Tools for Delivering on Green Growth

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BETTER POLICIES FOR BETTER LIVES

Tools For Delivering on Green Growth

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Tools for delivering on green growth

A range of policy options are available for driving green growth. This document outlines these options and summarises many of the issues that need to be taken into account when embarking on a green growth strategy.

Diagnose key constraints to green growth

As discussed in *Towards Green Growth*, there are a range of constraints which can prevent the emergence of greener growth. These will vary from country to country and depending on particular environmental issues at stake. Figure 1 develops a diagnostic framework for identifying key constraints to greening growth. It characterises constraints to green growth as factors which limit returns to "green" investment and innovation *i.e.* those activities which can foster economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.

These constraints are divided into two categories:

- The first is low overall economic returns, encapsulating factors which create inertia in economic systems (*i.e.* fundamental barriers to change and innovation) and capacity constraints, or "low social returns".

- The second is low appropriability of returns. This is where market and government failures prevent people from capturing the full value of improved environmental outcomes and efficiency of resource use. Examples include fossil fuel subsidies (government failure) or a lack of incentives for constructing energy efficient buildings (split incentives) or reducing air pollution (negative externalities).

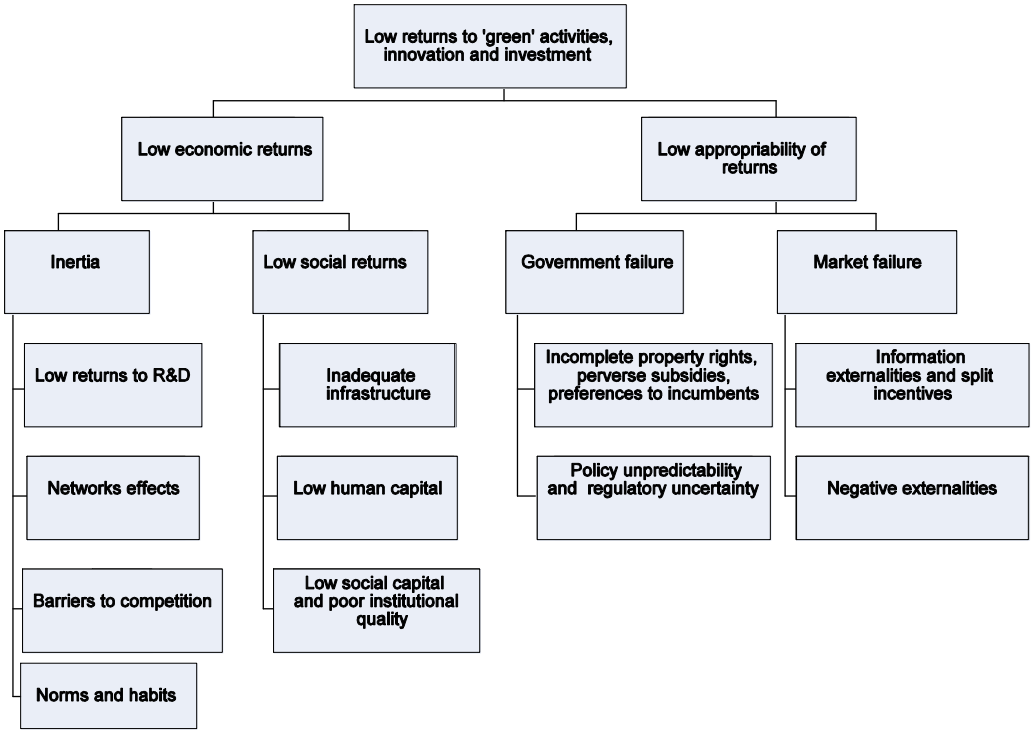
Low economic returns which are a function of inertia constrain the expansion of new or innovative production techniques, technologies and patterns of consumption. These constraints to green innovation are a mixture of market failure and market imperfection. Low returns to R&D are a market failure. Network effects (*e.g.* barriers to entry that arise from increasing returns to scale in networks) and the bias in the market towards existing technologies are examples of market imperfection. The exception to this is that government failure can arise from attempts to deal with these market failures (*e.g.* regulatory barriers to competition and government monopolies in network industries).

"Low social returns" implies the absence of enabling conditions for increasing returns to low environmental impact activities. These constraints reduce the choices of consumers and producers to pursue "green" activities. For example, inadequate electricity or water sanitation infrastructure may lead to water pollution or the use of high emission fuels or inefficient production of electricity. They can also include insufficient human capital such that people are not aware of alternative sources of energy or there is insufficient technical know-how to deploy them. In addition, at low levels of development, a mixture of poor infrastructure with low human capital and institutional quality can mean heavy reliance on natural resource extraction and little incentive for improved natural resource use like sustainable forest

management. These constraints reflect a mixture of government failure, market failures and market imperfections.

The categories of constraint described in Figure 1 are not entirely separable. There are, for example, some overlaps between market and government failures. Incomplete property rights are in many cases a market failure but they are listed as a government failure to reflect the inefficacy or absence of policy to address these well-known failures in cases such as over-fishing. Similarly, the presence of regulatory uncertainty is a major impediment to private actions to reduce greenhouse gas emissions, even though excessive greenhouse gas emissions are essentially a result of market failure.

Figure 1. Green growth diagnostic



Source: OECD, concept based on Hausmann, Velasco and Rodrik (2008), "Growth Diagnostics" in J. Stiglitz and N. Serra, (eds), *The Washington Consensus Reconsidered: Towards a New Global Governance*.

