OECD Regional Outlook 2011
Building Resilient Regions for Stronger Economies


PART II

*Chapter 5*

# Green Growth for Regional Development

*This chapter focuses on the regional dimension of the shift towards a greener economy, which is currently a major policy priority for OECD countries. Its principal emphasis is on the potential contribution of cities and urban policies in meeting this challenge, but it also looks at the potential for renewable energy development to drive both cleaner growth and the revival of some rural areas. Finally, it also looks at multi-level governance of water, one of the most important and yet environmentally sensitive goods.*

Green growth is increasingly seen as a new source of promoting societal progress and a more integrated model for development. However, the shift towards a greener economy implies a rather diffuse process across all sectors and economic actors. How can these different strategies be co-ordinated without taking into account the local dimensions, in cities and rural regions? This chapter focuses on urban and rural policies, as well as the water governance mechanisms that support such a green growth strategy.

## How cities can contribute to a green growth strategy

Over half the world's population lives in cities today, as much as two-thirds is expected to do so by 2050, and within the next decade, there will be nearly 500 cities of more than 1 million people, including several "megacities" with populations exceeding 20 million. Beyond that trend, several arguments are usually cited to justify the fact that cities should be at the heart of the transition to a green economy. They include the following:

- Cities' impact on the environment. The urban form matters: the lower the urban density, the more energy is consumed for electricity and transportation. The environment also impacts on cities, especially on cities located in coastal areas.
- The interactions between the economy and the environment are much more visible at the city scale. Attractiveness is a key factor of city growth performance and can be hampered by a poor environment.
- Because green growth is about synergies between environmental and economic policies, an urban policy package is more likely to deliver green growth than a wide economic approach only.

### *Cities and the environment: It is a two-way relationship*

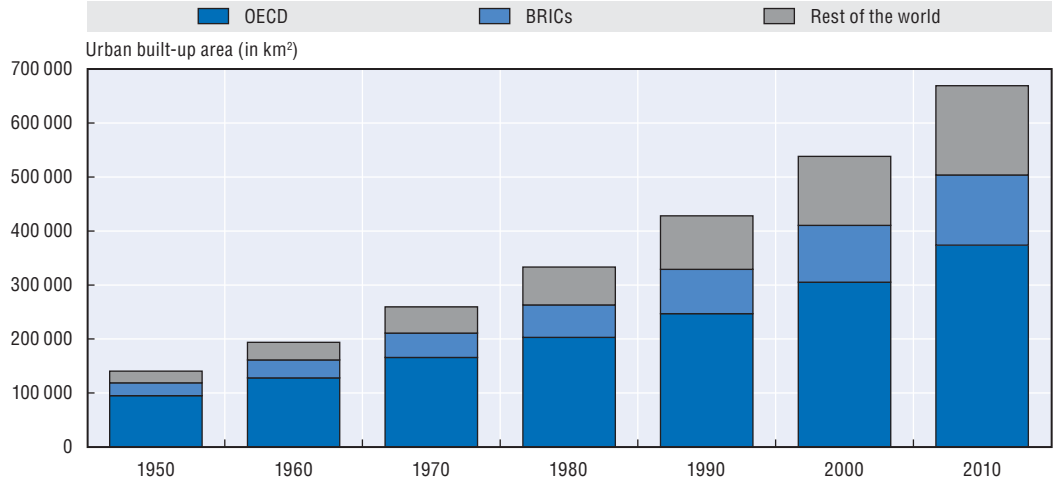
Reducing environmental pressure is perhaps ones of the most critical current policy objectives. Global greenhouse gas (GHG) emissions are projected to grow by a further 37%, and 52% to 2050 (OECD, 2008). This could result in an increase in global temperature over pre-industrial levels in the range of 1.7-2.4° Celsius by 2050, leading to increased heat waves, droughts, storms and floods, and causing severe damage to physical capital, including key infrastructure and crops. The estimated costs of these impacts vary widely, but may be as much as the equivalent of 14.4% of per capita consumption when all market and non-market impacts are taken into account (Stern, 2007).

Urbanisation has had a major impact on the environment. The ecological footprint – the total area required to provide environmental goods and services for a specific region – is particularly severe in cities. For example, London's footprint was found to be 125 times the size of the city and twice the land size of the United Kingdom (Wackernagel, 2006; London Remade, 2007). Although detailed harmonised data are not available at the urban scale, a recent IEA analysis estimates that 67% of global energy use occurred in cities in 2006, and will likely increase to 73% by 2030 given current urbanisation trends. In

climate change terms, cities were believed to generate 71% of global energy-related $CO_2$ emissions in 2006, and will likely be responsible for 76% of global energy-related $CO_2$ emissions by 2030 (IEA, 2008).

As discussed in Chapter 1, cities are critical drivers of national and aggregate growth. The contribution to aggregate growth of just the 2% of "hub" regions – mainly composed of the largest OECD urban areas – is approximately one-third. Their large and critical contribution largely reflects agglomeration economies. These benefits, however, are not without limits. Negative externalities including congestion, air and water pollution, and the loss of ecosystems on which the city depends, can, in some cases, reach a point where the metropolitan area becomes less competitive (OECD, 2006). These negative attributes are not internalised by firms and households, and may only show up as direct costs in the long term. They include, for instance: high transportation costs (*i.e.* congested streets) and loss of productivity due to long commuting times; higher health costs; and environmental degradation. Negative externalities are also associated with a city's historical decisions by government officials about how the city should grow. In many OECD countries growth in metropolitan areas has generally taken the form of an expansion of developed areas through suburbanisation. Overall, urban land area in the OECD has doubled in the second half of the last century, and in the vast majority of OECD metropolitan regions, the suburban belt has grown even faster than the core (Figure 5.1) (OECD, 2010).

Figure 5.1. **Incremental increases of urban areas, 1950-2010**




*Source:* OECD calculations based on data from Goldewijk, K. *et al.* (2010), "Long Term Dynamic Modelling of Global Population and Built-Up Area in a Spatially Explicit Way", *The Holocene*, Vol. 20(4), pp. 565-573.

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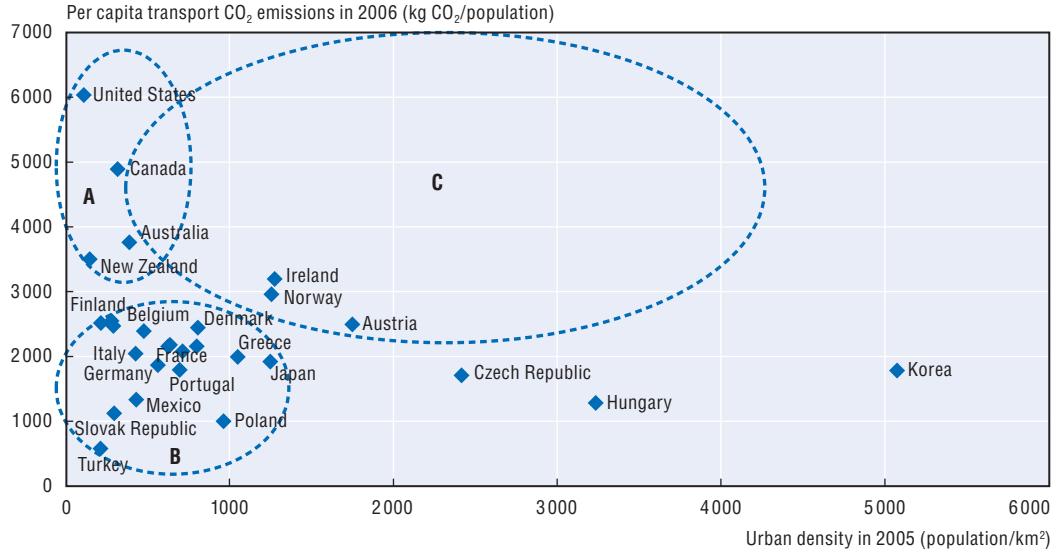
The urban form of cities is indeed one of several critical factors influencing energy demand and GHG emission levels. Figure 5.2 reveals an interesting trend displaying high environment pressure (*e.g.* highest emissions per capita) that can only occur in low densely populated urban areas (A); and not in high densely populated urban areas (C). While there are a number of low densely populated urban areas with low environmental pressure (B), there are no densely populated urban regions with high emissions per capita. This means the probability of high emissions per capita is indeed much higher in low densely populated areas. The urban form of cities is not a necessary condition to attaining lower

Figure 5.2. **$CO_2$ emissions per capita in transport and density in predominantly urban areas, 2005-06**




*Notes:* A = Low-density urban areas with high emissions/B = Low-density urban areas with low emissions/ C = Densely populated urban areas with high emissions.
Urban density is calculated based on the OECD definition of "predominantly urban" areas.
Iceland and Luxemburg were not included in the sample as *OECD Regional Statistics Database* identifies no predominantly urban (PU) regions in those countries.

*Source:* Calculations based on data from *OECD Regional Statistics Database*; International Energy Agency (2008), *$CO_2$ Emissions from Fuel Combustion 2008*, OECD Publishing, *http://dx.doi.org/10.1787/co2_fuel-2008-en-fr*; and International Energy Agency (2009), *Energy Balances of OECD Countries 2009*, OECD Publishing, *http://dx.doi.org/10.1787/energy_bal_oecd-2009-en-fr*.

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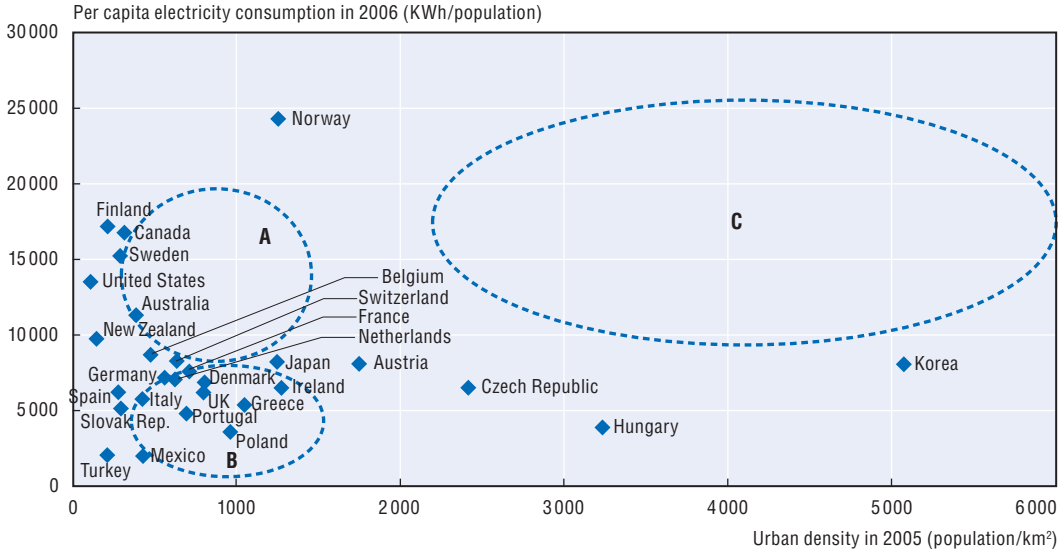
per capita emissions, but a critical factor among several others, such as energy prices, the productive structure of urban areas or the public transportation networks. As urban areas become denser and rely more on public transport, walking and cycling, carbon emissions tend to be reduced. Therefore there are no densely populated urban regions with high per capita emissions.

