% of participants every year	Pricing mechanism: Carbon allowance purchase program Communication of Information: Government publishes league tables
Climate Change Levy	**GHG to report**: CO_2 converted from energy use **Scope:** 1 and 2 (as far as energy use is concerned) **Threshold:** Covers IPPC installations			**Frequency:** every 2 years; **Recipient of information:** Environment Agency Individual reports by companies are not published	Removal of levy discount for non-compliance	Acts as a pricing mechanism Communication of Information: Government publishes overall progress report,

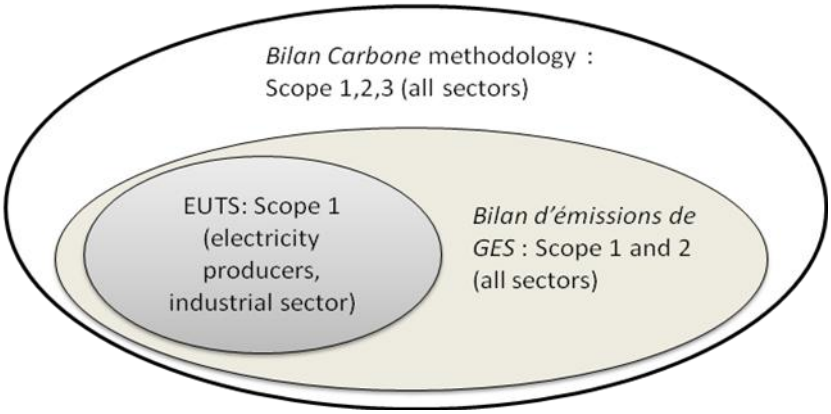
Guidance on how to measure and report your GHG emissions	**Geographical scope:** global emissions of UK companies **GHG to report**: all 6 Kyoto GHG **Reporting entities**: public and private organisations, all size. **Threshold:** none **Boundary**: none specified, those defined by the GHG Protocol are suggested **Scope:** 1 and 2;	**Methodology:** GHG Protocol; **Source of emission factors**: DEFRA guidelines (updated annually)	none	**Frequency:** yearly **Recipient of information:** none	Voluntary mechanism	No direct use. Mechanism to incentivise corporate action and improve information to investors.
EU ETS	**Geographical scope:** EU-27, Norway, Lichtenstein and Switzerland, **GHG to report**: CO_2, N2O, PFC (in future) **Boundary**: installation **Threshold**: 20 MW (approx. 28 560 tCO_2-e / annum) or production tonnage for some sectors **Scope of emission**: scope 1	**Methodology :** EC Monitoring and Reporting Guidelines under the EU ETS (Directive 2003/87/EC) **Emission factor source:** Site measured factors for fuels to be used, EF formula provided for process GHG sources, IPCC 2006 for default values; **Baseline**: defined in national allocation plans	The data must be verified by an accredited verifier	Data published in emission report and submitted to the National Competent Authority by 31 March.		Emission Trading Data published by the European Commission

Sources: www.decc.gov.uk/en/content/cms/emissions/ccas/ccas.aspx; www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx; and www.defra.gov.uk/publications/files/pb13309-ghg-guidance-0909011.pdf; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:059:0001:0074:EN:PDF; ERM (2010) and own research

France: towards a mandatory reporting framework through a broad consultation process

Carbon reporting methodologies and regulatory frameworks have developed in France over the last 10 years. The main landmarks in this development are the *Bilan Carbone*® methodology launched by the French energy agency (ADEME, *Agence de l'Environnement et de la Maîtrise de l'Energie*) in 2004, the EU Emission Trading Scheme since 2005 (see Box 8), and the mandatory reporting framework put in place by the French government as part of the "*Grenelle de l'environnement*" between 2007 and 2011. The most striking feature in this development is the multi-stakeholder approach adopted by the French authorities.

Figure 15. Emission coverage of different French GHG measurement and reporting provisions



Source: Authors.

Voluntary reporting practices and development of guidance documentation

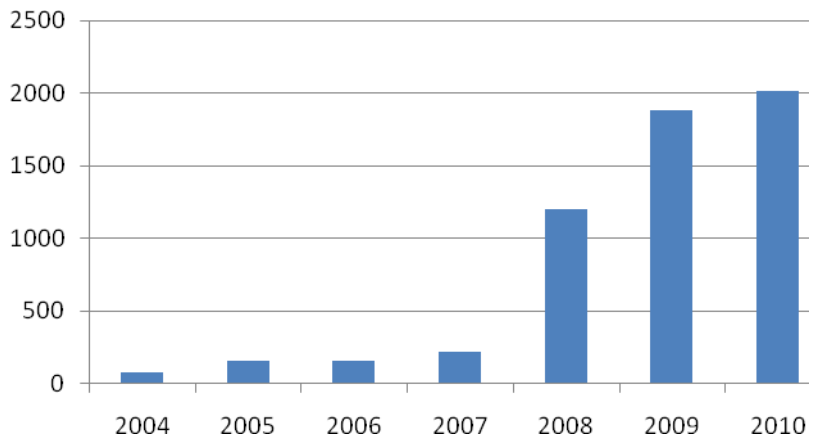
Between 2001 and 2004 ADEME, a public agency under the joint supervision of the Ministries of Ecology, Sustainable Development, Transportation and Housing, of Higher Education and Research and of Economy, Finance and Industry, developed and tested *Bilan Carbone*®, a comprehensive methodology for organisations to estimate and calculate their GHG emissions, to interpret the results and to set up and manage an emission reduction plan. *Bilan Carbone*® was developed as a management tool to help companies (and other organisations) to understand their GHG emissions and their impact on their performance. It was initially conceived to be used at site/facility level – and not at corporate level. From 2005, it was also applied to territorial entities.