The importance of constraints to green growth will vary according to level of development, socio-economic context, and existing economic and environmental policy settings. Low human capital or inadequate infrastructure will tend to be associated with lower levels of economic development (though not exclusively). Rectifying these constraints will be of high priority and perhaps a precondition to resolving many other constraints.

Where human capital is relatively abundant and infrastructure relatively well-supplied, the focus should first be on resolving government and market failures. In some countries and on some issues, policy is already relatively advanced in this regard (such as in the case of fuel taxes in much of Europe). In these cases, attention should turn to the inherent disadvantages that new technologies have relative to the installed capital base and policies that can help advance these.[1] Sequencing is important to the extent

that resolving low returns to activities with low environmental impact will create market conditions that are conducive to the introduction of new green technologies.

Identifying which constraints are most important is not, however, entirely sequential. In particular, while institutions in some countries may not presently be equipped to address environmental externalities, government failures or split incentives could be addressed. In other cases, environmental externalities may not be fully addressed but there may still be scope to address low returns to R&D.

One constraint which is likely to be common to all countries, regardless of development, is regulatory certainty *i.e.* the extent to which governments articulate and ideally legislate a clear plan for closing the gaps between private and social return so that people can plan and act without too much risk that governments will change the rules of the game.

The diagnosis of key constraints will require country-specific information and data from across the environment and the economy as well as an appreciation for links to global economic and environmental trends. The indicators discussed in Chapter 4 of *Towards Green Growth* provide high-level measures which can be used to inform a diagnosis of constraints to green growth.

Establish effective institutional arrangements

In most countries, new institutional arrangements will need to be established to guide the development of green growth strategies and to overcome the institutional inertia and silos that exist around economic and environmental policy making. For many developing countries, this will involve significant capacity building for integrating environmental issues into national development planning processes, including Poverty Reduction Strategies (PRSPs). In OECD countries, the primary focus will need to be on establishing governance structures at the highest levels of government and on ensuring co-ordination between different areas and levels of government (OECD, 2011a).

Specific steps for developing institutional capacity will depend on whether green growth strategies need to be incorporated into an existing and regular national development planning process or whether such a process will need to be initiated (Clapp, Briner and Karousakis, 2010). In all cases, the goal should be to integrate green growth into policy processes, rather than create stand-alone policy documents or agencies. A more co-ordinated response will be needed. Table 1 lays out some of the key strategic issues that will need to be addressed in this regard.

Table 1. Integrating green growth into economic policy

Strategic priorities	Priority issues, actions and actors
Assess the enabling environment *e.g.* • Overall policy process • Strategy development process • Public dialogue	• Assess existing institutional arrangements with respect to economic strategies and development planning • Link to key national policy issues *e.g.* infrastructure investment, food production, rural poverty • Enlist experts with an understanding of links between environmental and economic policy
Identify key actors *e.g.* • Government actors • Opinion formers • "Champions"	• Finance, economic development or planning ministries • Environment and natural resource agencies • Sector ministries • Civil society organisations • Private sector
Identify opportunities to shape organisational incentives *e.g.* • Incentives • Cross-agency working • Understanding different perspectives	• Assess weaknesses in current (inter-agency) institutional set-up • Enable participation of environmental agencies in key national planning and economic policy development processes e.g. involvement in key working groups • Ensure incentives for economic and budget or development planning agencies to take account of relevant environmental issues • Promote operational collaboration between key agencies • Identify best available "entry point" in National Development Plans cycle and potential role of "champions" • Prioritise according to realistic assessment of opportunities to effect improvements in policy process
Identify awareness and knowledge needs *e.g.* • Briefing • Training • Knowledge products	• Ensure key actors in environmental agencies understand the framework and process for economic management and development planning • Awareness raising on links between environment and social impacts, for both environment and economic policy agencies • Provide knowledge products *e.g.* primers, case studies, exchange visits
Identify analytical tools to be adopted and develop relevant training • Country-specific evidence • Making the economic case • Policy development	• Technical support/training on ecosystem services assessment and economic analysis of environmental assets and services • Technical support/training to economic analysis targeted at planning processes *e.g.* value of environment to specific long-term economic and social objectives • Technical support/training to analysis of effectiveness of cost-benefit of environmental policies and investments
Address options for policy influence • Revise policy priorities • Implementation strategies • Measures and investments	• Provide support on using results of technical analysis to fit decision-making process • Support to "making the economic case" for specific environmental policy measures • Develop skills in communication and negotiation for environmental agencies staff • Engage civil society organisations with potential to contribute positively to policy debate

Source: Adapted from OECD (2011), "Draft Policy Guidance on Capacity Development for Environment".

Construct policy packages

A range of policy options are available for addressing green growth constraints. These are summarised in Table 2. Policy should take advantage of any overlapping objectives and ancillary benefits to capture potential synergies (Karousakis, 2009). In addition to the choice of policy instruments and objectives (*e.g.* whether a tax or a technology standard or infrastructure improvement over boosting R&D), it is also important to consider issues related to how policy is implemented. Across the range of issues to be considered, policy initiatives should, in general, be designed on the basis of the following criteria: cost-effectiveness, adoption and compliance incentives, and ability to cope with uncertainty and provide a clear and credible signal to investors (de Serres, Murtin and Nicoletti, 2010).