Similar findings can be drawn in the electricity sector (Figure 5.3). For instance, Japan's urban areas are around five times denser than Canada's, and the consumption of electricity per person in the former is around 40% that of the latter. Denmark's urban areas are denser than Finland's by a factor of four, and people there only consume around 40% of the electricity consumed by the Finns. However, urban areas in Turkey, Mexico and the Slovak Republic have low levels of both urban density and per capita energy consumption.[1]

The contributions cities are collectively making to global climate change may come back to haunt them, undermining public health and the key urban infrastructure systems that are fundamental to their long-term competitiveness. Cities are especially vulnerable to water-related calamities and the effects of climate change. OECD work demonstrates that a 50cm sea-level rise, combined with predicted socio-economic development patterns, could result by 2070 in a tripling of the population at risk of coastal flooding and a tenfold increase in the amount of assets exposed, rising from 5% of global gross domestic product (GDP) in 2008 to 9% of GDP in 2070. Port cities most at risk for coastal flooding are located both in rapidly growing developing countries such as India and China (*e.g.* Kolkata, Shanghai, Guangzhou) and in wealthy countries such as the United States (*e.g.* Miami,

Figure 5.3. **Electricity consumption per capita and density in predominantly urban areas, 2005-06**




*Notes:* A = Low-density urban areas with high electricity consumption/B = Low-density urban areas with low electricity consumption/C = Densely populated urban areas with high electricity consumption
Urban density is calculated based on the OECD definition of "predominantly urban" areas.
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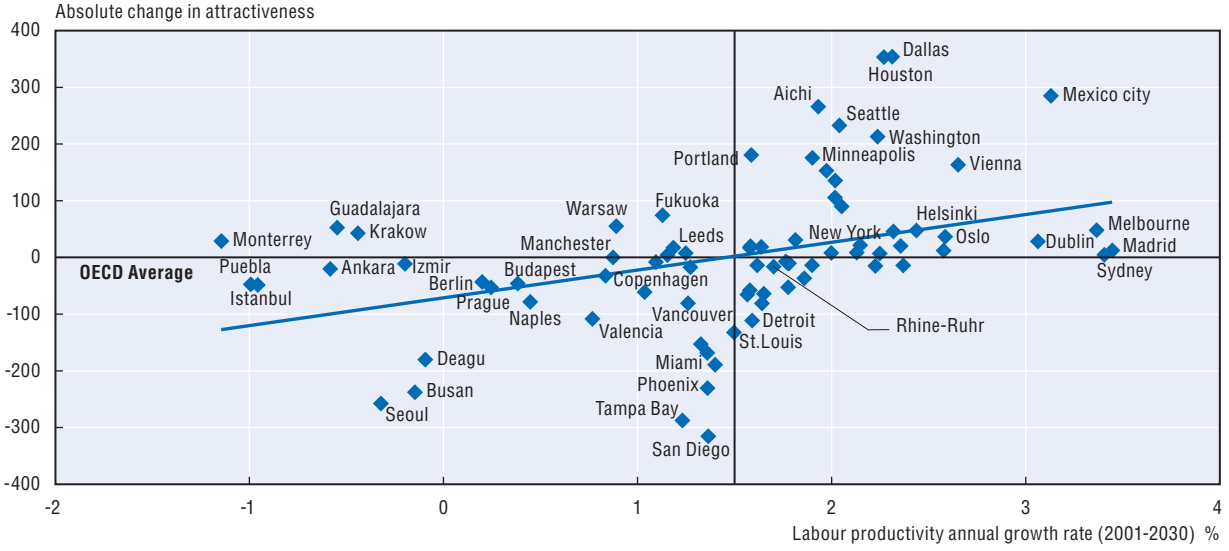
New York City), the Netherlands (*e.g.* Rotterdam, Amsterdam) and Japan (*e.g.* Tokyo, Osaka) (Nicholls *et al.*, 2008). The increasing frequency of severe weather events, combined with sea-level rise, can cause sanitation problems if urban infrastructure is ill-equipped to accommodate a sudden influx of water. Climate change may also intensify competition for water as cities generally rely on their immediate surroundings for water. Finally, climate change is likely to increase both the severity and duration of heat waves, which will be felt more strongly in urban areas, due to the "urban heat island" suspected of warming urban areas 3.5-4.5° C more than surrounding rural areas. Rising temperatures – particularly during the warm weather months – can also impose significant stress on the local energy system, increasing the risk of blackouts, which threaten both the local economy and public health (Hammer *et al.*, 2011a).

### *Improving environmental quality in cities can strengthen their economic attractiveness*

Congestion, pollution and public services constraints affect not just environmental quality but also the efficiency of local economic activities and a city's ability to attract firms and skilled workers. Policies that reduce energy and resource consumption and waste, and increase the attractiveness of the urban environment can thus also support urban economic growth. Findings from a general equilibrium model of OECD metropolitan regions demonstrate that urban density policies and congestion charges can reduce the overall cost to the economy of meeting GHG emissions reduction targets (OECD, 2010).[2]

Using a projection model (IMACLIM), OECD (2010) shows that over the long run improving environmental quality in cities (through curbing local pollution) can strengthen their economic attractiveness. Previous studies define city attractiveness as the appeal for firms of carrying out activities in a particular urban area (Berg and Braun, 1999). This in turn depends on the size of the production the firms may achieve in one location relative to that of others. In the projection model, urban attractiveness is the result of four different factors: expectations over production volume; capital returns; market size; and local environmental conditions. The first three indicators are positively correlated with attractiveness. The modelling exercise shows that the attractiveness of the 78 metropolitan regions included in the OECD metropolitan database is strongly positively correlated to firms' expectations about production and reflected in the average production growth rate (Figure 5.4).

Figure 5.4. **Change in economic attractiveness and growth across OECD metropolitan regions, 2001-30**




*Source:* OECD (2010), *Cities and Climate Change*, OECD Publishing, *http://dx.doi.org/10.1787/9789264091375-en.*

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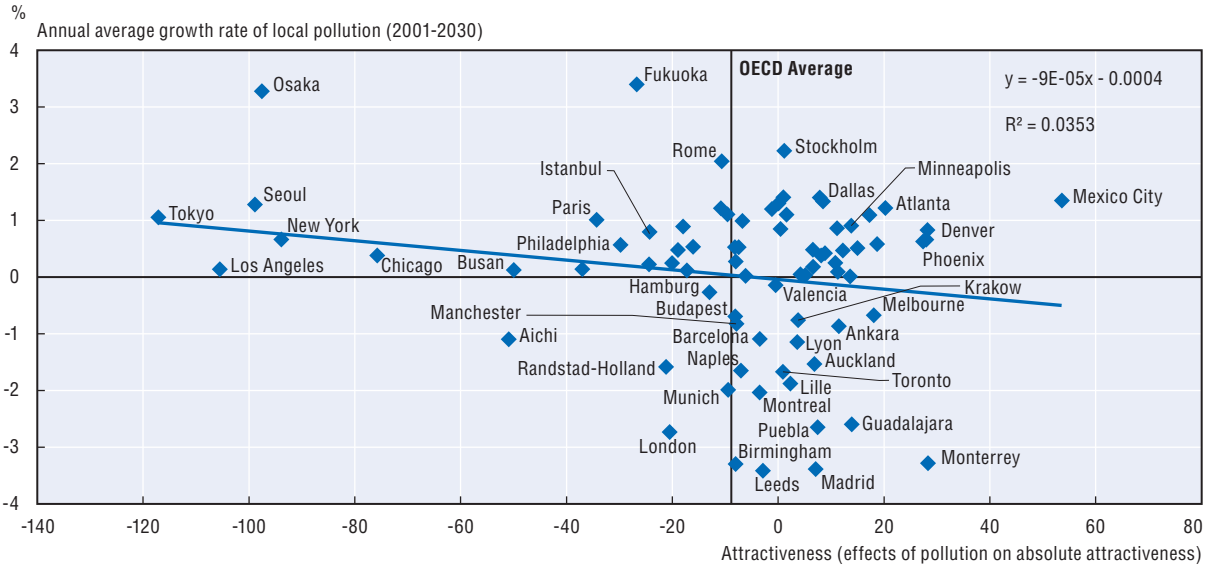
In this model, local pollution also drives attractiveness. Workers are willing to tolerate the negative externalities from pollution if properly compensated by firms in their wages. Higher pollution levels would likely undermine the attractiveness of a metropolitan region. The model is able to show that in the next two decades, pollution emission growth rates will affect the attractiveness of a number of metropolitan regions in the OECD (Figure 5.5). The pollution-attractiveness relationship also provides justification for the implementation of local policies aimed at reducing carbon emissions not only for environmental, but also for economic efficiency reasons.

### *But how is green growth defined?*

The concept of green growth imposes an explicit, normative judgment about the need to steer economic growth in a different direction, addressing externalities and other factors poorly served by current measures of economic activity. It also recognises that environmental policies that do not support economic growth and wealth creation are not

Figure 5.5. **Change in economic attractiveness and pollution emission across OECD metropolitan regions, 2001-30**




*Source:* OECD (2010), *Cities and Climate Change*, OECD Publishing, *http://dx.doi.org/10.1787/9789264091375-en.*

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sustainable in the long term. In this spirit, the OECD Green Growth Strategy defines the concept as follows:

> "*Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and ecosystem services on which our well-being relies. To do this it must catalyse investment, competition and innovation which will underpin sustained growth and give rise to new economic opportunities*" (OECD, 2011a).

As will be developed in the following paragraphs, the scope of this definition can be extended in three ways when applied to OECD urban areas, by taking into account: *i)* a need for new sources of urban growth; *ii)* policy complementarities present at the local level; and *iii)* the importance of social equity to urban development.

First, OECD analysis shows that the average output growth in predominantly urban areas has been lower than in other types of regions since 1995. According to the United Nations population projections, urbanisation in OECD countries will continue to slow down, requiring policy responses to foster new sources of growth (United Nations, 2007). Given the negative externalities generated by urban agglomeration and cities' urgent need to reduce their energy consumption and greenhouse gas emissions, urban areas have the opportunity to conduct environmental policies that can foster these new sources of economic growth.

Second, there are more opportunities on the local level to enact environmental and economic policies that are complementary, as activities related to environmental protection and economic development are more integrated at the local level than at the national level. Green growth policies benefit from these policy complementarities and can thus be more effective when applied at a local scale.