Initially, ADEME provided training in order to build up skills among technical staff of reporting companies, as well as engineering and consultancy companies. In addition, companies wishing to set up a *Bilan Carbone*®, were entitled to subsidies of up to 50% of set-up costs (estimated at some 5 to 10 000 Euros on average). In total, according to ADEME, some 5 000 organisations had used the methodology as of 2010, mostly private companies, but also some municipalities and administrations. ADEME estimates that around three quarter of all *Bilans Carbone* have been developed without the financial help of ADEME. However, the subsidy seems to have played a crucial role in the decision of small and medium sized companies to carry out a *Bilan Carbone*® – 50% of these companies indicated this in a survey carried out by I Care Environnement for ADEME against 25% of large companies (ADEME and I Care Environnement, 2010).

Bilan Carbone® was designed as an internal environmental management tool, with a view to incentivise companies and other organisations to reduce their GHG emissions. According to the same survey, 79% of companies carried out a *Bilan Carbone* in order to identify potential cost savings. 79% also indicated that

they wanted to improve the company's image *vis-à-vis* their clients. In terms of impact, the same survey indicates that two thirds of companies having undertaken a *Bilan Carbone* have been convinced to act on their emissions to reduce them.

Figure 16. Number of *Bilan Carbone* undertaken by companies and public bodies



Source: ADEME and Association Bilan Carbone

From a voluntary to a regulatory approach

The Law on New Economic Regulations (NRE, *Nouvelles Régulations Economiques)* of 2001 already provided for listed companies to disclose how they take account of the environmental and social consequences of their actions (NRE, Article 116-I, Clause 4). However, the transition to a mandatory system was effectively achieved through the *Grenelle de l'Environnement*, a multistakeholder process that took place between 2007 and 2010 and led to the development of a legislative framework for carbon reporting. On the one hand, the resulting *Grenelle* Law requires large companies and their subsidiaries active in all sectors to release an annual "social and environmental report" with their annual report (*Grenelle II*, art. 225). On the other hand, it requires companies over 500 employees, sub-national governments over 50 000 inhabitants and public bodies over 250 employees to carry out out a GHG emissions inventory (*Grenelle II*, art. 75). Concrete modalities were left to be defined through an application decree. To inform this process, the French president commissioned Deputee Michel Havard to investigate the concrete application conditions of the *Grenelle* Law. The "Havard" report was published in December 2009.[27]

The application decree of Article 75 of the *Grenelle* Law was published in July 2011.[28] It contained important specifications that took into account Havard's key recommendations, in particular the 3-year periodicity of the GHG inventory and the initial reporting deadline by the end of 2012. The decree specifies that the GHG inventory should encompass both direct emissions and indirect emissions related to energy consumption and be accompanied by a synthesis of the mitigation actions foreseen by the company for the next three years including an estimate of the expected emission reduction. The application decree however does not require that GHG emission information be verified, nor does it foresee any sanction if companies or territorial entities do not comply with the reporting requirements. The Decree also provides

[27] See www.ladocumentationfrancaise.fr/var/storage/rapports-publics/104000165/0000.pdf

[28] See http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000024353784&categorieLien=id

for a new institutional architecture around a "pôle de coordination nationale" (a national coordination committee) established in order to develop the necessary methodologies in support of GHG emission inventories and define the official emission factors. The functions of ADEME were accordingly redefined to be less connected to the support of a specific tool and to take more regulatory responsibilities. In this context, ADEME became the Secretariat of the national coordination committee.

Consequently, in September 2011, ADEME commissioned the further development of *Bilan Carbone®* to the multi stakeholder Association Bilan Carbone.[29] The new methodology (named *Bilan d'Emission de GES*) was developed by a national committee composed of representatives of stakeholders and the French administration, and approved and published by the Minister of Ecology. The methodology is based on ISO 14064-1 and the GHG Protocol.[30] The reporting requirements of the mandatory *Bilan d'Emission de GES* concern only scope 1 and 2 emissions occuring on the French national territory. Nevertheless, the methodology recommends to take scope 3 emissions into account.

The scope of information and perimeter of reporting were the subject of important debates. According to Harvard (2009), measurement of scope 3 emissions would have revealed largely unknown business areas to the executive management and helped identify profitable and important leverage of action at a relatively low cost. Recognising companies' claims that important sector specificities could prevent the development of a common, standard methodology for measurement of scope 3 GHG emissions, ADEME has been developing since 2008 a number of sector guidances. This approach is expected to assuage some of the industry concerns by creating consensus among the sector experts on adaptations / additions needed to the general guidance, defining sector specific information for the database of emission factors; and discussing and sharing good emission reduction practices at sector level.[31]

Table 4. French GHG emission reporting schemes: Overview

Name	Year	Law	Responsible authority	Mandatory / voluntary	Sectors	Methodology
Bilan d'émissions de GES	2011	Law « *Grenelle II* » n°2010-788 of 12 July 2010 (Article 75).	Ministry of Environment	Mandatory	all	"*Bilan d'Emission de GES*" Methodology based on ISO 14064-1 and GHG Protocol and building on lessons learnt from *Bilan Carbone®*
Bilan Carbone®	2004	Voluntary Guidance	ADEME until Autumn 2011. Association Bilan Carbone thereafter.	Voluntary	all	Methodology and calculation tools consistent with ISO 14064-1 and GHG Protocol.

Sources: www.greenadvisor.fr/actu/31-reporting-des-gaz-a-effet-de-serre--au-dela-du-grenelle.php; www.associationbilancarbone.fr/sites/default/files/guide_methodologique_v6_euk-v.pdf

[29] See www.associationbilancarbone.fr/le-bilan-carbone%C2%AE/presentation.