Table 2. Possible policies to address green growth constraints

Green growth constraints	Policy options
Inadequate infrastructure	• Taxes • Tariffs • Transfers • Public-private partnerships
Low human and social capital and poor institutional quality	• Taxes • Subsidy reform/removal
Incomplete property rights, subsidies	• Review and reform or remove
Regulatory uncertainty	• Set targets • Create independent governance systems
Information externalities and split incentives	• Labelling • Voluntary approaches • Subsidies • Technology and performance standards
Environmental externalities	• Taxes • Tradable permits • Subsidies
Low returns on R&D	• R&D subsidies and tax incentives • Focus on general-purpose technologies
Network effects	• Strengthen competition in network industries • Subsidies or loan guarantees for new network projects
Barriers to competition	• Reform regulation • Reduce government monopoly

Policies will need to be complemented by a strengthening of institutions and integrated into national development strategies. Some of the key dimensions include: operational independence of regulatory agencies; integration of policy objectives into legislative arrangements to reduce regulatory uncertainty; stable funding to environmental agencies; and multilevel governance.

In general, policy options will vary according to institutional capacity and needs associated with different levels of development. Table 3 shows how constraints to green growth can manifest themselves across countries and how this can imply different policy responses.

Strategies need to account for how these constraints and respective policies cut across different sectors and government agencies. Key issues to consider in this regard include (OECD, 2008):

- Are key domestic economic and sectoral policies (especially in the transport, energy, agriculture, trade, investment, and development assistance domains) subjected to a systematic review of their potential environmental consequences (both harmful and beneficial)?

- Are proposed international trade (including export credits) arrangements screened for their environmental impacts; where these impacts are expected to be significant, is a more detailed environmental impact assessment then carried out?

- Are opportunities for improved co-ordination between environmental, sectoral and economic policies periodically explored, at both the national and sub-national levels?

The formulation of policy should follow a well-defined and iterative process:

- Objectives should be informed by an assessment of business-as-usual (BAU) projections with respect to economic and environmental trends (taking into account population and economic growth). This will help to identify the key current and projected challenges.

- An assessment of BAU should form the basis for developing a long-term vision and accompanying interim objectives, with high-level buy-in and dialogue with major stakeholders within and outside government.

- The establishment of a long-term vision should be informed by cost-benefit analysis.

- Given a set of objectives, the policy process should proceed to identify least-cost policy options and areas for intervention - to identify policy priorities and sequencing.

- Implementation of policies should incorporate regular monitoring and review the effects of policy to assess progress towards the objectives over time. Policy should be robust but flexible, to allow for any adjustments as new information becomes available.

Table 3. Examples of policy challenges by development status

Countries	Challenges	Policy options
Developed countries	• High greenhouse gas emission per capita • Lock-in into carbon intensive infrastructure	• R&D into technological innovation • Investment into low-carbon infrastructures • Pricing externality through market-based instruments
Developing countries	• Industrialisation and increased energy and material consumption • Low energy efficiency • Weak legal enforcement	• Shifting away from carbon-intensive infrastructure and promoting energy and material-efficient technologies • Strengthening government capacity • Technology development, diffusion and transfer
Least developed countries	• High dependence on natural resources (both renewable and non-renewable) • Climate vulnerability • Lack of basic infrastructure (*e.g.* transport, energy and water) • Insufficient financial and technical capacity in government	• Avoiding open-access regime of natural resources • Increasing productivity of net resource use • Climate risk assessment of national policy, plans and programmes • Investment in infrastructure to support access to markets

Use prices where possible...

A central feature of green growth is integrating the natural asset base into everyday market decisions. This suggests extensive use of market-based and pricing instruments. Table 4 summarises the strengths and weaknesses of price-based instruments (based on the aforementioned criteria) and conditions for favourable use.

Prices also offer the potential for integrating environmental considerations into fiscal reform: an important aspect of aligning economic and environmental policy objectives. Environmentally-motivated fiscal reform can be conducted within the envelope of existing budget constraints. It can increase the overall efficiency of spending programmes, especially if it focuses attention on the negative impacts of

some subsidy programmes. It can also be an efficient new source of revenue where this is needed for funding critical growth and welfare-enhancing expenditure programmes, such as health and education.

Table 4. Taxes and trading schemes: strengths and weaknesses

	Strengths	Weaknesses	Conditions for favourable use
Cap-and-trade permit systems	• Tend toward equalisation of pollution abatement costs, can raise revenues, continuous incentives to innovate to reduce abatement costs • Once in place will be defended by stakeholders and provide natural mechanism for financial transfers in international context • Certainty over pollution emission levels	• Steep learning curve, strong learning-by-using effects, potentially high start-up administrative and transaction costs • Adoption incentives lowered by costs to producers / consumers • Concerns of competitiveness and income distribution • Potential price volatility and frequent adjustments to cap	• Public-good market failure is not dominated by monitoring and information costs. Cross-border spill-over effects are important. • Sufficient institutional capacity (experience) and potential size of market sufficiently large to function properly. • Environmental damage depends on overall amount of a pollutant, not specific location or timing of emission sources. Precise control over emissions is available at reasonable cost.
Taxes or charges on pollution or exploitation of natural resource	• Tends to equalise pollution abatement costs, can raise revenues, continuous incentives to innovate to reduce abatement costs • Implementation can be done through existing national institutions	• Potentially high monitoring costs, uncertainty about level of pollution emissions • Adoption incentives lowered by costs to producers / consumers which are more visible than with permits • Concerns of competitiveness and income distribution • Lower predictability of future policy adjustments	• Public-good market failure is not dominated by monitoring and information costs. Cross border spill-over effects are important. • Insufficient capacity or scope for a cap and trade system. Baselines can be set and verified at reasonable cost.
Taxes or charges on a proxy for pollution	• Lower monitoring and administrative costs (relative to permits or direct taxes) • Implementation can be done through adjustment to existing taxes	• Loss of static and dynamic efficiency relative to charges at source, which can be large in the case of distant proxy	• Public-good market failure is not dominated by monitoring and information costs • Pollution sources are small and diffuse. Temporary deviations in emission levels from target have little consequences for environmental damage • Environmental damage depends on overall amount of a pollutant, not on specific location or timing of emission sources. Precise control over emissions is available at reasonable cost.