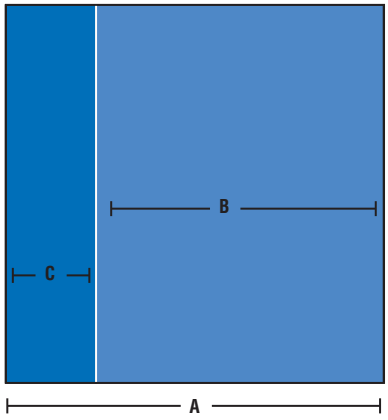
Third, while the OECD Green Growth Strategy focuses on the inter-relatedness of economic and environmental concerns, the implementation of green growth at the local level addresses social issues in a more direct way. There are clear instances where green growth initiatives can provide social co-benefits and others where the transition might generate concerns for social equity.

### *Alternative green growth scenarios*

It is possible to identify six distinct scenarios that embody different economic growth impacts depending on the greening activities, primarily by differentiating between the impacts on green and traditional economies.

The six green growth scenarios are as follows:

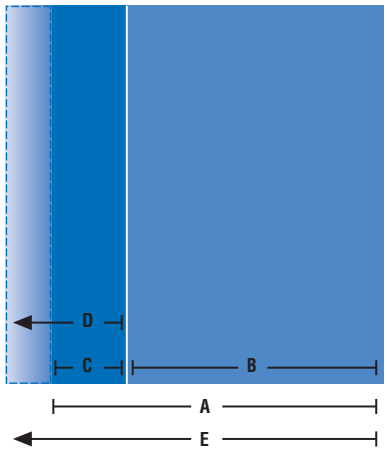
**Scenario 1 (Baseline): No impact**




Under this baseline scenario, green policies provide no significant long-term economic bump, with the total economy remaining constant (A) and the traditional (B) and green (C) sectors also remaining constant in size. This would occur in two ways: the policies established by the relevant authorities are very ineffective, producing none of the desired environmental or economic impacts, or the policies deliver the desired environmental outcomes but without any demonstrable economic impact. The latter might occur with a tree planting programme designed to improve local air quality, reduce the urban heat island, sequester $CO_2$ emissions, and improve the overall attractiveness of the city. Because most cities will procure the trees from nurseries or tree farms outside of their area and utilise existing staff to plant and maintain the trees, the economic impacts may be relatively small.

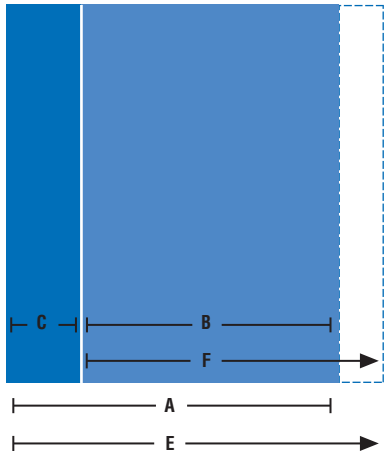
Under Scenario 2, the implementation of green policies and other initiatives designed to deliver local and global environmental benefits results in a significant expansion in the total level of economic activity in the region (from A to E). This expanded economic activity primarily occurs in the green technology and service sector, however, which increases in size from C to D. The balance of the region's traditional economy (B) does not increase in any meaningful way; although there might be some cost savings and other less tangible co-benefits (improved quality of life, etc.) that do occur. In other words, the greening benefits do result in decreased resource use and/or decreased environmental degradation, but the benefits do not have significant spill-over in terms of the traditional economy. This scenario might occur in regions that are importing and deploying large quantities of

**Scenario 2: Green sector growth**



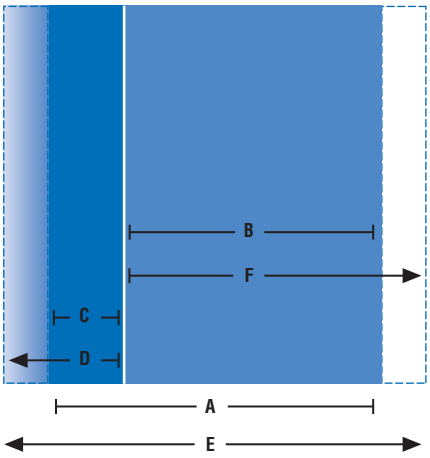

renewable power technology, with the power primarily being exported to other parts of the country. Job growth thus occurs in the renewable sector, but the other localised economic impacts may not be as large as originally hoped.

**Scenario 3: Economic greening**



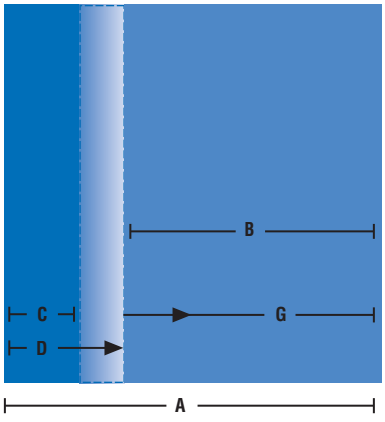

By contrast, economic greening occurs when the implementation of multiple green policies and other initiatives results in a significant expansion in the region's economy (from A to E) that is concentrated in the traditional economy, which increases from B to F. This is not to say that there is no increase in economic activity in the green sector (C), but this activity is either offset by other losses in the environmental business sector (from existing companies in that sector losing market share to new firms), or by the fact that the technology being deployed does not involve significant new employment or is imported from outside of the region. The imposition of congestion pricing in New York City for instance, which was projected to deliver significant efficiency gains in the local retail, banking, and other service sectors, is an example of economic greening. This scenario may also occur in regions with poor air quality, which dampens the overall economic attractiveness of the area. Resolving the problem may involve deploying imported pollution abatement technology at local industrial facilities, remedying the problem without necessarily increasing the size of the local green economy.

**Scenario 4: Multi-sector growth**



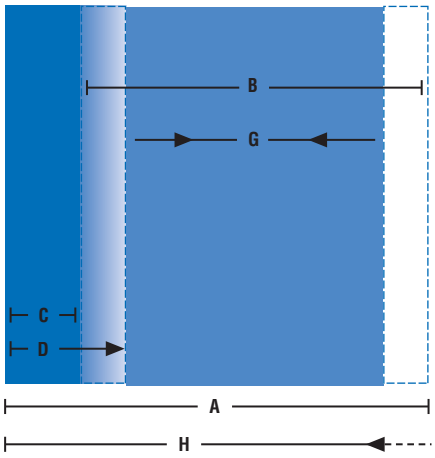

The multi-sector growth scenario would ordinarily be considered the ideal by most policy makers, as greening strategies result in expansion of both the green business sector (from C to D) and the traditional businesses sectors in the region (from B to F). Accordingly, significant economic growth occurs in the region, increasing the overall size of the economy from A to E. Whether the green and non-green segments of economy grow at equal rates is less important than the notion that significant growth occurs in both sectors, resulting in a noteworthy improvement in the level of economic activity in that region.

**Scenario 5: Sectoral displacement**




One issue of concern to many policy makers is the extent to which growth in one sector may displace or cannibalise economic activity occurring in another sector. In the case of activities designed to improve a region's environmental performance, this could occur if, for example, policies promoting the deployment of renewable energy technology deliberately or inadvertently resulted in the shrinkage of economic activity in other energy sectors, such as the extraction of fossil fuels or operations at fossil fuel-fired power plants. Such a scenario might occur in areas where fossil fuel resources are primarily extracted for local use, or where local fossil fuel-fired power plants are the primary source of power for the region. The Scenario 5 figure embodies this possibility, assuming that growth in the green sector (from C to D) is fully offset by losses in the traditional economy (from B to G), resulting in a situation where overall economic activity for the region remains constant (A).

**Scenario 6: Economic stagnation/de-growth**

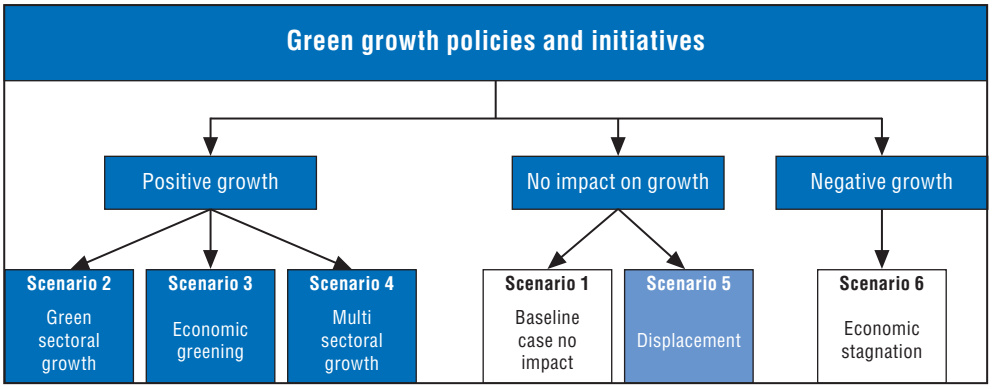



The final scenario, perhaps feared most by policy makers, occurs if the imposition or pursuit of greening policies results in significant adverse economic impacts in the region's economy, stunting activity to such a level that the overall economy actually shrinks (from A to H). This scenario presumes that greening policies do result in some demonstrable increase in the size or level of activity in the green sector (from C to D), but this is more than offset by sizeable losses in the balance of the extant economy (from B to G). Such a situation could occur if greening policies are excessively onerous, significantly affecting the profitability of businesses operating in the region, or forcing businesses to leave or shut down altogether.

### *Defining green growth in an urban context*

Defining green growth in an urban context requires first agreeing on desirable scenarios. Figure 5.6 illustrates how the six above-mentioned scenarios fall along a spectrum, ranging from positive to negative growth outcomes. The (dark blue) colour indicates the desirable scenarios, the (light blue) may be considered second best options, and (white) indicates the non-desirable scenarios. Although it is important to understand the extent to which growth occurs in sectors specifically aimed at promoting environmental protection or resource-conservation services or technology, these sectors generally represent a relatively small subset of the larger service and manufacturing economy in a region. What is important, therefore, is the extent to which green growth initiatives contribute to overall economic expansion in a city region, with that growth attributable either to green sectoral growth (Scenario 2), economic greening (Scenario 3), or multi-sectoral growth (Scenario 4). In all of these cases, the level of economic activity triggered by a greening strategy is sufficient to grow the entire regional economy by some noteworthy amount. Two (1 and 5) envisage no growth occurring or displacement. Although these two scenarios are not optimal, in some cases, they could be desirable. The final scenario (6) displays a situation where environmental policies are sufficiently onerous that they actually result in shrinking the region's economy with business closures and job losses. This scenario is perhaps the greatest fear of policy makers, as it would fulfil the longstanding fear that environmental protection and economic growth are incompatible goals.

Figure 5.6. **Impacts of greening policies on economic growth: The desirable and non-desirable scenarios**




*Note:* The (dark blue) colour indicates the desirable scenarios, the (light blue) may be considered second best options, and (white) indicates the non-desirable scenarios.