[30] See www.developpement-durable.gouv.fr/Bilans-des-emissions-de-gaz-a.html

[31] See www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24976

Table 5. Main characteristics of French reporting schemes

Name	Scope and boundaries	Calculation methods	Verification	Reporting platform	Enforcement mechanisms	Government use of GHG information
Grenelle II	**Geographical scope:** within the borders of France **Reporting entities**: companies over 500 employees; sub-national government over 50 000 inhabitants and public bodies over 250 employees **Threshold:** no **GHG to report**: all 6 Kyoto GHG **Boundaries**: organisation **Scope**: 1 and 2 required, 3 recommended.	**Methodology:** Bilan d'émissions de GES, strongly inspired by ISO 14064-1, and GHG protocol **Source of emission factors:** ADEME database (www.basecarbone.fr)	No verification requirements foreseen by law	**Frequency:** every 3 years **Recipient of information:** region's prefect (préfet de la région) and published on the organisation's website	None foreseen by law	No direct use. Mechanism to incentivise corporate action.
Bilan Carbone®	**Geographical scope:** industrialised countries. **GHG to report**: largest range of GHGs possible whenever the level of scientific knowledge permits it (larger than Kyoto gases) **Scope**: 1,2,3	**Methodology** : compatible with ISO standard 14064-1 and GHG Protocol ; **Source of emission factors:** ADEME database	Not part of the methodology	**Frequency:** free. In practice at least every 3 to 5 years **Recipient of information:** ADEME when public financial incentive was used	Voluntary mechanism	Mechanism to incentivise corporate action.

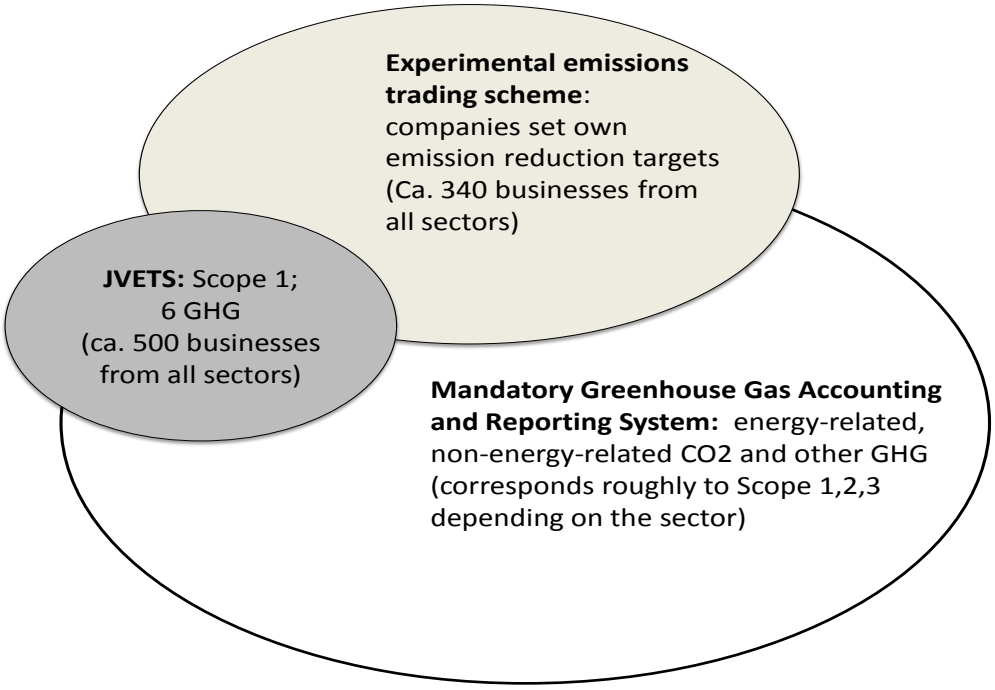
EU ETS	**Geographical scope:** EU-27, Norway, Lichtenstein and Switzerland, **GHG to report**: CO_2, N2O, PFC (in future) **Boundary**: installation **Threshold**: 20 MW (approx. 28 560 tCO_2-e / annum) or production tonnage for some sectors **Scope of emission**: scope 1	**Methodology :** EC Monitoring and Reporting Guidelines under the EU ETS (Directive 2003/87/EC) **Emission factor source:** Site measured factors for fuels to be used, EF formula provided for process GHG sources, IPCC 2006 for default values; **Baseline**: defined in national allocation plans	The data must be verified by an accredited verifier	Data published in emission report and submitted to the National Competent Authority by 31 March.		Emission Trading Data published by the European Commission

Sources: www.greenadvisor.fr/actu/31-reporting-des-gaz-a-effet-de-serre--au-dela-du-grenelle.php; www.associationbilancarbone.fr/sites/default/files/guide_methodologique_v6_euk-v.pdf; *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:059:0001:0074:EN:PDF; ERM (2010) and own research*

Japan: from energy saving programs to climate change reporting

Regulation that aims at increasing energy efficiency of private companies has a long history in Japan. The Act on the Rational Use of Energy was enacted in 1979 in the light of the oil crisis. The Act prescribes both the establishment of an energy management system as well as mandatory energy planning and identification of energy efficiency measures. Under this Act, business operators which use more energy than a specified level have to reduce the average of energy consumption by at least 1% every year. The legal framework covers all sectors within the economy. In addition, for energy-intensive industries it provides benchmarks for each sector (steel, electricity, cement, pulp and paper, oil refinery, chemicals) to evaluate their relative energy-efficiency (IIP, 2012).