Source: De Serres *et al.* (2010).

That said, price-based instruments may not always be appropriate. Considering some of the key dimensions along which price-based instruments operate can provide guidance for assessing the appropriateness of price-based policy instruments (de Serres *et al.*, 2010):

- To what extent can the source and quantity of a pollution emission or the exploitation of a natural resource be measured and monitored? Is the technology and procedure required to do so available and can they be implemented at reasonable cost?

- To what extent can price-based instruments be enforced effectively? Can sanctions be envisaged in case of non-compliance?

- What could be the main institutional or structural limitations to the implementation and smooth functioning of pricing instruments, be they taxes or permit systems?

Existing taxes and permit systems should also be assessed:

- Are there opportunities to scale back exemptions and other special provisions in existing environmentally-related taxes?

- Where a tax on a proxy is used, is it possible to tax the source of pollution more directly at affordable cost?

- Where taxes with differentiated rates are used, can the favourable rates still be justified in light of the environmental objective? Could the objective be achieved more efficiently through a combination of taxes and fees that would avoid tax rate differentiation?

- Has the problem of market power and entry barriers been considered in the design of the cap and trade system and is the option of broadening the sectoral coverage being reviewed? Has the option of auctioning the permits been considered?

- Where a baseline-and-credit trading system is being used, is the baseline sufficiently stringent and transparent? Is there scope for transforming the system into a cap-and-trade scheme?

...in combination with other complementary policy instruments

Non-market instruments may also be useful where there are intractable political obstacles to price-based measures. They can, however, reduce the cost-effectiveness of policy and thus may not always be suitable substitutes for price-based measures irrespective of the intractability of political obstacles (Table 5). As for price-based instruments it will be useful to check non-market instruments against a range of criteria to assess whether they are appropriate to address a particular environmental issue or constraint to green growth (de Serres *et al.*, 2010):

- Where price-based approaches are deemed ineffective or inapplicable at reasonable cost, can policy objectives be set in terms of performance standards with respect to environmental outcomes rather than in terms of specific technologies to be used?

- Where performance standards are used or envisaged, to what extent do they encourage polluters to search for and adopt low-cost abatement options through built-in adjustment mechanisms such as standards set on best performers?

- Where technology standards are used or envisaged, are monitoring and enforcement costs substantially lower than possible alternatives based on performance? Do polluters have sufficiently similar abatement costs? If this is not the case, can technology standards be tailored to target differing abatement costs?

- Are learning-by-doing and market size effects strong enough to require direct public support to green technology development in addition to pricing measures for overcoming path dependency?

- How does the implicit cost of pollution abatement through technology support policies compare with the market price of pollution where markets for pollutants are operative?

- Where voluntary approaches are used or envisaged, is the basic information that is needed for implementing price-based approaches lacking in the area concerned? Have the costs and benefits of voluntary approaches been estimated and compared with those of a price-based mandatory approach? How much moral persuasion can the government exert on polluters? Have the risks of anti-competitive practices been addressed?

- To what extent could information-based instruments be used to underpin the responsiveness of agents to price signals?

Table 5. Non-price instruments: strengths and weaknesses

	Strengths	Weaknesses	Conditions for favourable use
Performance standards	• Leave flexibility to search for cheapest option to meet standard • High adoption and compliance incentives (relative to pricing instruments) • Certainty over pollution emission levels • Preserve incentives to innovate to reduce costs of meeting standard	• Do not naturally tend towards equalisation of marginal abatement costs • Potentially high administrative costs • Weak adoption incentives in an international context given difficulty in reaching agreement on burden sharing • More information required than for permits and taxes in order to be effective and efficient	• Pollution control at the source of emissions is infeasible or very costly • No adequate proxy for pollutant that could be object of taxation • Weak response of agents to price signals • Pollution emissions can be measured from application of technology
Technology standards	• Low monitoring costs • High adoption and compliance incentives (relative to pricing instruments) • Certainty over pollution emission levels (at individual units level)	• Provides no flexibility to search for cheaper abatement options • Cannot be easily adapted in response to new information about costs and benefits • No incentives to innovate	• Pollution control at the source of emissions is infeasible or very costly No adequate proxy for pollutant that could be the object of taxation • Administrative costs of performance standards are too high • Abatement costs are relatively homogeneous across agents
Voluntary approaches	• Contribute to information gathering and dissemination on abatement costs and benefits • High (political) adoption incentives	• No intrinsic mechanism to encourage adoption of least-cost abatement options • Uncertainty about outcomes as effectiveness varies with perceived benefits of participants • Risk of collusion among participants	• When the authorities can put strong pressures (credible threat of follow up actions) • Where information is not too costly to provide

Source: De Serres *et al.* (2010).

