

## II. A framework for green growth

11. Moving towards green growth will require targeted government intervention across a number of policy areas in order to address the existing externalities and market failures characterising environmental goods and services (Box 3), to accelerate green innovation, and to manage the transition to a green economy. This will help to put green growth on an even playing field with conventional growth. It will establish the market certainty and incentives that businesses need to make long-term investment decisions. It will also help providing stable, long-term support for research, development and deployment of clean energy, for innovation throughout the economy, and for the sustainable use of natural resources while supporting the rise of household and private sector demand for green products and services. A broad range of policies can and have already been introduced to this end.

12. With a view to bring policy mixes closer to best practice from a green growth perspective, the OECD is identifying the key elements of an economic framework to help determine the economic efficiency and environmental integrity of different policy mixes, as well as their coherence at both a national and an international level. The framework identifies a set of criteria and principles against which policy instruments can be assessed. It also discusses the public policy challenges to be met during the transition towards a greener growth path, which is likely to be characterised by clean technology development, industrial and job restructuring, and changing consumer habits.

### **Box 3. Environmental externalities and market failures**

#### **A. Externalities**

Production and consumption activities lead to various environmental side-effects that impact negatively on welfare. Correcting for these externalities can improve welfare and is therefore desirable. From this perspective, there is thus not necessarily a trade-off between promoting wellbeing and ensuring environmental quality. Externalities can be distinguished according to the nature of the trade-off they entail, which depends in part on whether they primarily impact on material or quality-of-life aspects of wellbeing:

Externalities on material wellbeing are defined as the by-products of production and consumption activities that lead to a reduction in current and future production capacity. They mainly concern side-effects on the stocks of environmental, physical or human capital, as well as on productivity. Road congestion is an example of an externality having an impact on current GDP that can be substantial. However, externalities that take several years to materialise tend to be more common and addressing them may involve policy trade-offs between current and future GDP. For example, an excessive level of soil exploitation would entail erosion, thereby reducing future agriculture yields and GDP. Climate change is another environmental externality that is expected to imply large destruction in physical capital through more intense and frequent storms, droughts and floods, and a rise in sea level.

Externalities can also affect the quality of life independently from any direct impact on current or future productive capacity. Examples are the various forms of pollution that would affect the health of individuals who may be outside the labour force, or changes in the environment that would affect the perceived quality of life. Addressing this type of externality often involves trade-offs between material and quality-of-life aspects of wellbeing, as maintaining a level of quality of life may bear an economic cost. In general, externalities involving trade-offs between current and future well-being may raise issues of inter-generational equity and sustainability.

## B. Market failures

Externalities arise from a number of market failures and imperfections inherent in the nature of environmental goods and services. These include:

- **The “public good” nature of environmental assets:** It is often impossible for individuals or countries to fully appropriate the benefits of their own actions to protect the environment, giving rise to free-riding incentives. This is particularly acute in the case of the climate, given that regardless where GHGs are emitted they contribute equally to global climate change, but it is also relevant for a number of natural resources, as illustrated by problems of over-exploitation of water basins and fish stocks as well as other biodiversity and ecosystems services.
- **Monitoring and enforcement costs:** These can be large, as for example in the case of GHG emissions from deforestation or from pipeline leakages. All GHGs other than carbon involve significant monitoring and enforcement costs.
- **Information asymmetry and split incentives problems:** When information is not fully available and the cost of acquiring it is high, as is often the case for households or small businesses, incentives might not suffice to prompt efficient behaviour. Problems of split incentives arise when, for example, information about energy efficiency of electrical appliances or thermo-isolation of buildings is mainly disseminated to home owners while it is tenants who pay the electricity and heating bills. Again, standards may be more effective than incentives.
- **Market incompleteness:** Both the benefits and costs of action to reduce pollution and unsustainable resource use often materialise with long time lags and therefore their evaluation is subject to risks and uncertainties which cannot be fully addressed by establishing contracts covering the whole set of market contingencies.

There are also knowledge externalities in innovation that reflect the public-good nature of ideas, with the result that private investment in innovation falls short of the socially desirable level because innovating firms cannot prevent other firms from benefiting from the knowledge they create. While this positive externality affects technological innovation in general, there are reasons to believe its impact may be exacerbated in environmental areas, in particular climate change given the uncertainty of future policy action. Together, these market failures may have adverse effects on the functioning of financial markets, limiting access to finance for investment in green technologies. More generally, the presence of learning-by-doing and forward R&D spillover effects provide a comparative advantage to existing technologies at the expense of cleaner technologies that are in their infancy and whose commercial viability and future profitability are therefore more uncertain.

13. The tools to promote green growth include instruments covering both demand and supply. A first set comprises market-based instruments aimed at promoting green growth through pricing signals, including environmentally-related taxes, charges and fees, tradable permits, and removal of environmentally harmful subsidies. Another set entails instruments that seek to influence the behaviour of firms, households or individuals through means other than price signals. These include command-and-control regulations, policies to support green technologies and innovation, and voluntary approaches based on the dissemination of information and on negotiated agreements between the government and particular industrial sectors to address a specific environmental concern. An effective policy mix will have to draw on both sets according to the circumstance.