Figure 17. Coverage of GHG emissions by Japanese government schemes



Source: Authors.

A range of governmental schemes provide for GHG emission reporting: the Mandatory Greenhouse Gas Accounting and Reporting System, Japan's Voluntary Emissions Trading Scheme, and the Experimental Emissions Trading Scheme, established in 2008. The latter two, combined with other credit systems, form the "Experimental Introduction of an Integrated Domestic Market for Emissions Trading". A local emission trading scheme, the Tokyo Metropolitan Government Emission Trading Scheme has also been implemented. Besides these governmental schemes, some private voluntary initiatives are in place. The Voluntary Action Plan (VAP) developed by *Keidanren*, the Japanese Business Federation, is subject to an annual follow-up by the government. The Experimental Emissions Trading Scheme is operated in accordance with the VAP. [32]

[32] The Keidanren Voluntary Action Plan (VAP) on the Environment is a unilateral voluntary commitment devised by the Nippon Keidanren (Japan Business Federation) .The VAP includes a non-binding target to reduce CO_2 emissions in industry and the energy sector below their 1990 levels by 2010. Currently, 35 industries (or business categories) (accounting for about 40% of total emissions in Japan in 1990) are involved in the Keidanren plan. In the VAP,

In 1998, the Act on the Promotion of Global Warming Countermeasures was established in order to incentivise national and local governments, businesses and citizens to reduce voluntarily their GHG emissions, including the formulation of action plans, the disclosure of the plans and the state of their implementation. The revised Act of 2006 introduced the Mandatory Greenhouse Gas Accounting and Reporting System. This system requires specified entities (which emit "a considerably large amount of GHGs" according to a list published by the Ministry of Environment) to calculate their GHG emissions and report the results to the Government. Companies already required to report energy usage under the Act on the Rational Use of Energy must report their CO_2 emissions from energy consumption. These companies include designated energy management factories, specified freight carriers, specified shippers, specified ground transport services for passengers and freight, and specified air transportation services. For other types of GHG, companies with more than 20 full-time employees are required to report the aggregate amounts of their emissions by type at each business site where emissions exceed 3 000 tons of CO_2 equivalent.[33] The scheme covers 11 358 facilities and 1 382 transportation companies (2009 data, Japan, Ministry of the Environment). For phase 1 of the mandatory GHG reporting system, there are no specific requirements for a facility to have its emissions verified by a third party. However the information should be verifiable, which means that any information that would allow a facility's emissions to be verified is to be retained. A "statement of certification" must be signed by an authorised official.

GHG reporting requirements also underpin two emission trading schemes: the Japanese Voluntary Emission Trading Scheme (JVETS), launched in 2005 as a trial emission trading system, and the Tokyo Trading Scheme. The JVETS aims to support voluntary CO_2 reductions by business and to ensure their target achievement in a cost-effective manner, using (i) a subsidy to facilities which achieve CO_2 emission reductions, (ii) participants' commitments to reduce CO_2 emissions below their base year emissions and (iii) emissions trading (Sone, 2009). Facilities participating in the program have to report their scope 1 emissions. One characteristic of JVETS is the calculation of GHG emissions by factory or business facility unit. In this regard, this system is different from the EU ETS under which GHG emissions are calculated by equipment unit (Japanese Ministry of Environment, 2007). Various IT systems have been introduced to support the operation of these trading schemes, including a registry, emissions management and trade matching system. The monitoring and reporting guidelines are based on the EU ETS and ISO 14064-1 (CDSB, 2011).

Based on the Action Plan for Achieving a Low-carbon Society (Cabinet decision of July 29, 2008), the Japanese Government commenced the "Experimental Introduction of an Integrated Domestic Market for Emissions Trading" in 2008, in which the JVETS was incorporated with effect from 2009. Companies participating in the experimental emissions trading scheme voluntarily set their own emission reduction targets in a manner consistent with the sectoral target established under the Voluntary Action Plan or the actual sector-specific emission records. They are allowed to use other entities' allowances issued by emission reductions exceeding their targets, the Domestic credits, and Kyoto Mechanism credits to achieve the targets.

The Tokyo Metropolitan Government Emission Trading Scheme is the first mandatory cap-and-trade emission trading scheme in Japan. The first phase runs from 2010 to 2014. The program, put in place in 2010 by the Tokyo Metropolitan Government (TMG), covers the industrial and the commercial sectors. These sectors account for approximately 40% of GHG emitted in Tokyo. The cap applies to large-scale

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separate sector plans are drafted by respective industrial branch/sector organisations in consultation with government and the companies in the sector. VAP allows industry groups to choose one of four types of indicators. The target(s) can be set in terms of energy consumption, energy intensity, CO2 absolute emission, or CO2 intensity, but total energy consumption or emissions for the sector as a whole are not limited http://iepd.iipnetwork.org/policy/keidanren-voluntary-action-plan-vap.

[33] See www.japanfs.org/en/pages/026377.html.

facilities (buildings/factories) that have total consumption of fuels, heating and electricity of at least 1500 kiloliters per year. These facilities include large CO_2 emitters, such as office buildings and factories. About 1400 facilities in Tokyo come under this classification. The main targets of TMG's cap-and-trade program are the final users of energy (Bureau of the Environment of Tokyo Metropolitan Government, 2010).