Many environmental challenges will be best addressed through a combination of instruments. This will be the case for most issues involving several market imperfections and/or multiple and varied sources of pollution, such as:

- Where eco-innovation is hampered by specific innovation failures, overall cost-effectiveness can be improved by combining pricing instruments with R&D and technology adoption policies.

- Systemic changes involve more than technology alone and often require significant organisational and institutional changes. These changes often involve their own barriers and constraints, which may need to be addressed by policy.

- Where the degree of damage caused to the environment depends on the specific location or timing of emissions, pricing instruments may need to be complemented with command-and-control regulation such as local standards on emissions or local bans on certain products.

- Information-based instruments can be useful and effective in strengthening the responsiveness of agents to price signals.

- A combination of taxes, tradeable permits and/or performance standards may be optimal in the cases of multiple and varied sources of pollution. However, instruments should be set so as to minimise the differences in the implicit or explicit pollution prices across sectors.

... while avoiding overlaps

Similarly policy mixes need to avoid counter-productive overlaps of instruments. As a general rule, policies overlap when the same people (*i.e.* individuals, firms, public administrations) are covered by at least two instruments that essentially address the same environmental issue. For instance, if a firm is covered (directly or indirectly) by both a cap-and-trade system and a tax for carbon emissions, one of the two instruments will be redundant (Duval, 2008). Likewise, emission performance or energy efficiency standards for the car industry may not be justified in the presence of a carbon pricing covering the transport sector, unless they also constitute the best option to address other externalities.

Combining fixed-price policies (taxes or subsidies) is relatively transparent: if an emissions tax is in place, the incremental incentive effect of an additional tax is similar to the incremental effect of that policy on its own (other than perhaps some diminishing returns). But since tradable credit systems allow overall market conditions to set the credit price – which determines the incentive effect of the policy – any other policy that changes those market conditions will also change the credit price. As a result, the net incentive effect of the overlapping policy can be quite different than if it were implemented alone (Fischer and Preonas, 2010).

For example, Böhringer and Rosendahl (2010) consider the interaction between the European Union's Emission Trading Scheme (EU ETS) and a renewable portfolio standard (RPS). They find that a binding RPS, by encouraging more renewable energy than the ETS alone, makes it easier to comply with the emissions cap, reducing the permit price. This price reduction confers a greater advantage on relatively dirty producers (*e.g.* coal-fired generators), while the burden of buying green credits falls on dirty producers equally. The net effect is that the dirtiest producers actually *increase* their output (and emissions), while the relatively clean non-renewable sources are displaced.

New subsidy programmes should be approached with caution...

Green growth strategies will inevitably elicit calls on government to provide funds to green sectors or to subsidise environmental activities. In markets for consumer products such as cars, houses and electric goods, many governments are implementing pricing schemes to support the green market. A green growth framework demands careful scrutiny of such schemes. Table 6 summarises the strengths and weaknesses of potential expenditure instruments and conditions for favourable use.

Table 6. Potential expenditure instruments

	Strengths	Weaknesses	Conditions favourable to use
Subsidies	• High adoption and compliance incentives (relative to permits or taxes)	• Potentially large budgetary costs • May trap excessive resources in subsidised "clean" activity • Uncertainty about impact on negative externality • No incentives to search for cheaper abatement options	• Enforcement of alternative pricing instruments is difficult or very costly Activity to be subsidised is a strong substitute for targeted "dirty" activity • Subsidy programme can be designed in a relatively simple way, for a time-limited period and with minimal secondary effects
Active technology support policies	• High adoption and compliance incentives • High incentives to invest in research and development of new technologies	• Do not directly address negative environmental externality • Can lead to low-cost available abatement options being overlooked • Potentially large budgetary costs and deadweight losses • Uncertainty about the level of pollution emission	• Technology areas where market size and learning-by-doing effects are dominant • Infrastructures in areas where network considerations are important

Source: De Serres *et al.* (2010).

Despite their budgetary cost, subsidies to encourage a switch to greener activities are more commonly used than price instruments. Examples can be found in the case of industrial pollution control and agricultural activities, notably to support the use of bio-fuels. Such schemes need to be very carefully evaluated, however, as they are often costly and the way that such policies are designed can lead to wide variations in cost-effectiveness.

Policy makers should consider the following issues for determining the appropriateness of committing public funds to the promotion of green growth (OECD, 2008; de Serres *et al.*, 2010):

- Is public support provided only in cases where public goods are expected to be generated (e.g. where significant environmental improvements would not otherwise not be provided by producers)?

- Are public support measures likely to be the most efficient and effective ways of reaching a given environmental target?

- Has the feasibility and cost of pricing the externality been directly assessed? How strong is the substitutability between the subsidised activity and the dirty activities it is supposed to replace?

- Do clear and transparent eligibility criteria exist concerning who is entitled to receive support, and under what circumstances; has an appropriate "reference level" been established to guide the allocation of support?

- Are existing public environmental expenditure programmes consistent with the Polluter Pays Principle and with international rules regarding state aid?

- Do existing public environmental expenditure programmes have the secondary effect of encouraging additional demand for, or supply of, polluting products or activities over the long term?

- Is public support allocated first to private agents that commit to achieving the largest environmental improvement per unit of support?