Based on this screening of scenarios, green growth in an urban context could be defined as follows:

> *Urban green growth means fostering economic growth and development through urban activities that reduce negative environmental externalities, the impact on natural resources and the pressure on ecosystem services. The greening of the traditional urban economy and expanding the green urban sector can generate growth (through increased supply and demand), job creation and increased urban attractiveness. These effects are in part the result of stronger interactions at the urban level among economic efficiency, equity and environmental objectives.*

### *How to enable the transition to urban green growth*

#### *Economy-wide policies*

Economy-wide policies conducted by national policies are essential to establish broad, cross-sectoral price signals to guide investment in green technologies, for example through a tax on carbon or establishment of national cap-and-trade regulations. More targeted, sector-specific national policies or regulations may also be needed to encourage large-scale investment in energy conservation and fuel switching (Betsill, 2001; OECD, 2008) or create the market conditions for other green technologies to thrive. In both cases, having a clear national policy framework is an important precursor that will determine the appropriateness and direction of different local strategies and policy instrument choice. Additionally, national policies can also help ensure that policy making is not confined to a few front-runner municipalities, but rather is integrated into the functioning of urban areas across the country.

However, economy-wide policies alone are unlikely to deliver green growth. Because green growth is about synergies between environmental and economic policies, policy coherence is necessary and requires taking into account the spatial dimension. City and regional governments may more easily identify and combine complementary green policies within and across sectors than higher levels of government, given the interconnectedness of urban policy sectors. The existence of policy complementarities signals a benefit in the form of the return generated when one policy is enacted along with another (De Macedo and Oliveira Martins, 2006). Identifying the impact and benefits that policy sectors can have on each other is essential to designing policy packages that enhance the effectiveness of each

individual policy. Some urban sectors are particularly interlinked to others, and thus can enhance or undermine the effectiveness of other sectoral policies.

### *A policy framework for urban green growth*

A policy framework for an urban green growth agenda would consider different interactive elements. First, there are policies to support economic growth, including efforts to improve the skills of the local workforce, promote innovation, and improve or expand local infrastructure necessary to sustain growth. These three "pillars" are fundamental prerequisites to a growing economy, and policies aimed at addressing these goals will serve as the first lens through which green growth policies will be viewed. Second, there are greening challenges and opportunities, each of which comes with its own set of tailored technology or policy prescriptions that have been proposed or are in use in cities around the world. We can identify six different types of greening opportunities in a city, including mobility, energy, building, natural resources management (land ecosystem and water), green services and pollution prevention (solid waste, air or water quality). Third, there are different types of policy instruments or tools to promote urban greening (*e.g.* rulemaking authority and regulatory oversight, public spending, financial tools, and information and advocacy). For these three elements, there is an underlying issue of policy competency or jurisdiction. Green growth policies must necessarily involve the efforts of both national and sub-national stakeholders, because no single stakeholder (or tier of government) has sufficient policy influence to implement a comprehensive green growth policy on its own. These different elements interact and come together in an urban green growth policy framework (Hammer *et al.*, 2011b).

Several dynamics are at play here:

1. Sub-national authorities pursuing a green growth programme must necessarily view their policy efforts through an economic lens, meaning pro-growth goals may influence the topics viewed as priorities in a city or region.
2. The greening opportunities or challenges are highly interconnected sets of issues, with actions in one policy area having links to many of the other policy silos. For example, promoting compact city design will have impacts related to air quality, transport system viability, energy-technology decisions, and the like. This concept is discussed at length in the following pages.
3. Finally, these policy decisions all occur amidst an important backdrop, *i.e.* the goals or values that influence policy decisions. These could relate to environmental or economic aspirations policy makers hold for the city/region, or they could relate to social equity goals they also wish to accomplish via a green growth initiative. In some cases, officials may not even realise how their views have been shaped by these factors, as they might represent long-standing operating procedures, technologies, or market practices. Changes might thus be manifested in incremental terms, rather than in paradigm-shattering or generation-skipping technological terms.

### *How to design an urban policy package for green growth?*

To deliver an urban green growth agenda, an urban policy package holds the promise of a new development path where economic growth and higher environmental quality are complementary. The need to exploit synergies among policy instruments demands a dramatic shift toward more integrated policy making at the urban level. More sustained municipal investments in infrastructure that is less carbon-intensive represent a

necessary first step. However, supply-side measures alone will not be enough and are unlikely to be sustainable, given the current price of green technologies and the market demand for low-carbon goods and services. Thus, urban policy makers should pursue an integrated policy package that takes into account: *i)* how firms adapt to new business opportunities and energy price changes; *ii)* how individuals change their preferences; and *iii)* how green technologies are developed and diffused in the market.

Prioritisation among the different interventions needs to be based on an accurate screening of possible complementarities among the Urban Green Growth Policy Framework greening opportunities and challenges. In other words, within a well-developed strategy, interventions in one domain unlock positive developments in other domains. For example, a large retrofit programme for public buildings can be a powerful boost to skilled and semi-skilled employment generation. However, the impact of the programme on local employment can be maximised only if well-trained workers are locally available. Higher competition among suppliers of retrofit services, as well as technological innovations that can reduce the cost and the carbon-intensity of these materials, is also needed to improve the cost-efficiency of public retrofit investments. Synergies and possibilities for leverage do exist, and urban policy makers should develop capacities to spot and use them. More knowledge of how the local economy works and a strong capacity to pursue interdepartmental programmes are essential prerequisites to seize the employment and growth potential of the low-carbon transition. Table 5.1 provides examples on how the different elements of a green growth strategy can interact, in this case related to building policies.

Table 5.1. **Green growth policy synergies: The example of building policies**

| Pro-growth policies → Greening opportunities ↓ | Infrastructure and investment policies | Innovation policies | Human capital policies |
|---|---|---|---|
| *Buildings* | *Retrofitting of public buildings. Publicly supported financing mechanisms for individual investment in energy efficiency technologies. Publicly supported financing mechanisms for individual investment in distributed renewable energies (*e.g. *solar PV).* | *Support for firms producing building energy-efficient technologies. Labelling and standards for building energy efficiency. Facilitation of contracting with Energy Service Companies (ESCOs) for retrofitting.* | *Retraining of traditional economy workers for energy efficiency retrofitting and installation of distributed renewable energy generation systems.* |
| Impact on jobs | Building retrofits and installation of distributed renewable energies and energy efficiency technologies is labour intensive. | Low and high-skill job opportunities at firms producing building energy efficiency technologies. | Facilitates transition to job opportunities in building energy efficiency retrofitting and installation of distributed renewable energy technologies. |
| Impact on demand for green goods | Public support lowers barriers to consumer demand for energy efficiency and distributed renewable energy technologies. | Labelling and lowering information barriers to energy efficiency programmes can increase consumer awareness and demand. | – |
| Impact on urban attractiveness | New and retrofitted energy efficient or energy-neutral buildings can attract firms seeking lower energy costs. | Funding and technical assistance, and clear labelling standards, can attract energy efficiency retrofitting and renewable energy installation firms. | Skilled labour pool can better attract energy efficiency retrofitting and renewable energy installation firms. |

There are several examples of how such an approach of fostering policy complementarities can be achieved. One example is integrated strategies for transportation and land-use planning. With limited budgets, cities now face the dual challenges of

providing transportation infrastructure that meets the needs of a growing economy while reducing pollution, congestion and GHG emissions, and providing land and services to expand the tax base while avoiding the negative economic, environmental and social impacts of sprawl. To meet these challenges, many urban areas are putting the priority on orienting development around public transportation and public services delivery (*e.g.* Copenhagen's Finger Plan). In some cases, this takes the form of spatial plans in which cities aim to direct growth around an urban core or a polycentric system of urban core areas. In other cases, cities have focused primarily on promoting development that extends outward around public transportation networks, public services and urban amenities. What these strategies have in common is their goal of supporting economic growth through means that also reduce energy consumption and other resources.

Multimodal public transportation delivery also responds to sustainability and job-growth priorities. The synergy between transportation and economic activities generates new employment opportunities in entertainment, recreation, dining, banking, commerce and community services. Integrated urban strategies for sustainable transportation can serve as incubators for green technology innovations, providing a good framework for evaluating the costs and benefits of new technologies with wide industrial applications, such as hybrid engines, hydrogen fuels and sensor networks. For example, the City of Hamburg has sought to support the development of hydrogen-fuel buses by combining its purchasing power with other cities, Barcelona, Berlin, Cologne and London, with the goal of creating demand for 100-150 hydrogen buses (EurActiv, 2009).

Another example of policy complementarities is when cities improve their environmental effectiveness and attract new firms and jobs through combined investments in transportation networks and information and communication technology (ICT). Efficient intra-urban mobility is crucial to realise the economic advantages of agglomeration – that is, cities that are more connected and more compact. There are important complementarities between ICT and transportation investments. Both respond to the need to improve connections between people and businesses, reducing costs of commuting and information transfers. ICT innovations, when applied to public transportation systems, can improve service quality and thus ridership more cost-effectively than large-scale capital investments.

### *A renewed interest in compact city policies*

In some countries, the green growth agenda has generated a renewed interest in a compact city policy approach (OECD, 2011b). The latter goes in the same direction of fostering complementarities between economic and environmental objectives. In general, successful "compact cities" rely on transportation linkages, mixed land uses, and high-quality urban services. Different urban forms may have the same density, however, and the policy goals, strategies and tools applied to the concept can vary (Fouchier, 1997). This underlines the importance of local contextualisation. Applying densification policies or congestion charges can have long-term positive effects on the economy due to technological innovation: high-quality, more-efficient public transport that responds to economic needs and better connects labour with employment, thus increasing firms' productivity, etc. Land-use zoning policies that allow for higher densities and greater mixing of residential and commercial uses can enhance transportation goals by reducing trip distances while strategic mass transit linkages can attract development and promote compact growth. Long-term growth plans in a number of OECD metropolitan areas aim to maximise these complementarities (*e.g.* Paris, New York, London).

### *There are limits to the urban green growth paradigm*

There are some limitations to the concept of green growth that policy makers at both the national and regional/city levels must keep in mind as they move forward.

First, there is a potential issue of a zero-sum game. Green growth Scenarios 5 and 6 hint at one of the biggest concerns, namely that there may be winners and losers as cities begin to work towards green growth. Some urban economies may grow a great deal, others will grow less, and some might potentially shrink, if the process is managed poorly. In a similar vein, some business sectors may thrive, while others may see little change in economic activity level. To the extent a city is heavily dependent on businesses likely to decline as a result of competition from green growth-related businesses, the economic impacts could be considerable. National governments will be concerned about the net impacts across all regions in their country; local government officials will naturally be more concerned about the localised impacts. The question of a zero-sum game among territories in the race towards green growth development is a concern for national policy makers.

Second, cities are not in an equal position. There are several baseline variables (Table 5.2) that link to how successful urban green growth initiatives will be over different time periods. Whether these factors put the brakes on or accelerate green growth will depend on how well local officials assess their greening needs and opportunities, and structure an implementation strategy that leverages the support and involvement of other key stakeholders. The baseline variables include the city's natural resources asset base, the technology already deployed (which may constrain future technological investments), local economic conditions, and local political capacity to act.