Table 6. Japanese GHG mission reporting schemes: Overview

Name	Year	Law	Responsible authority	Mandatory/ voluntary	Sectors	Methodology
Mandatory GHG Accounting and Reporting System	2006	Act on Promotion of Global Warming Counter-measures	Ministry of Environment, Ministry of Economy, Trade and Industry	Mandatory	Companies that "emit considerably large amounts of GHG"	"Calculation and Reporting Manuals" published by the Ministry of Environment are based on the EU ETS and ISO 14064
Japanese Voluntary Emissions Trading Scheme (JVETS)	2005		Ministry of Environment	Voluntary	Industrial and commercial sectors	Methodology consistent with ISO 14064 and ISO 14065
Experimental emissions trading scheme	2008		Cabinet Secretariat, Ministry of Economy, Trade and Industry, Ministry of the Environment	Voluntary	Industrial and commercial sectors (most of the participation companies are members of the Voluntary Action Plan)	Verifying Guidelines for verification agencies Calculating and Reporting Guideline for non-VAP members.
Tokyo Metro-politan Govt. Emission Trading Scheme	2010		Bureau of the Environment, Tokyo Metropolitan Government	Mandatory	Industrial sector and commercial sector	Guidelines for Calculating GHG for facilities under the cap, the Guidelines for Verifying GHG for registered verification agencies

Sources: www.env.go.jp/en/earth/ets/jvets1105.pdf; www.kankyo.metro.tokyo.jp/en/attachement/Tokyo-cap_and_trade_program-march_2010_TMG.pdf

Table 7. Main characteristics of Japanese reporting schemes

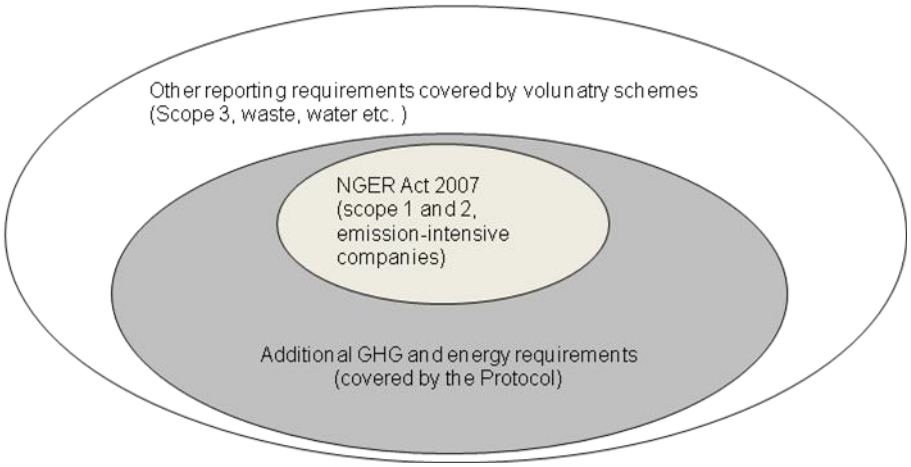
Name	Scope and boundaries	Calculation methods	Verification	Reporting platform	Enforcement mechanisms[34]	Government use of GHG information
JVETS monitoring and reporting	**GHG to report**: 6 GHG of the Kyoto Protocol + detailed information on reduction measures **Boundary:** Facility-level; **Scope:** 1	"Monitoring and Reporting Guidelines" Calculation methods and emission factors are provided	Verification of base year emissions. About 20 verifiers are officially certified.	**Frequency:** Annual reporting		Emission trading in JVETS
Experimental Emission Trading Scheme	**GHG to report:** CO2 generated from energy use **Boundaries:** business, individual company or group of companies	Calculating and Reporting Guideline for non-VAP members VAP member participants calculate and report emissions in accordance with VAP methods.	Verification is required if allowances would be traded. Emissions from Non-VAP member participants must be verified.	**Frequency:** Annual reporting	Government supports verification costs	
Mandatory GHG Accounting and Reporting System	**Geographical scope: Japan** GHG to report: All six GHG gases (depending on particular thresholds) **Boundaries:** all business establishment s(but reporting of breakdown of establishment) **Thresholds:** 1) for reporting of energy-derived CO_2**:** annual energy consumption of at least 1 5000 kiloliters; 2) for other companies: total emissions of each type of GHG of at least 3 000 tons and at least 21 full-time employees;	"Calculation and Reporting Manual" Calculation methods and emission factors are provided	No specific requirements; however the information should be "verifiable".	**Frequency:** every year until end-July; **Recipient of information:** competent ministers that compile the reported information and notify the Environment Minister and the Minister of Economy, Trade and Industry		The Environment Minister and the Minister of Economy, Trade and Industry publish aggregated information; the emission information on a specific operator is disclosed upon request.
Tokyo Metropolitan Government Emission Trading Scheme	**Geographical scope:** Tokyo **GHG to report**: All 6 GHG under the Kyoto Protocol **Reporting entities**: large-scale facilities (buildings/ factories) **Threshold:** total consumption of fuels, heating and electricity of at least 1 500 kiloliters per year **Boundaries:** facility-level **Scope:** 1 and 2	**Methodology:** Guidelines for Calculating Greenhouse Gases for facilities under the cap, **Emission factors** provided	GHG emissions are verified by a third-party verification agency which has to be registered with the Governor of Tokyo.	**Frequency:** every fiscal year; **Recipient of information:** the Governor		Emission trading

Sources: European Commission (2010), Bureau of the Environment of Tokyo Metropolitan Government (2010), Minstry of Environment (2012).

[34] Includes only enforcement mechanisms relating to reporting obligations.

Australia: addressing multi-level governance of carbon reporting

Figure 16. Coverage of NGER



Source: Authors, based on Australia, Department of Climate Change (2009).