... and existing programmes carefully reviewed and reformed

Before new funds are committed to green growth, governments should identify those subsidies whose removal (or reform) would boost long-term economic growth or reduce environmental damage. Thus, a review of subsidies should include scrutiny of support related to both economic and environmental policy objectives. For example, high levels of production-linked price support have traditionally been provided to the agriculture sector. This has encouraged overuse of chemical inputs, as well as expansion of farming onto land that is of relatively low value economically – but often of high value environmentally. In turn, this has led to efforts to address these negative environmental impacts via programmes that are conditional on meeting certain environmental standards (cross-compliance). It will generally prove to be more efficient and effective to reform the original subsidy than to retain (and try to correct) the environmental problems it creates through cross-compliance requirements (OECD, 2008).

Issues to consider when engaging in subsidy reform include:

- Is it clear that environmental cross-compliance programmes are leading to real environmental improvements, and in the most efficient manner possible?

- Are the beneficiaries of environmentally damaging economic subsidies, and the circumstances under which these subsidies are provided, both transparent to the general public?

- Have transitional (and time-limited) compensation measures been developed, to support the process of reforming environmentally damaging economic subsidies?

The coherence of subsidies with other government objectives or programmes also needs to be taken into account *e.g.* do existing subsidies have undue negative impacts on developing countries?

Particular attention needs to be paid to innovation and overcoming inertia…

A strong capability to innovate is an essential prerequisite for green growth with due attention given to non-technological innovation and demand-driven innovation. Strategies should address the specificities of innovation in the environmental area (Table 7). The use of packages of policies will be especially important in this context because of the range of market and policy failures and imperfections which come into play.

An essential set of criteria against which innovation policies aimed at improving environmental performance should be measured includes (Johnstone, Haščič and Kalamova, 2010):

- Stringency – how ambitious is the policy target?

- Predictability –what effect does the policy have on investor uncertainty?

- Flexibility – whether potential innovators are free to identify the best way to meet the objective?

- Incidence – does the policy target the environmental objective as closely as possible? and

- Depth – that is, do incentives exist to innovate through a range of potentially ascending objectives?

Table 7. Possible policies to foster green innovation

Policy challenge	Policy options
Insufficient demand for green innovation	• Taxes and market-based instruments to price externalities and enhance incentives • Demand-side policies, such as public procurement, standards and regulations, in specific markets and circumstances
Lack of innovation capability	• Broad-based policies to strengthen innovation
Technological roadblocks and lack of radical innovation	• Investment in relevant R&D, including thematic and mission-oriented research • International cooperation
Research and investment bias to incumbent technology	• R&D support, tax incentives • Adoption incentives/subsidies • Technology prizes
Lack of finance	• Co-investment funds • Market development
Regulatory barriers to new firms	• Regulatory reform • Competition policy • Front-runner approaches
Lack of capabilities in SME to adopt green innovation	• Access to finance • Skills development • Linking SMEs to knowledge networks • Improving information supply • Reducing regulatory burdens
Non-technological innovation	• City and transport planning • Regulatory reform
International technology transfer	• Development of capabilities • Trade and investment policies • IPR protection and enforcement • Voluntary patent pools and collaborative mechanisms

Note: A detailed toolbox to foster innovation, including green innovation, is currently being developed as a follow-up to the OECD Innovation Strategy. This Innovation Policy Platform will be released in 2012.

The ideal policy instrument will be one which is sufficiently stringent to encourage an optimal level of innovation; stable enough to give investors adequate planning horizons for risky investments; flexible enough to encourage novel solutions; and closely targeted on the policy goal, so as to avoid misallocation of effort and provide incentives for continuous change.

…including ways for enabling change in consumer behaviour

Addressing barriers to behavioural change will facilitate the emergence of new patterns of demand and increase the cost-effectiveness of policy signals aimed at producers. Special attention needs to be given to these barriers because habits and norms can lock households into patterns of consumption which are hard to alter. A range of policy tools should be considered in this regard. Table 8 summarises the key issues to be addressed and policy levers that could be used to encourage the greening of consumption behaviour.

Table 8. Key dimensions for greening household behaviour

Information	Awareness

• Can shift behaviour because
  o Consumers often do not know how much they consume
  o Labels influence consumer choice
• Information needs to:
  o Reflect public and private benefits
  o Be trustworthy and easy to decipher
	• Of environmental issues is linked to greener consumption
	• It rises with educational attainment
	• It can be influenced by appropriately tailored education for sustainable consumption
	• And increases acceptability of policy reform

Alternatives	**Incentives**
• Availability of alternatives is as important as incentives, especially in public services and infrastructure • Natural monopoly can reduce consumer access to these services, so regulatory oversight is key	• Such as prices, increase efficiency of consumption short-term • Drive demand for "green" consumer durables and household equipment, helping to green consumption long-term

Leveraging public and private finance for green growth

Boosting growth and development prospects while greening the growth trajectory at the same time will require both increased investment flows into infrastructure, particularly in developing countries, and also a shift in the composition of investment flows. To shift the composition of investment, governments will need to assess and resolve barriers preventing or discouraging institutional investors, especially pension funds, from investing in infrastructure which will enable greener growth[2] (Table 9).