Third worth noting in this discussion is the prominence of social equity arguments, and the idea that these variables can shape decisions made in the name of environmental protection or economic growth. Ideally green growth strategies can be crafted so there will be few or no losers, addressing both short- and long-term displacement problems and other inequities that may occur as a city transitions to a new growth paradigm.

Last but not least, moving towards a low-carbon, more sustainable society will require significant upfront investment. Existing urban revenue sources could be "greened": congestion charges and road taxes can reduce car travel and fund green infrastructure; local energy fees that put a price on wasteful energy use can increase efficiency; and property taxes can stop favouring urban sprawl and start encouraging development in the urban core and around transportation linkages. National governments could also green urban finance by redesigning grants to sub-national governments to correct incentives for unsustainable behaviour and reward cities that create environmental benefits beyond their borders. However, acting on green growth in cities will require new sources of funding. Carbon finance for cities as well as public-private partnerships emerge promising tools. A better understanding of advantages and limits is however necessary to extend their use on a wider scale.

Table 5.2. **Baseline variables that link to how successful urban green growth initiatives will be**

| | |
|---|---|
| **Resource environment** | **Natural resource base:** Many local greening and green growth strategies seek to harness naturally occurring ecosystem services in or near the city. For instance, water from deepwater lakes can be used to cool buildings. Abundant sun, wind or other power supply sources can facilitate – or hamper – the development of renewable energy. Circumstances can change over time as technological innovation and efficiency improvements occur. Another type of natural resource may relate to the dominant power supply sources in a city, as regions with large amounts of coal deposits may find proximity to these resources gives them an inexpensive and relatively secure fuel supply. This too can influence the viability of other green growth options.<br>**Climate/geographic conditions:** A city's location (*e.g.* coastal *versus* inland) and climatic zone (*e.g.* hot/cold/temperate) may also help to determine its greening priorities. In the face of climate change, coastal locations may focus green growth plans on climate adaptation strategies. Weather and climate patterns may also be linked to past and planned technology and infrastructure investment decisions (*e.g.* district heating and cooling technology).<br>**Technology/infrastructure:** Historic investments in technology and essential infrastructure have long been linked to path dependency or technology lock-in (Unruh, 2000, 2002), which can dramatically shape a city's path toward green growth. These sunk investments may offer short-term cost advantages that prevent alternative technologies to effectively compete on price.<br>**Urban form/built environment:** A city's land-use patterns and transportation system contribute to both density and urban form, which are essential levers for a number of green growth issues (*e.g.* transport/mobility options, energy system design, water supply and treatment options, access to green space, amount of permeable surfaces, etc.). |
| **Policy and economic environment** | **Policy competency and level of engagement:** The policy making powers assigned to local authorities determine their ability and "willingness to act" (Hammer, 2009) in selecting green growth issues and policy instruments. Whether key infrastructure assets (*e.g.* the water supply, power-generation facilities, the public transport system), are owned and operated by local, regional or federal authorities or the private sector influences the extent to which a city is able to mobilise these assets for greener growth.<br>**Industrial/economic base:** The state and structure of the local economy can influence the locus of a city's green growth strategy. Heavily industrial cities may find that pollution and escalating energy demand top the list of issues to be addressed through a green growth strategy, while cities dominated by a service-based economy, like tourism, may pursue greening strategies that enhance recreational amenities.<br>**Other economic factors:** Policy makers should also understand how other economic factors might influence green growth initiatives. Cities with low per capita income or high corporate tax rates may find it difficult to finance green growth. The local elasticity of demand for essential services, such as energy and transportation will determine the extent to which green growth policies drive up the cost of these services and, ultimately, price some consumers out of the market. Human capital can also shape the type and sustainability of green policies. |

## The contribution of rural areas to a green growth regional development strategy

Rural development is as crucial in taking forward the green growth agenda as the contribution of cities. While agglomeration policies are valuable in encouraging economic growth, policies cannot depend on agglomeration alone. Rural areas, for example, will always host some population, related to past or current rurally based economic activity; and migration of the more mobile people to cities can result in disproportionate costs in the supply of public services to the residual population. It therefore makes good public policy sense to search for untapped growth potential and look to exploit regionally specific assets in rural areas to the full. Those assets are dominated by natural resource products – food, water, forest products, minerals and scenic attractions that can be a basis for the tourism and leisure industry.

Taking the need for green growth in rural areas as a starting point, and the need to make the best use of rural assets as sources of future growth, a key challenge for all countries is how to achieve the best use of land as a resource, within its long-term carrying capacity. As with water, the pressures on land use are building, given increasing population, and changing weather patterns. Rising demand for food is putting more pressure on arable land; demand for more homes, business and leisure developments are often met by sprawl onto land currently used for agriculture or forestry; climate change

imperatives have created big new demands for biofuel crops where few were grown before; at the same time, governments have agreed globally to put more emphasis on biodiversity – especially through mechanisms to deter the loss of rainforest from conversion to seemingly economically more valuable uses. Development policies should be addressing how to achieve the best outcomes from land use, if the world is to achieve the best use of this finite resource and hand it on in good order to future generations.

In a world of increasing population, and increasing consumption per head, pressures on versatile land are increasing. Land is a finite natural resource being called on to provide ever more services, in greater volumes. Greater pressures will bring greater tensions between those services. Many of the services are part of the production of essentials of life – food, drinking water, flood management, biodiversity, renewable energy and stored biomass in the shape of forestry and carbon-rich soils. The next section describes one response to the potential of green growth rurally – harnessing renewable energy potential, which is of increasing importance given climate change. But there is a wider challenge: climate change and urbanisation are reducing the amount of fertile land capable of delivering life essentials and increasing the potential for weather and human conflicts to intensify commodity shortages and price spikes. Countries should be looking to make more of the green growth potential of their land, though the amount of exploitable land is likely to shrink.

This makes it more important for rural development to take account of the green growth agenda and, looking to the future, capitalise on rural land for the various contributions it can make to better lives for all people. A key question, in the interests of the long-term global economy, is how countries will reconcile the competing pressures on land locally in a way that can contribute positively to the global imperative. What are the best governance models to deliver rural development that embraces both private goods such as food and biofuel, and public goods such as biodiversity and sequestered carbon?

The aim will be to look at the governance arrangements that countries and regions have put in place that are relevant to influencing the way that land-based assets are exploited for their sustainable development potential. Do countries' and regions' individual combinations of regulation, subsidies and taxation encourage optimum use of land? Where can best practice be found? Addressing these questions will require a broader view integrating OECD countries, as well as those countries with large land resources, such as Brazil, the Russian Federation, India, China and South Africa (BRICS).

Like the work on water, innovation and green growth, land-use research and policy analysis require a cross-cutting approach. In many countries, land-use responsibilities also require an approach running across ministries for communities, development, agriculture and environment, if the goal is a properly joined up strategy. At the level of the European Union, there is no competence for land-use planning, so the relationships between the programmes – for example on regional development, agriculture and rural development, energy and transport – can be difficult to assess. The land-use governance agenda is therefore an important area for further work in light of the OECD's Green Growth Strategy.

## An employment strategy for rural areas: Fostering renewable energies

Many OECD governments see the renewable energy supply chain as a promising sector for the creation of valuable and stable jobs. This is particularly important in rural areas, since exploitation of the major renewable energy sources is space-intensive and thus likely

to develop primarily in rural areas. Worldwide investment in renewables increased more than tenfold between 2002 and 2010, reaching USD 240 billion (Ernst and Young, 2011). This surge in global investment is strongly supported by public policies aimed at stimulating the development of renewable energy sources. These policies reflect three major concerns: climate change; energy security; and job creation. The first of these is a well-established driver of policy change, while the second has grown in salience over the last decade, owing to the upward trend in oil and gas prices and geopolitical instability in many hydrocarbon-rich areas of the world. The emphasis on job creation has become ever more important as a result of the economic crisis and is seen in particular as a way to revive some lagging rural economies – in particular, since renewables, being space-intensive activities, are in some respects fundamentally rural undertakings.

The deployment of renewable energy is thus increasingly seen as a key development opportunity for rural regions and also a way for governments to give substance to "green growth" rhetoric (see Chapter 4). However, economic and workforce development opportunities are often constrained in rural areas by limited infrastructure and/or limited availability of the necessary competences to deal with new sectors or new technology. To reverse this trend and tap rural regions' endowment of renewable sources of energy will require improved learning capacity and the accumulation of competencies in rural areas. If successful, regional specialisation in the production of renewable energy is likely to percolate to other sectors, like construction, manufacturing, and services, thereby multiplying job opportunities along the supply chain localised in the region. Regional governments are well positioned to magnify the impact of this regional specialisation. In many OECD countries, they have a key role in the design and/or implementation of national energy strategies. Regional governments are also well placed to develop innovative policy solutions that can be scaled up into supra-regional or national programmes, or to provide laboratories for national pilot programmes.

### *What are the likely labour-market impacts of renewable energy?*

Forecasts of substantial employment creation have helped increase public support for investment in renewable energy. According to UNEP (2008), "given rapidly rising interest in energy alternatives, future years may well see worldwide employment soar, possibly as high as 2.1 million in wind energy and 6.3 million in solar PVs by 2030, and on the order of 12 million jobs in biofuel-related agriculture and industry". There are positive forecasts also for activities that are related to green power generation. For instance, the environmental goods and services (EGS) sector is estimated to be worth over USD 600 billion world wide and is projected to rise to just under USD 800 billion by 2015, with very positive impacts on employment (Selwyn and Leverett, 2006). Value added is mainly due to rent, interest and profit, however, implying that GDP data hugely overstate the benefits of this investment for the regions concerned, which depend mostly on wages.

Thus, while green power generation will largely be located in rural areas, the benefits for local economies are uncertain. The impact on labour markets will depend on the job multipliers associated with the activities located in a given region. For instance, the stricter environmental regulation needed to encourage the use of renewable energy will probably act as a "job killer" in places specialised in conventional energy production, reducing the number of jobs in this sector. The imposition of stricter climate-change regulation will lead to significant job losses and increasing social fragmentation if appropriate steps are not taken. A study conducted by the Worldwide Fund for Nature shows that in the United States,

net job losses due to clean energy policies are most likely to occur in sectors that are usually located in rural areas: coal mining, oil and gas extraction, oil refining, and electricity and natural gas utilities (Kammen *et al*., 2004). Similar patterns are likely to be found in other OECD economies.

Hence, to assess the impact of green power on rural economies, both macro and local levels must be taken into account. At the macro level the issue is net new jobs, as evidenced by a rise in the participation rate or a fall in the structural unemployment rate. To what extent will green power simply displace jobs in traditional power supply or offset employment losses in other sectors that are negatively affected by climate-change mitigation efforts? If green power is more expensive, how many jobs will be lost due to lower GDP? At the local level, it is key to understand how many jobs are associated with each specific project and how durable they are likely to be. Certain jobs will be in operation and maintenance (O&M), while others in the construction of the needed facilities. As a consequence, there will be both temporary and long-term jobs created in regions.