In the absence of federal climate change mitigation action and of ratification of the Kyoto Protocol until late 2007, some Australian States, Territories, and Local Governments decided to take action of their own to address climate change. In 2003 the State of New South Wales introduced the Greenhouse Gas Abatement Scheme (GGAS), in order to incentivise electricity generators and retailers to reduce emissions associated with electricity production and consumption. The scheme foresees that underperforming companies compared to a benchmark have to purchase credits from firms that outperform. The New South Wales Scheme inspired other schemes, such as the GGAS scheme introduced by the Australian Capital Territory in 2005 and the 13% Gas Scheme in Victoria in the same year (Sartor, 2010). Provisions on GHG measurement have also been introduced at State level in Queensland, South Australia, and Tasmania.

In terms of reporting requirements and the measurement, calculation and verification methodology applied, these schemes differed largely. This is due to the fact that the individual programs and their often unique reporting obligations were developed to meet specific objectives. As a result, the complexity of reporting and costs for business increased significantly. Furthermore, programs often used different terminology even though similar concepts were applied. Consequently, companies were required to reinterpret the terms and obligations for each program. They also had to familiarise themselves with different IT systems and protocols which had been developed independently to meet the data collection needs of specific initiatives. Lastly, confidentiality protocols to protect corporate data prevented sharing of information between the different programs and governments (Department of Climate Change, 2009).

In order to tackle these inefficiencies and to improve public policy making, the National Greenhouse and Energy Reporting (NGER) Act of 2007[35] introduced a national framework for the reporting and dissemination of information about GHG emissions, GHG projects, energy use and production by companies. It notably promoted the use of a streamlining protocol to ensure the use of a common terminology and of a single and comprehensive on-line portal for GHG information. Besides avoiding the duplication of similar reporting requirements in the States and Territories, the objectives of the NGER Act were to underpin the introduction of an emissions trading scheme, inform government policy formulation and the Australian public, help meet Australia's international reporting obligations, and assist

[35] See www.comlaw.gov.au/Details/C2012C00091/Html/Text#_Toc314159906

Commonwealth, state and territory government programs and activities (Department of Climate Change, 2009).

The first reports were to be submitted by 31 October 2009 for emissions between 1 July 2008 and 30 June 2009. Corporations that meet an NGER threshold must report their GHG emissions, energy production and consumption (scope 1 and 2) as well as other information specified under NGER legislation. The principal obligations under the Act apply to 'controlling corporations'. A controlling corporation's group may include subsidiaries, joint ventures and partnerships in addition to the controlling corporation. For the period 1 July 2010 to 30 June 2011 the threshold stood at 50 000 tonnes of CO_2e or production/consumption of more than 200 TJ of energy".

Australian State and Territory governments agreed to a standard methodology to GHG and energy reporting known as the National Greenhouse and Energy Streamlining Protocol that is largely based on the GHG Protocol and the ISO standard 14064-1. The Protocol also covers reporting requirements relating to intensity indicators, energy audits, action plans, energy savings, greenhouse gas reductions, and projections. Technical guidance is provided in the NGER Measurement Technical Guidelines 2009. Besides a common methodology, a common IT system is used, namely the National Greenhouse and Energy Register that makes use of the Online System for Comprehensive Activity Reporting (OSCAR) which is already used for reporting under Greenhouse Challenge Plus, a voluntary emissions and energy reporting program.[36]

Table 8. Main characteristics of Australian reporting schemes

Scope and boundaries	Calculation methods	Verification	Reporting platform	Enforcement mechanisms	Government use of GHG information
Geographical scope: Australia **GHG to report:** 6 GHG under the Kyoto Protocol **Boundary:** activities under control of the corporation **Reporting threshold:** 50 000 tCO_2e or production / consumption of more than 200TJ of energy **Scope of emissions:** Scope 1 and 2 mandatory, scope 3 voluntary.	**Methodology:** NGER Measurement Technical Guidelines 2009 GHG Protocol, ISO standard 14064-1; Emission factors for Australia are provided	**Methodology:** ASAE 3410 Assurance Engagements on Greenhouse Gas Statements by the IAASB	**Methodology:** National Greenhouse and Energy Reporting Technical Guidelines, **Frequency:** annual reporting in line with financial reporting		Carbon tax to be introduced in 2012 will be transferred into emission trading scheme in 2015. Online System for Comprehensive Activity Reporting (OSCAR)

[36] See www.climatechange.gov.au

Assurance rules are scheduled to be published in 2012. The Australian Auditing and Assurance Standards Board (AUASB) intends to issue a standard equivalent to the ISAE 3410 standard scheduled for release by the International Auditing and Assurance Standards Board (IAASB) in June 2012. This proposed standard will provide requirements for assurance practitioners when conducting assurance on statements of GHG, including energy and emissions. The AUASB intends to issue guidance in applying the proposed ASAE 3410 to assurance engagements under Australia's National Greenhouse and Energy Reporting Scheme (NGERS). The development of these assurance standards seemed also necessary in the light of the launch of a carbon pricing mechanism that the NGER Act is meant to underpin.

The Clean Energy Legislative Package, passed by the Senate on 8 November 2011, sets out the way in which Australia will introduce a carbon price to reduce Australia's emissions and move to a clean energy future. The carbon pricing mechanism will start with a fixed price of AUD23 per tonne of -CO_2.e on 1 July 2012 before transitioning to an emissions trading scheme on 1 July 2015. Under the plan, liable entities (i.e. those that generate over 25 000 tonnes of CO_2e emissions each year) must register under the National Greenhouse and Energy Reporting System. They are required to report emissions and surrender permits for each tonne of CO_2.e they emit. Carbon liabilities will be administered by The Clean Energy Regulator.[37]

Emissions from agriculture and transport will not be directly covered by the scheme. The Government's clean energy plan is expected to cut pollution by at least 5% compared with 2000 levels by 2020. The Government's long-term climate change target is to cut pollution by 80% below 2000 levels by 2050.[38]

Comparative analysis: some general lessons from national experience

Although the case studies of government reporting schemes represent only a small sampling, the following preliminary lessons emerge.