Table 9. Boosting investment in infrastructure: barriers and solutions

Barriers	Solutions
Lack of experience and knowledge (*i.e.* with infrastructure, private equity and other investment vehicles or direct investments)	• Encourage improved knowledge and understanding of pension fund stakeholder and supervisors on infrastructure assets • Encourage development of appropriate investment vehicles • Support consolidation and pooling of pension funds
Shortage of data (*e.g.* on performance, costs, risks, and relationships)	• Support stronger efforts in independent data collection and objective information provision in the field of infrastructure investment • Recommend upgrade of national and supra-national statistics data collection with a view to better capture infrastructure (and other alternative asset classes)
Fees	• Promote higher transparency standards in private equity vehicles and direct investments
Instability (*e.g.* regulatory instability, political risks, and risk associated with emerging markets such as currency risk)	• Enhance the investment environment • Ensure stable regulatory environment • Create a platform for dialogue between investors, financial industry and governments (*e.g.* the OECD) • Development national, long-term policy frameworks for key individual infrastructure sectors, improving the integration of the different levels of government in the design, planning and delivery of infrastructures through the creation of infrastructure agency/bank, and the creation of a National Infrastructure Pipeline • Encourage the study of more advanced risk analysis beyond the traditional measures, including the specific risks of infrastructure
Regulatory constraints (including accounting and investment regulations *e.g.* restrictions on asset classes/ liquidity/ non-listed/ diversification requirements/ leverage rules/ valuation rules)	• Check funding and investment regulation is not inadvertently preventing infrastructure investments • Recommend the establishment of international guidelines for performance and risk management of infrastructure (and other alternative) vehicles

Facilitate adjustment and address transitional concerns

Jobs strategies should be tailored to address a transition to green growth

Labour market and skill policies can play an important role in facilitating the structural adjustments associated with Green Growth, while at the same time minimising the associated social costs. Like any major economic transformation, the transition to Green Growth will have significant employment effects. New jobs will be created, some jobs will be at risk and many others would have to be reallocated from grey to green sectors.

A prerequisite for a smooth and fair transition to green growth is a well functioning labour market. The OECD Reassessed Jobs Strategy (OECD, 2006) provides a comprehensive framework for achieving that. It shows that a carefully designed package of labour market and skill policies can assure that the labour market is both dynamic - continuously redeploying labour from declining to growing industries and firms - and inclusive.

Within the general framework of the Reassessed Jobs Strategy, a number of labour market and training policies tailored to the transition to green growth will also be required, although their details are difficult to foresee in many cases (Table 10). In particular, the greening of the economy will have an

impact on skills, and a major challenge for policy makers is to identify future hiring needs and skill requirements. Well-designed green education and training programmes will have an important role to play in helping workers to exploit the potentials of the emerging green economy.

Table 10. Possible policies to foster labour market transition to green growth

Policy challenge	Policy options
Promoting an inclusive labour market	• Effective income and re-employment support for jobseekers, in particular for disadvantaged groups • Mutual obligation strategy, ensuring that benefit recipients engage in active job search in exchange for receiving employment services and benefit payment • Strong system of vocational education and training
Fostering labour market dynamism	• Moderate employment protection and labour taxes to foster job creation in emerging green activities • Strong product market competition to promote the entry of new innovative firms and reap the full benefits of new green competitive niches
Adapting the workforce skills	• Close monitoring of job skill requirements in key green industries and occupations in order to identify new skill needs • Incorporate new skill requirements into education and training programmes

Assess solutions for addressing competitiveness concerns

Green growth policies are likely to raise concerns about the relative stringency of domestic policy and the potential losses to firms whose competitiveness can be undermined. These concerns are likely to be strongest in relation to policy to protect the global commons such as climate policies. Any proposed measures to deal with these concerns should be scrutinised in terms of their economic efficiency, the incentives they create for reducing GHG emissions, their impacts on developing countries, and their effectiveness in addressing competitiveness concerns (Tables 11 and 12). The domestic political economy aspects and the practicality of implementing measures also need careful consideration.

Table 11. Reducing adverse impacts on international competitiveness

Principles for policy design

Principle	Description	Indicators for Evaluation *(quantitative and qualitative)*
Effectiveness in addressing international competitiveness impacts	Policy makers should evaluate whether measures to address competitiveness impacts achieve their objectives, such as retaining market share of polluting industries relative to foreign competitors, reducing job losses, or eliminating competitiveness-related emission leakage.	• Sectoral output and employment • Sectoral profits and market share • International trade and investment flows • Emissions and leakage rates
Economic efficiency	Policy makers should minimise costs to the economy from the imposition of measures to address international competitiveness impacts. For example, the overall costs of achieving a given climate policy target will be increased for a country if the measures taken to address competitiveness impacts result in lowering the emissions reduction requirements for energy-intensive industries, as this would imply some low-cost reduction options are not exploited.	• Domestic welfare or GDP changes • Changes in the pricing of pollution • Cost per tonne of leakage reduced • Foregone government revenues
Incentives for minimising environmental impacts and promoting innovation	Given the stringency of proposed environmental policy targets over time, measures should maintain significant incentives for abatement and innovation. Exempting sectors from such policy would reduce their incentives for pollution reduction.	• Incentives for pollution reduction (such as a price signal) • Innovation impacts (*e.g.* patents and changes in abatement costs)
International political economy	Effects on other countries from measures to reduce competitiveness impacts should be considered.	• International GDP or welfare changes (with particular regard to impacts on the poor)
Domestic political considerations	Tradeoffs among stakeholders should be considered, as well as impacts on government revenues and transfers.	• Impacts on affected stakeholder groups (*e.g.* employment, output) • Foregone government revenues
Implementability	The administrative costs and implementation burden should be evaluated by policy makers for each measure.	• Estimates of implementation burden • The ability to obtain data needed to implement policy measures

Source: OECD (2010), ''Addressing International Competitiveness in a World of Non-Uniform Carbon Pricing: Lessons from a Decade of OECD Analysis'', *Policy Brief*.