A thorough assessment of employment effects should thus focus on job multipliers, the backward and forward linkages green power can generate at the regional level, and income effects. Power generation (O&M) typically creates relatively few local jobs and has small local job multipliers.[3] It is a capital-intensive activity and has low linkages to the local economy. This is especially true for those forms of renewable generation that rely on free energy inputs, like wind and sun. Conversely, indirect job creation at provincial/state or national level can be significant. For instance, a region can specialise in the production of component manufacturing for renewables. Finally, displacement effects at the national level can offset many of the renewable energy effect jobs. Due to lock-in dynamics that may take place at the national level, some regions will become home to core high-value activities in the renewable energy supply chain, while others will host the low-value added parts, with lower impacts on employment creation and regional development.

The number and the unit cost of new jobs created vary according to the activity in which the regional economy specialises. Although energy generation is a capital-intensive activity with a low impact on the labour market, the jobs created are usually valuable and stable. The situation is completely different for construction, which typically has a far higher job multiplier and can generate up to 30 jobs for each USD million invested. However, construction is a short-term activity, so it does not affect the long-term economic trajectory of rural communities in the same way. Manufacturing also has high multipliers, and it is a long-term activity (Table 5.3). Regions that are able to increase their specialisation in manufacturing activities related to renewable energy are thus likely to benefit from a large and lasting increase of their workforce.

Table 5.3. **Employment multiplier estimates**

| Province/State | Local |
|---|---|
| Generation (O&M) – 7-8 jobs per USD million in output. | Generation (O&M) – 0.7-1 jobs per USD million in output. |
| Construction of generation – 19-30 jobs per USD million of construction cost. | Construction of generation – 12-15 jobs per USD million of construction cost. |
| Manufacturing of electrical equipment – 16-24 jobs per USD million of output. | Manufacturing of electrical equipment – 10-14 jobs per USD million of output. |

*Source:* Freshwater, D. (2010), "Green Power, Green Jobs", presentation at the launch seminar for the OECD Project The Production of Renewable Energy as a Regional Development Policy in Rural Areas, Montreal, 15 September, *www.oecd.org/dataoecd/31/1/46186430.pdf*.

Establishing such a specialisation will not be easy, as competition among suppliers in these markets is increasingly intense, notwithstanding the rapid growth in demand. All countries undertaking renewable developments anticipate export activity, and it is unlikely that all of their ambitions can be satisfied. Moreover, developed country forecasts may need to take better account of developments in China, whose increasing specialisation in green energy production is likely to influence specialisation patterns in other regional and national economies. Since it is very difficult for OECD regions to compete with China on price, sustaining a successful manufacturing specialisation over the longer term is likely to depend on continued innovation and quality improvements (see below).

The timescale over which the national and local specialisation takes place is crucial. The long-term goal of many governments is to displace existing generation from conventional sources with renewables. The faster the displacement takes place, the greater the industry's annual installations and economic impact in terms of jobs and output, but the shorter the window of displacement becomes.[4] After the displacement takes place, there is only replacement, so the industry shrinks unless it can export.

Renewable energy prices represent another key issue. While the objectives related to climate-change mitigation and energy security are coherent with higher prices for energy, it might be difficult to achieve a net increase in employment with higher energy costs. Because the price elasticity of demand for energy tends to be low, when energy prices go up, consumers tend not to reduce demand for energy very much, but discretionary spending on other goods and services declines. The impact on the labour market is negative, as lower demand causes a general reduction in employment.

### *How to develop the knowledge base for renewables in rural areas?*

Rural areas that have accumulated competencies and are able to support a multidimensional learning process are likely to benefit most from the deployment of renewable energy. This can happen when investment is focused on economic activities compatible with the renewable energy supply chain, and when the region features a diffused propensity for learning, which usually underpins self-employment and entrepreneurship. In this case, the local community starts investing local resources in the renewable energy supply chain, enhancing the regional specialisation. It is also possible that investment will have a limited impact on the local productive fabric. For instance, large-scale installations located in small rural communities generate some valuable and stable jobs and a profitable rent for the local community through local taxes. This is a positive dynamic for local communities, as they acquire financial resources and produce key public goods that improve dwellers' well-being and place attachment, but few or no links between the local business community and the deployment of renewable energy are developed. In other cases, investment in renewable energy can trigger endogenous development.

The legacy of past economic specialisations can create opportunities for such development. For instance, a given region can be specialised in the production of electricity from conventional sources and take advantage of this specialisation to develop renewables. This is typical of many rural areas, as large conventional power plants are unlikely to be located in large urban centres. Accumulated knowledge in electricity production and distribution can easily be integrated into the renewable energy supply chain; thus, pre-existing local competencies support regional specialisation. Manufacturing activities also contribute to regional specialisation in renewables. Installations require components that are shared with other industries. Concentrating solar thermal or photovoltaic plants

need metallic structures that are relatively easy to produce but expensive to transport. Thus, local producers, if present, have a competitive advantage *vis-à-vis* external competitors, in spite of being active in a mature and relatively low-tech sector.[5]

In general, the presence of large-scale manufacturing activities has a positive impact on the regional capacity to specialise in the renewable energy industry. This is due to the availability of codified skills (engineers, for instance) and business services (such as, finance or technical and ICT services).[6] Regardless of accumulated competencies, it is unlikely, and not necessarily desirable, that a region develop a self-sufficient supply chain from product conception through disposal.

Interactive learning is another key component supporting regional specialisation in the renewable energy industry. In general, it is unlikely that advanced research activities will be located in rural areas. However, as the technology to produce energy from renewable sources is not mature, empirical research needs to be done in the field, where the installations are located. The deployment of renewable energy, however, does not depend on research and development (R&D) alone. Learning by searching is just one part of a much broader system based on the transfer of knowledge among actors engaged in the innovation process. As suggested by Lundvall (1992), there are three other kinds of learning, besides learning by searching, that should be taken into account when assessing regional innovation systems: learning by doing, learning by using, and learning by interacting. These three dimensions of learning (*i.e.* innovation capacity) are often found in rural areas; they are intertwined and mutually reinforcing.

The learning system can affect the local propensity to entrepreneurship and self-employment, which, in turn, benefit the regional innovation system. This can be observed in Italy and Spain, where rural areas are home to clusters of small and medium-sized enterprises (SMEs) (OECD, 2008; Boix and Vaillant, 2010). The production of renewable energy, which in these countries is booming, creates new business opportunities for self-employment. The presence of a large number of actors involved in the renewable energy industry enriches the "learning fabric" of the region. SMEs are active in finding business niches as well as clients and valuable suppliers. Even when the basic technology (the scientific information) is imported from outside the region, local actors adapt such information to local needs and potentials, fulfilling a large part of the learning (or innovation, according to the definition used in this assessment) process. This activity is likely to affect the learning capacity of the region. As actors become more specialised and accumulate skills in the new industry, their capacity to learn (innovate) is enhanced.

Entrepreneurship and self-employment feed into popular legitimacy and active participation in regional development strategies. The fact that (external) investment is underpinned by local capital is critical to fostering local innovation capacity. As Kamp (2002) highlights in her comparative assessment of the competitiveness of the wind turbine industry in the Netherlands and Denmark, the technological lead of Danish firms over Dutch firms results in part from the larger number of interactions that take place at the local level. Kamp found that while Dutch firms relied more on learning by searching, due to larger R&D subsidies, the Danes focused on learning by doing. In Denmark, the learning processes have involved a large number of producers and users. Innovative dynamics are intertwined with the geographical, policy and institutional *milieux* that characterise Danish regions specialised in wind energy. In a market where breakthrough

innovations are relatively rare, a diffused learning process that involves a large number of actors at the local level could have a larger impact on local economies than a research centre focused on patenting.

### *Developing social acceptance and community ownership of renewables*

Achieving the long-term objectives for renewable energy development will in part depend on gaining community acceptance. Even in relatively developed markets like Germany, social opposition is emerging as a potential threat to future development. Currently, debates at the level of the *Länder* are halting the construction of the "energy highways" that would transport large amounts of renewable energy from the rural north to the urban south. Opposition is coming from different local constituencies (rural dwellers, farmers, and environmentalists) concerned about the impact of the power line on health, landscape, and wildlife (Fröhlingsdorf, 2011). This regional opposition is distinct from the general popular support for Germany's ambitious renewable energy development goals. In this respect, Germany is by no means unique: broad public support for aspirational goals often sits alongside fierce local resistance to concrete projects. In this context, the governance responsibility for achieving renewable energy objectives falls largely on the shoulders of sub-national authorities charged with overseeing the deployment of renewable energy.

Regional governments are well placed to foster social acceptance where it is lacking most: at the community level. As governments seek to increase renewable energy capacity, the primary concern is with community acceptance, which is most closely tied to implementation. Socio-political acceptance is generally high, as numerous surveys have shown. Indeed, governments have exerted significant effort assessing the technical and financial aspects of renewable energy policy to ensure socio-political and market acceptance, particularly during the policy design phase.

The lack of social acceptance and involvement of local communities in the decision-making process related to renewable energy deployment has two main negative impacts. First, the local community may simply reject (further) deployment of the new technology. Alternatively, deployment may proceed but without the active involvement of local actors. This is particularly evident in the case of large-scale installations located in small rural communities. The high preferential tariffs generate large revenues for the owner of the plant to transfer. A small portion of the revenue, which can be a significant amount of money in the local context, is paid to the host community for the use of their land, and that is the extent of local engagement. This leaves the renewable energy development entirely dependent on outside actors and reduces the potential of the investment to act as a spur to endogenous growth. Local actors, having little or no involvement in the development strategy, fail to look for investment opportunities along the renewable energy supply chain. Ultimately, this has a negative impact on the potential for triggering self-employment and entrepreneurship, which are pillars of regional development processes.

The challenge for regional governments is to implement policies linked to renewable energy in such a way that economic, environmental and energy security goals are all achieved. To do so, they will need to find the sufficient level and form of compensation for communities without sacrificing the economic viability of renewable energy projects (and therefore external investment). In other words, they need to ensure that the benefits of renewables (wages, rent, interest and profit) are appropriately distributed among all groups contributing to their successful deployment. The constellation of affected groups will vary

by technology and scale of deployment; in general, it consists of investors, developers and "host" communities. This challenge is compounded by the difficulty in assigning value to the "costs" borne by local communities. The market costs are well understood and relatively straightforward, but the costs to communities are more complex. Typical concerns or "costs" cited by communities include changes to landscapes, nuisance (*e.g.* noise or shadow flicker), environmental impacts (*e.g.* wildlife and water quality) and the potential for reduced property values (Hubert and Horbaty, 2011). Many communities also feel excluded from the decision-making processes concerning the sites and technologies selected for their area (Bryden, 2010). For land-intensive renewable energy sources like large-scale solar and bio-energy, the potential for competition among land uses can also fuel social opposition. Landscape and land-use concerns are particularly strong in rural areas where local income is often tied to the land through agriculture and related industries, as well as tourism.