Convergence in methodology and language used – pushed by the emergence of international standards

The small sample of case studies does show a convergence pattern as regards measurement practices and use of terminology. The terms scope 1, 2, 3 as defined by the GHG Protocol has become common language today, even though some countries originally chose different definitions in the beginning, such as France. The Australian efforts at generating a common language and platform of GHG emission information across states participate in this convergence.

The GHG Protocol and ISO standard 14064-1 have been mainstreamed into these government schemes as illustrated by the fact that these standards are clearly referenced in government-sponsored methodology and guidance documents. They are the methodology of reference of new schemes. In cases where governments had developed their own methodologies, such as France with *Bilan Carbone®*, they have been subsequently rendered compatible with the GHG Protocol and ISO 14064-1.

Variations in scope, assurance level and reporting practices – spurred by differing government motivations for putting in place carbon reporting provisions

The Scope of reporting schemes, assurance levels and reporting practices (in terms of platforms used, periodicity, the recipient of information and whether the information is published to a general audience or not) remain to a large extent country-specific.

[37] See www.comlaw.gov.au/Details/C2011B00166/Explanatory%20Memorandum/Text

[38] See www.climatechange.gov.au/government/reduce/national-targets.aspx

Some significant differences appear, between, on the one hand France and the UK and, on the other hand, Japan and Australia.

In France and the UK national regulatory or voluntary reporting schemes rely on providing companies with internal management systems based on more accurate GHG information that incentivise emission reductions and other low-carbon corporate actions. These systems are seen as complementary to the EU ETS, which despite being the only trans-boundary government scheme to date, is limited in terms of scope of information (scope 1), of boundary (facility level) and of companies affected (energy intensive). The complementary government schemes put in place in France and in the UK therefore seek to raise awareness and incentivise action in companies which do not fall under the EU ETS, i.e. smaller and less energy- intensive, or in relation to emissions outside of the EU ETS scope (typically scope 2 and scope 3). These "complementary" schemes are not set up in a perspective of establishing a carbon tax or another pricing mechanism, at least in the short term. The collected information is not used by the government – or, at best, for punctual information purposes. Verification requirements are therefore limited or even absent.

On the other hand, in Australia, reporting schemes underpin trading markets and other carbon pricing mechanisms. As a result, the scope of schemes is more limited and the monetary valuation of emissions leads to more stringent verification provisions.

Even between France and the UK, which share strong commonalities, a significant difference in the periodicity of the inventory remains: while the periodicity considered under the British scheme is annual, the French Law foresees a three year period between inventories. A stronger reliance on investors – as a lever to induce corporate change – in the UK can explain this difference in approach. Annual reporting of GHG emissions brings it closer to companies' financial reporting cycle. In the French case, the rationale behind a 3 year periodicity is to leave companies time to achieve the emission reductions to which they commit in the report on actions accompanying the inventory.

In countries with multiple regional initiatives a need for consistency has led to reforms and adjustments

The EU ETS is designed to be administered by a Competent National Authority in each country. However this is leading to divergences in administration practices. Consequently, phase 3 of the EU ETS foresees more efforts in ensuring a consistent approach across member countries. In particular, the Commission will publish a set of guidelines for the purposes of providing more consistency in both the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation, including a user manual and electronic templates for monitoring, reporting and verification activities.

Australia did not ratify the Kyoto Protocol until 2007. In the meantime, in the absence of a commitment to climate change mitigation at national level, regional initiatives developed in different states. These initiatives used different language and had different reporting requirements, potentially creating additional costs to governments and to business. As part of a broader strategy to „deliver more consistent regulation across jurisdictions and address unnecessary or poorly designed regulation" (the National Partnership Agreement to Deliver a Seamless National Economy), a National Greenhouse and Energy Reporting (NGER) system was implemented to address the inconsistencies of the different reporting schemes. One streamlining protocol and a single web portal were put in place. Here, federal regulation was seen as a strong driver of consistency across States. The reform agenda was here „to reduce excessive compliance costs on business, restrictions on competition and distortions in the allocation of resources in the economy".[39]

[39] See www.coag.gov.au/intergov_agreements/federal_financial_relations/docs/national_partnership/seamless_national_economy_np.pdf

Wide consultations with business and other stakeholders are important.

Be it in France, the UK, the U.S. or New Zealand, the development of GHG measurement methodologies and of regulatory schemes has substantially involved and required inputs from business. Country experiences clearly show the benefit of broad consultation to underpin effective reporting schemes. There are several reasons for this. The technical knowledge of GHG emissions is deeply embedded in companies. The level of compliance with voluntary schemes, and level of acceptation of mandatory schemes, is a function of whether companies deem the requirements well balanced and fair, and not to distort competition. In addition, broad and open consultations are essential to avoid regulatory capture by specific business interest.