Table 12. Addressing competitiveness impacts on energy-intensive industries

Evaluation of measures

Principle	**Full auction/tax ("Reference Case")**	**Measures to address competitiveness impacts from climate policy:** Change from Reference Case: "no change", "+" indicating improvement of criterion from reference case, "-" indicating reduction, and "+/-" indicating uncertain effect)				
		Free Allocation		**Border Taxes**		**Other**
		Grandfathered free allocation	Output-based revenue recycling or allocation	Import Only	With Export Rebate	Industry exemption
Effectiveness in addressing competitiveness impacts	Likely to impact some energy-intensive sectors	**+/-** Profits maintained, but market share impacts remain	**+** Incentivises production	**+/-** Output further reduced; domestic market share may not change	**+/-** Preserves export market share but reduces output due to higher carbon price	**+** Though indirect costs still remain
Economic efficiency	Maximises economic efficiency	**+/-** Efficiency of policy maintained, reduces fiscal revenues	**-** Production and emissions levels distorted and fiscal revenues reduced	**-** Barriers on imports increase costs	**-** Barriers on imports increase costs	**-** Some cost-effective abatement not implemented
Incentives for GHG mitigation and innovation	Full abatement incentives	**No change**	**-** Abatement from production reductions eliminated	**No change**	**-** Export exemption decreases abatement	**-** Very few incentives
International political economy	Mixed effect on developing country GDP and welfare	**No change**	**No change**	**+/-** Reduces developing country GDP/welfare further with uncertain effects on climate action		**No change**
Domestic political implications	Generally negative due to political power of energy-intensive industries	**+** Reduces industry concerns over profits	**+** Can allow for more ambitious policy	**+/-** Intermediate goods are more costly for all; some industries may perceive market share benefits from international competitors facing similar carbon costs		**+** Fewer stakeholders
Implementability	Similar for all participating sectors	**No change**	**-** Requires common output metrics and competitive domestic market	**-** Analyses of embedded carbon can be costly		**+** Fewer participating sectors

Source: OECD (2010), "Addressing International Competitiveness in a World of Non-Uniform Carbon Pricing: Lessons from a Decade of OECD Analysis'', *Policy Brief*.

To ensure a more effective imposition of environmentally related taxes, without reducing a country's competitiveness, there are several options (OECD, 2001):

- Integrate environmentally-motivated reforms better with broader fiscal reforms.
- Announce the introduction of new taxes and tax rate increases well in advance, and phase out existing rebates and exemptions gradually, thus enabling a smooth adaptation of economic agents over a period of time.

- In instances where exemptions and rebates are currently given for competitiveness reasons: Impose full tax rates on industry, but channel part of the revenues back to industry in such a way that marginal abatement incentives are maintained; for example by providing subsidies to industrial polluters for R&D or investments aimed to reduce pollution levels.

- The negative environmental effect of exemptions and rate reductions can also be limited by ensuring that firms that currently benefit from exemptions and reduced tax rates sign up to stringent mitigation measures.

- A two-tier rate structure, with lower rates for more internationally exposed sectors, would be a better option than full exemptions for some sectors; for example, an energy tax could have higher rates for the health care sector and domestic building industry, and lower rates for the petrochemical industry.

Assess and implement policies for addressing income distribution concerns

Possible strategies to compensate low-income groups include:

- *Lump sum compensation,* calculated on the basis of average green tax payments per household, in the form of cash transfers or credits against income tax. Cuts in income taxation may not benefit groups of low-income households because they pay little or no income taxes (Smith, 1998). To assist the households concerned, countries can use tax credits. Tax credits are amounts deductible from tax payable (as distinct from deductions from the tax base). Two types of tax credits are distinguished, those (referred to as wastable tax credits) which are limited to the amount of the tax liability and therefore cannot give rise to a payment by the government to the taxpayer, and those (referred to as non-wastable tax credits) which are not so limited, so that the excess of the credit over the tax liability can be paid to the taxpayer. To compensate poorer households for the impact of environmentally related taxes, non-wastable tax credits are the preferred option because the revenue service pays out the excess of the credit over income tax due to qualifying households.

- *Income-tested compensation,* with two further options. One way to calculate the amount in compensation would measure the green tax due by average energy users or polluters against household income. A second, more complicated mechanism would calculate the compensation by comparing actual green tax payments of households to household income. The rationale for this variant might be that poor households have sometimes limited options to reduce their energy use, such as in the case of block heating. However, if it were decided that households need not pay more than say two percent of their income in a given green tax, the price signal would be ineffective once a household had exceeded this threshold.

- *Reduction of other taxes,* sometimes referred to as "tax shifting". In this situation, the regressive impact of an environmentally-related tax is (partially) offset by a reduction in the marginal rates of other taxes, specifically taxes on labour.

Notes

1 The nature of this disadvantage will vary according to existing regulatory environments. In some cases, the regulatory environment will be such that incumbent firms enjoy an advantage over new entrants. In other cases the lack of a supporting network may prevent deployment of innovative technologies.

2 See Inderst (2009), OECD (2011b) and OECD (2007).

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Tools for Delivering on Green Growth

The OECD Green Growth Strategy aims to provide concrete recommendations and measurement tools to support countries' efforts to achieve economic growth and development, while at the same time ensure that natural assets continue to provide the resources and environmental services on which our well-being relies. The strategy proposes a flexible policy framework that can be tailored to different country circumstances and stages of development.

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