Regional authorities can foster community acceptance in two ways: increasing understanding of renewable energy projects and ensuring local benefits. In an analysis of the social acceptance of wind farms, IEA (Huber and Horbaty, 2011) highlights how "reducing the risk for future surprises, early and transparent communication can even strengthen projects and assist in building public support", concluding that "public consultation on projects cannot begin too soon". Regional governments can facilitate this upfront effort by requiring community consultation during the project development phase and streamlining permitting processes so communities understand how they will be effected by renewable energy projects. What is more, regional authorities are well placed to understand how renewable energy projects related to cultural and regional specificities. Investors will also benefit by understanding the community's priorities from the outset, rather than investing in costly designs for inappropriate projects (Huber and Horbaty, 2011).

Communities will be more willing to accept some of the "costs" of renewable energy installations if they stand to gain from them. In this way, there is a strong link between the need to focus renewable energy development on accumulated competencies and gaining community acceptance. Regional governments can ensure local benefits by creating opportunities for communities to invest in or directly contribute to the production of renewable energy. Creating opportunities for community investment or financing counteracts the popular perception that large utility companies and corporate investors are the main beneficiaries, which has proven problematic in the Netherlands and the United Kingdom. These cases can be contrasted with Denmark, Finland and Sweden where the local populations tend to support renewable energy initiatives. In both the Netherlands and the United Kingdom, the local content of value added is generally very small, being limited to land leases and wages, for example. By contrast, farmers and local co-operatives in Denmark have long had the opportunity to invest in wind farms and increase the local value added from the industry. These efforts eased the path for renewable energy development and make investment more politically secure (Midttun and Koefoed, 2003; Bryden, 2010).

## Managing water: What multi-level governance arrangements should be put in place?

As many other environmental assets, water is a public good that has strong externalities on several policy areas and implies local considerations and territorial characteristics at rural, urban, basin and cross-border levels. Beyond scarcity issues, the

current "water crisis" is fundamentally a governance crisis. In a global context of fiscal consolidation, social, technological and environmental transformation, "adaptive" water policies in response to climate change, demographic and urbanisation pressures rely more and more on cities and regions. But reforming water policy requires the prior understanding of complex institutional settings.

Along these lines, institutional data collection from an extensive survey sent to 17 (half) OECD countries, allowed OECD to: *i)* comprehensively map the allocation of water responsibilities at central and sub-national government levels; *ii)* measure perceived "implementation" obstacles in water-policy implementation; and *iii)* review existing governance tools to bridge a series of co-ordination and capacity gaps (see OECD, 2011b). The main insights from this survey are detailed in the following sections.

### *There is a highly fragmented sector with multiple stakeholders at central and sub-national levels*

A pervasive feature of water systems is the lack of a "master plan" for assigning water-related tasks across ministries and levels of government. In most cases, the central government plays a strong role in water-policy design, regulation and implementation. In some countries (France, the Netherlands, Spain) this role is rather focused on strategic planning, and priority setting, while in others (Korea, the United Kingdom), it is more oriented towards economic and environmental regulation. The role of central government is somewhat "minor" in federal countries that transferred most water competences to sub-national governments such as the United States (Box 5.1) or Belgium, where water responsibilities are so scattered across states or regions that it is almost impossible to capture a "national institutional mapping".

Several ministries, public agencies and departments are usually involved in water policy at the central government level because of the interconnectedness of different issues (agriculture, energy, territorial development, spatial planning, health, investment, etc.), thus generating a high degree of fragmentation across policy areas and inherent risks of "silo" approaches in the absence of inter-ministerial co-ordination.

As Figure 5.7 shows, this number ranges from 2 ministries in the Netherlands to 15 public agencies in the case of Chile. This indicator helps "measure" the fragmentation of roles and responsibilities, based on the assumption that the more actors there are, the more "complex" the situation is. But it has to be analysed in light of the governance tools adopted to overcome such complexity. There are several examples of highly fragmented contexts (Canada, France, Mexico) where the multiple actors and layers usually perceived as obstacles to policy coherence have been compensated by the adoption of sound co-ordination mechanisms (see below) that reduced, to a more or less important degree, the impact of sectoral fragmentation.

In OECD countries, sub-national governments are always involved in water policy, but to varying degrees (Figure 5.8). In federal states with important geographical and hydrological disparities (Australia, Canada, the United States), or strong regional characteristics (Belgium), local and regional authorities are the main actors in water-resources management and service delivery. In most cases (EU countries), sub-national governments play a significant role in the design and implementation of water policies, together with the central government, while in some countries (Chile, Israel, Japan, Korea), they are mostly "implementers" of central government policies, with low involvement in the "design" stage.

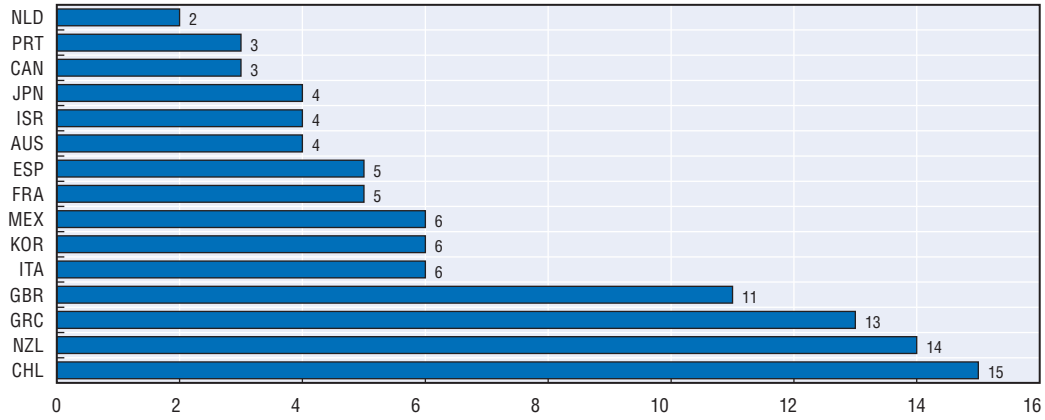
### Box 5.1. **Mapping roles and responsibilities in water policy: The challenging case of the United States**

In the United States, on most aspects of water-supply planning and management, there is no central (national) policy, and no one agency with responsibility or oversight, although at least 20 federal agencies have some role in the area. In addition, there are very few significant river basin scale organisations and the institutional mapping and governance challenges vary greatly from one state to another. In all, more than 50 000 agencies at federal, state, local and county levels are involved in water policy, hence the difficult task of achieving a comprehensive mapping.

Some states (*e.g.* California) have adopted a co-ordinated institutional framework for state-level water planning and management, but in most others, this is also largely absent, and the void is mostly filled by around 16 000 municipal water agencies. The state of Colorado is somewhere near the middle of this continuum. In most states, water supply planning is conducted almost exclusively on a project-by-project basis, often at the municipal level, and often without direction from any federal or state-level policy framework. And even at the project scale, there is often no clear criteria or policies for selecting among options, and in some cases, no planning or reporting requirements of significance.

Compared to sectors such as energy or transportation, water-supply planning and management is not merely decentralised, but rather fragmented, incomplete, and almost unsophisticated. However, there is one exception: water-quality management. In this case, there is a well-established national policy (the Clean Water Act), a federal agency (Environmental Protection Agency [EPA]) authorised to enforce the policy through a programme based on permits. The programme allows implementation to be conducted by state agencies that meet standards established by the EPA, which most states do. Additionally, there are also clear federal laws that deal with other environmental aspects of water management, such as the preservation of biodiversity, wetlands, and rivers.

Figure 5.7. **Number of central government institutions involved in water policy, 2010**




*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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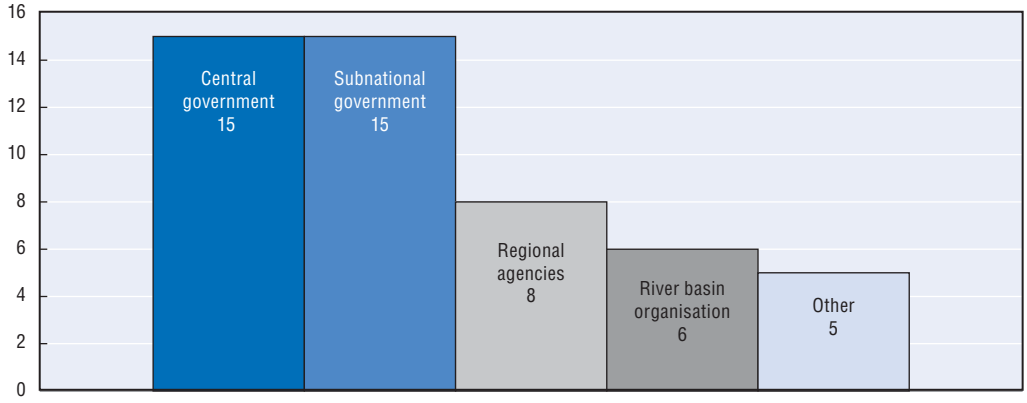
Figure 5.8. **Type of actors involved in water policy budget**




*Note:* There are 18 responses for the 17 countries surveyed. As water is a regional issue in Belgium, Flanders and Wallonia replied separately. Brussels is not covered.

*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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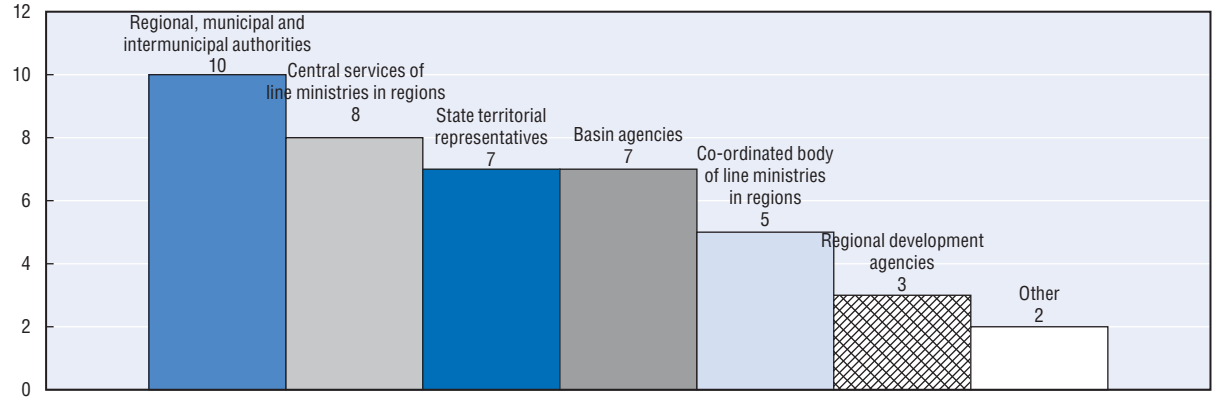
As Figure 5.9 shows, regions, municipalities and inter-municipal bodies are the primary actors in charge of implementing central government policies at the sub-national level. In most OECD countries surveyed (15/17), the latter are involved in water-policy budgets together with the central government. In France, for instance, the three levels of sub-national governments are involved. Municipalities, usually in charge of public services of water, can also have planning functions. "Departments" (sub-national government between municipal and regional layers) contribute to territorial development and rural equipment through a series of financial subsidies to municipalities for investments related to water and sanitation infrastructure, and regions can also co-fund water and sanitation networks in the framework of the *Contrat de Plan État-Régions*.