ANNEX 1 – SELECTED GOVERNMENTAL GHG REPORTING SCHEMES

Scheme and date	Legal Framework	Authority	Mandatory / voluntary	Content, scope and boundaries	Calculation methods	Verification/ assurance	Reporting
Australia National Green-house and Energy Reporting **2009**	National Greenhouse and Energy Reporting (NGER) Act of 2007		Mandatory	**Geographical scope**: Australia **Content:** 6 GHG of Kyoto Protocol **Boundary:** activities under control of corporation **Reporting threshold:** 50 000 tCO_2e or production / consumption of more than 200TJ of energy **Scope of emissions:** Scope 1 and 2 mandatory, scope 3 voluntary	**Methodology:** NGER Measurement Technical Guidelines 2009, GHG Protocol, ISO standard 14064-1 Emission factors for Australia are provided		**Methodology:** National Greenhouse and Energy Reporting Technical Guidelines, **Platform**: Online System for Comprehensive Activity Reporting (OSCAR) **Frequency:** annual

Canada Environment Canada GHG Emissions Reporting Program (GHGRP) **2004**	Canadian Environmental Protection Act 1999 (CEPA 1999) – section 46 "GHG Emissions Reporting Scheme"	Statistics Canada	Mandatory	**Geographical scope:** Canada **Content:** All 6 Kyoto gases **Reporting entities:** Largest industrial GHG emitters **Boundary:** facility-level **Threshold:** 50 000 tonnes CO_2-e per facility. **Scope of emission:** 1	**Methodology:** Technical Guidance on Reporting GHG Emissions, published by the Government of Canada, based on IPCC Guidelines and Good Practice Guidance documents **Source of emission factors:** GHG Emissions Quantification Guidance provides sector-specific guidance manuals, national emission factors, global warming potentials, conversion factors and electricity intensity tables	No specific requirements for a facility to have its emissions verified by a third party. Information should be "verifiable"	**Recipient of information:** Statistics Canada **Platform**: Electronic Data Reporting (EDR) system on the GHG Reporting Web site
EU ETS **2005**			Mandatory	**Geographical scope:** EU-27, Norway, Lichtenstein and Switzerland **Content**: CO_2, N2O, PFC (in future) **Boundary**: installation **Threshold**: 20 MW (approx. 28 560 tCO2-e / annum) or production tonnage for some sectors	**Methodology:** EC Monitoring and Reporting Guidelines under the EU ETS (Directive 2003/87/EC) **Emission factor source:** Site measured factors for fuels to be used, EF formula		**Recipient of information:** Data published in emission report and submitted to the National Competent Authority by 31 March each year. **Platform:** Data published by the European Commission

				Scope of emission: 1	provided for process GHG sources, IPCC 2006 for default values; **Baseline**: defined in national allocation plans		
France "Bilan d'émis-sions de GES" **2011**	Law "*Grenelle II"* n°2010-788 of 12 July 2010 (Article 75).	Ministry of Environment	Mandatory	**Geographical scope:** within the borders of France **Reporting entities**: all companies over 500 employees; sub-national government over 50 000 inhabitants and public bodies over 250 employees **Threshold:** no **Scope of emissions**: 1 and 2	**Methodology:** Bilan d'émissions de GES, strongly inspired by ISO 14064-1, and GHG protocol **Source of emission factors:** ADEME database	No verification require-ments foreseen by law	**Recipient of information:** region's prefect (préfet de la région) **Platform**: Information not published **Frequency:** every 3 years
Israel Voluntary Reporting scheme **2010**		Ministry of Environ-mental Protection	Voluntary	**Geographical scope:** global emissions of Israel companies **Scope:** 1 and 2, Scope 3 optional	**Methodology:** Israel GHG Protocol **Source of emission factors:** IPCC 2006 guidelines for national inventories		

Japan Mandatory GHG Accoun-ting and Reporting System **2006**	Japan Act on Promotion of Global Warming Countermeas ures	Ministry of Environment Ministry of Economy, Trade and Industry	Mandatory	**Geographical scope:** Japan **Content**: All 6 Kyoto GHG gases (depending on particular thresholds) **Reporting entities:** large emitters **Boundaries:** all business establishment (but reporting of breakdown by establishment) **Thresholds:** 1) for reporting of Energy-derived CO_2**:** annual energy consumption of at least 1 500 kiloliters; 2) for other companies: total emissions of each type of GHG of at least 3 000 tons and at least 21 full-time employees;	"Calculation and Reporting Manual" Calculation methods and emission factors are provided	No specific requirements However the information should be "verifiable".	**Recipient of information:** competent ministers that compile the reported information and notify the Environment Minister and the Minister of Economy, Trade and Industry **Platform**: The Environment Minister and the Minister of Economy, Trade and Industry publish aggregated information; the emission information on a specific operator is disclosed upon request. **Frequency:** every year until end-July
New Zealand Emissions Trading Scheme **2008**		Environ-mental Protection Authority (EPA).		**Reporting entities:** Forest, Energy, Transport, Emission-intensive industrial processes, Agricultural Gases, Fishing **Scope:** 1,2,3			
UK Guidance on how to measure and report your	Climate Change Act 2008	DEFRA	Voluntary The UK governmen t has to decide by	**Geographical scope:** global emissions of UK companies **Content**: all 6 Kyoto GHG **Reporting entities**: public	**Methodology:** GHG Protocol; **Source of emission factors**: DEFRA guidelines	None	**Recipient of information:** none **Frequency:** yearly

GHG emissions **2009**			April 2012 whether to make it mandatory	and private organisations, all size, all sectors **Threshold:** none **Boundary**: none specified, those defined by the GHG Protocol are suggested **Scope:** 1 and 2	(updated annually)		
US Mandatory Reporting of GHG Rule (MRR) **2009**	In response to the FY2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), EPA issued the Mandatory Reporting of Greenhouse Gases Rule	EPA	Mandatory	**Geographical scope**: US **Reporting entities**: Fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities **Content**: 6 Kyoto Protocol GHG and HCFCs and other fluorinated gases **Boundary**: installation **Threshold**: In general, 25 000 metric tons or more per year of GHG emissions **Scope**: 1 and 2	**Methodology:** General Reporting Protocol (GRP)	Optional: Self-certification by designated representative who must certify and submit report (one designated rep per facility and supplier)	Recipient of info: US EPA Platform: EPA website Frequency: Annual

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