14. Given the range of market imperfections as well as political economy considerations, green growth policies should be evaluated on the basis of their cost-effectiveness, the adoption and compliance incentives, and their ability to cope with uncertainty, notably to provide a clear and credible signal to investors. Another important

criterion is their effectiveness in stimulating innovation and the diffusion of green technologies so that the cost of abating pollution can be lowered in the future. Finally, as many environmental externalities, spill across national borders (*e.g.* climate change, water management, fishing stocks), the extent to which instruments can be designed and implemented in a way that facilitates international coordination also needs to be considered.

15. OECD review of the relative strengths and weaknesses of the different instruments with respect to the above criteria (De Serres, Murtin and Nicoletti, 2010), indicates that the best choice of instruments will vary by environmental issue as well as across country- or region-specific circumstances. Indeed, given the presence of several interacting market failures, the most appropriate green growth policy response will, in most cases, require a combination of instruments. This combination may be influenced by the weight put on environmental concerns. This is partly a matter of social preferences that are expected to increase with income levels, thereby differing across countries and stages of development. Market conditions may also have an influence on the choice of instruments. For instance, intergenerational transfers that could improve the wellbeing of both current and future generations may fail to take place in countries with less-developed financial markets. The introduction of green technologies in their early stages of development may have to be supported by specific measures to avoid paths dependency in "dirty" technologies. Furthermore, the design and implementation of policies often raise governance issues that differ across countries. Difficulties in monitoring environmental performance, collecting green taxes or setting up new markets may influence the choice of policy instruments in countries with large informal economy areas and/or weak capacity in environmental policy design or implementation.

16. Despite such differences, conditions that seem particularly favourable to the use of specific instruments are reported in Table II.1 and lend to the following policy considerations:

- Putting a price on a pollution source or on the over-exploitation of a scarce resource through mechanisms such as taxes, natural resource charges, or tradable permit systems should be a key element of a policy mix.
- Regulations will be needed when market failures result in a weak response of agents to price signals. This is the case when pollution emissions cannot be adequately monitored at the source – at least not at a reasonable cost – and there is no good proxy that could be subject to taxation. Regulation may also be the only option applicable when a complete ban on certain activities is deemed necessary. Regulation should be designed with a view to minimize the additional administrative burden and compliance costs for businesses and consumers.
- A combination of taxes, tradable permits and/or performance standards may be an optimal option in cases of multiple and varied sources of pollution. For example, GHG emissions which originate from very different types of agents and economic sectors. Instruments should be set so as to minimise the differences in the implicit or explicit pollution prices across sectors.
- Policies to support green technologies and innovation may be appropriate in areas characterised by strong market size and learning-by-doing effects and which involve high entry costs. They could also support the development of technology infrastructures in areas where network considerations are important. In general, where the development and diffusion of clean technologies are hampered by specific innovation failures, overall cost-effectiveness can be improved by combining pricing instruments with R&D, innovation and technology adoption policies.
- Subsidising green activities should generally be avoided, given the potentially large budgetary costs, their limited impact on incentivising reductions in the environmentally harmful activities and potentially distortive effects on competition and trade. However, it may be an effective option in cases where

pricing instruments would be difficult or very costly to enforce and when the subsidised activity is a strong substitute for the dirty activity that is targeted. When they are used, subsidy programmes should be time-bound and closely monitored.

- Other approaches, including voluntary instruments and information-based instruments such as energy efficiency ratings and well-designed eco-labelling, can complement other policies in the environmental policy mix. For example, eco-labels can be effective in strengthening the responsiveness of agents to price signals by raising consumer and producer awareness on the environmental damage caused by specific activities as well as on the availability of cleaner alternatives. Voluntary approaches can help to reveal information about abatement costs and environmental damages. However, in order to ensure that they achieve emissions reductions beyond business-as-usual, they are most effective when combined with regulations.

17. Ensuring coherence between the different tools of the policy mix to promote green growth will be critical for their overall efficiency (Box II.1). Policy mixes that result in counter-productive overlaps of instruments should be avoided. As a general rule, policies overlap when the same emission source (*e.g.* individuals, firms, public administrations) is covered by at least two instruments that essentially address the same environmental externality. For instance, once a total emission-reduction objective is set through a national emission-trading scheme, additional targets, such as for renewables or biofuels, will not necessarily reduce emissions beyond the cap-and-trade target. Thus, potentially overlapping policies should only be used in situations where they can be justified on other grounds, for example, as a way to boost low-carbon technologies or improve energy security.

#### *Managing the transition towards green growth*

18. The transition to a green economy will require dedicated policy approaches to foster the development and diffusion of green technologies, and to facilitate the re-allocation of capital and labour resources across sectors while minimizing the likely adjustment costs that such processes entail. While green growth will offer many new opportunities in terms of technological, sectoral and employment developments, it will also involve a careful management of the potential decline and job losses in more polluting or environmentally-damaging activities. The economic environment that will prevail in the next few years will make such transition particularly challenging. The consequences of the recession on potential output as well as the need in many countries to embark on fiscal consolidation will exert additional pressure to selectively use public resources. At the same time, a transition towards green economies will open new opportunities for growth, jobs and skills development. Some of the key strategies for addressing these transitions issues are discussed in more depth in Section III.