Figure 5.9. **Implementation of central government water policies at the sub-national level, 2010**




*Note:* There are 18 responses for the 17 countries surveyed. As water is a regional issue in Belgium, Flanders and Wallonia replied separately. Brussels is not covered.

*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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Central services of line ministries in regions and state territorial representatives (STR) are key actors in the implementation of water policies alike. In unitary countries such as Japan (regional offices of individual ministries), Israel (Israeli Water Authority) and Korea, representatives of line ministries in regions are the main actors in charge of implementation at sub-national level. Central services representing line ministries in regions can also play an important role in countries that have somewhat decentralised their water policy making, whether these are federal states (Belgium) or unitary (New Zealand).

Thus, no systematic correlation can be drawn between a given country's institutional organisation (unitary *versus* federal) and the institutional mapping of water policy. On the one hand, some federal countries (Belgium, Canada, the United States) have almost entirely devoted water responsibilities to lower levels of government while in other federal states (Australia, Mexico), the central government still plays a strong role (strategic planning, regulation, etc.) in ongoing water-policy reforms. On the other hand, though some unitary states still retain significant water responsibilities at central government level with highly centralised water policy making (Chile, Israel, Japan, Korea), most OECD unitary countries (France, Greece, the Netherlands, New Zealand) have *de facto* devoted responsibilities to lower levels of government. In all cases, the institutional mapping of water policy also relies on environmental, territorial and hydrological considerations. The plurality of mutually dependent actors across ministries and public agencies, between levels of government, and at sub-national level raises significant multi-level governance challenges, hence the need for "diagnosing" capacity and co-ordination challenges likely to hinder integrated water policy.

### *There are significant multi-level governance challenges in water policy*

Table 5.4 details the seven co-ordination gaps experienced by OECD countries in water policy, whatever their institutional contexts. Respondents from central administrations, river basin organisations and regulatory agencies in the 17 countries surveyed were asked to rank multi-level governance challenges from one (not important) to three (very important) according to proxy indicators. The degree to which water policy implementation may be

Table 5.4. **Frequency of multi-level governance gaps in OECD water policies, 2010**

| "Important" or "very important" gap | Number of countries or regions | Examples of countries or regions |
|---|---|---|
| Funding gap | 11/17 | Australia, Belgium (Flanders), Chile, France, Greece, Israel, Korea, Mexico, New Zealand, Portugal, Spain, the United States (Colorado). |
| Capacity gap | 11/17 | Australia, Belgium (Flanders), Chile, Greece, Italy, Korea, the Netherlands, Portugal, Spain, the United Kingdom, the United States (Colorado). |
| Policy gap | 9/17 | Belgium (Flanders), Canada, France (sub-national actor), Greece, Israel, Italy, Korea, Spain (sub-national actor), the United States (Colorado). |
| Administrative gap | 9/17 | Australia, Greece, Italy, Korea, the Netherlands, Portugal, Spain, the United Kingdom, the United States (Colorado). |
| Information gap | 9/17 | Australia, Chile, Italy, Korea, the Netherlands, New Zealand (sub-national actor), the United Kingdom, the United States (Colorado). |
| Accountability gap | 9/17 | Belgium (Flanders), Chile, Greece, Italy, Korea, Mexico, the Netherlands, Portugal, the United States (Colorado). |
| Objective gap | 4/17 | Belgium (Flanders), Israel, Korea, Portugal. |

*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

hindered by given multi-level governance gaps varies widely in OECD regions but common challenges have been identified. A closer look at each of these gaps is provided in the paragraphs that follow.

Understanding multi-level governance challenges in water policy requires a systemic approach to co-ordination gaps (Table 5.5). These are interrelated, can exacerbate each other and should be approached in a holistic way. For instance, any country facing a sectoral fragmentation of water roles and responsibilities across ministries and public agencies (policy gap) may also suffer from contradictory targets between these public actors (objective gap), which may not favour the sharing of information because of silo approaches (information gap) and is likely to undermine capacity building at sub-national level (capacity gap) since local actors, users and private actors would have to multiply efforts to identify the right interlocutor in the central administration. Promoting co-ordination and capacity-building is a large and critical step toward bridging multi-level governance gaps in water policy.

Table 5.5. **Description of multi-level governance gaps in OECD countries' water policies**

| Gap description | Country illustration |
|---|---|
| **Funding gap:** The absence of stable and sufficient revenues of sub-national actors is a primary challenge for co-ordinating water policy across ministries, between levels of government, and building capacity at the sub-national level. | Israeli Water Authority (IWA) is responsible for the national water management plan and for the budget (setting the tariffs and deciding on the expenses). IWA obtains the funds to run the national water-management plan from the state of Israel's national budget, rather than directly from the water payments of the users via tariffs. This raises efficiency considerations as well as funding inadequacies in many areas. |
| **Capacity gap:** OECD countries are close to universal coverage, but face significant issues to maintain and adapt existing infrastructure to new environmental regulations. Innovative water processes and technologies introduced in response to cost-effectiveness objectives, water scarcity and climate change (desalination, recycling of water use, etc.) require transfers of know-how at the sub-national level. | Greece lags behind in the implementation of the EU Urban Wastewater Treatment Directive, which required all municipal wastewaters to be treated by 2005. The biggest cities are in compliance with the directive but smaller municipalities are facing major obstacles related to infrastructure. In 2002 only two of the wastewater treatment plants discharging in sensitive areas achieved the treatment efficiency required by the EU Directive, mainly because of capacity and funding gaps. |
| **Policy gap:** Policy coherence relies on the set up of institutions. When roles and responsibilities are scattered across actors and policy areas of different organisational cultures, sensitivity to lobbies and constituencies (farmers, trade unions, voters, private companies, etc.), segmented working methods can prevail and complicate the decision-making processes. This over-fragmentation has an impact on water-policy implementation at the territorial level. | In the United States, where there is no single agency in charge of water policy, the intervention of 50 000 federal and state agencies, committees and 3 000 county governments affects water-policy formulation across levels of government. |
| **Administrative gap:** The mismatch between administrative (local, regional, national, international) boundaries and hydrological frontiers is a major concern in water policy. It deters effective river basin management that requires integrated view and plans. | In Korea, the largest problem in water-resource management is the incongruence between administrative zones and hydrological boundaries. Municipalities often execute budget only considering their own perspective and plan, and this lack of integrated approach and territorially customised water policy affects the efficiency of budget execution. |
| **Information gap:** Scattering and fragmentation of the water and environmental data are strong bottlenecks to co-operation across ministries, agencies and levels of government. | In New Zealand, the lack of common information and common national frame of reference has historically been the largest hurdle for policy makers. For example, there has never been a mandated methodology for calculating quantity limits that reflect ecological bottom lines and/or wider community outcomes. |
| **Accountability gap:** Periodic assessment of progress toward established policy goals is crucial to understanding whether efforts are effective or not and, when necessary, adjusting the policy. But feasibility is often limited because of political, financial and capacity considerations and low public participation. | In Italy, the outcomes of national water policies are not necessarily quantified in a timely manner and there are few incentives or specific rules to encourage companies responsible for pumping, purifying, and transporting water to consumers to produce relevant data on the quantity and quality of water. |
| **Objective gap:** Water policy requires a balance between social, financial, economic and environmental considerations (agriculture, energy, etc.). As water management cuts across many of government strategic directions, the lack of real recognition of conflicts between different government policies regularly creates difficulties for local and regional authorities. | In Colorado (the United States), the inherent trade-offs and potential for conflicts of the water allocation system – with all users in competition – illustrates the objective gap. Municipal water providers spend resources on water supply projects that rely upon the same water or build parallel pipelines. All water supply projects must go through lengthy, adversarial processes to be permitted. Due to little quantification of environmental water needs and the lack of a comprehensive vision including environmental protection, the task of co-ordinating water policies can quickly become resource intensive. |

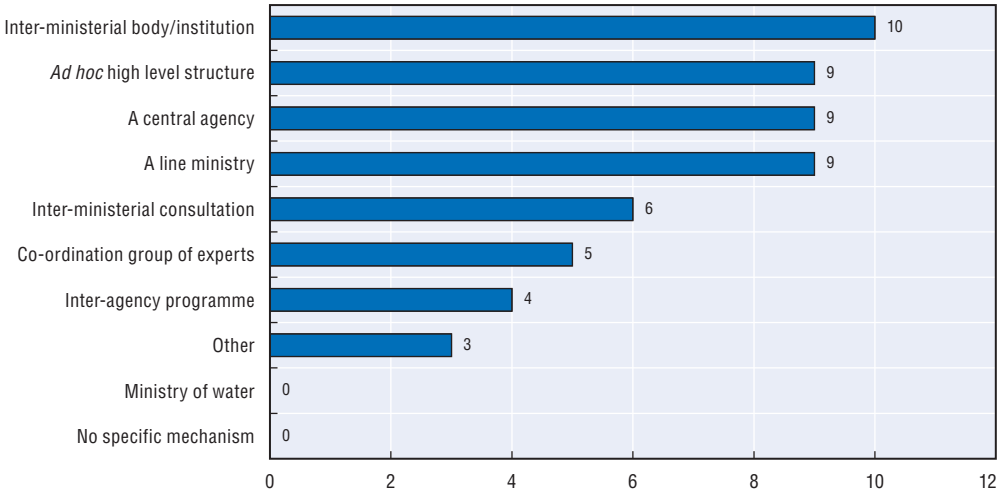
### *How to implement appropriate co-ordination mechanisms for water policy*

#### *Horizontal co-ordination at the central government level*

There are several options for co-ordinating water policies – including within a same country – and incentives for adopting them proceed from a variety of parameters. Co-ordination instruments across ministries, between levels of government and across local actors are more or less binding, more or less formal and more or less flexible. Most of them aim to create a framework for combining tools, funds and organisations or establishing a multi-stakeholder platform for dialogue for integrated water policy at all levels. Their creation relies on several factors, ranging from scarcity concerns, which is usually a driver for efficient water management, to institutional mismatch or equity and efficiency objectives including in developed countries and water-rich states. Each co-ordination mechanism can help bridge different gaps and one specific gap may require the combination of several tools (Figure 5.10).

Figure 5.10. **Mechanisms for co-ordinating water policies at the central government level, 2010**

Number of countries




*Note:* There are 18 responses for the 17 countries surveyed. As water is a regional issue in Belgium, Flanders and Wallonia replied separately. Brussels is not covered.

*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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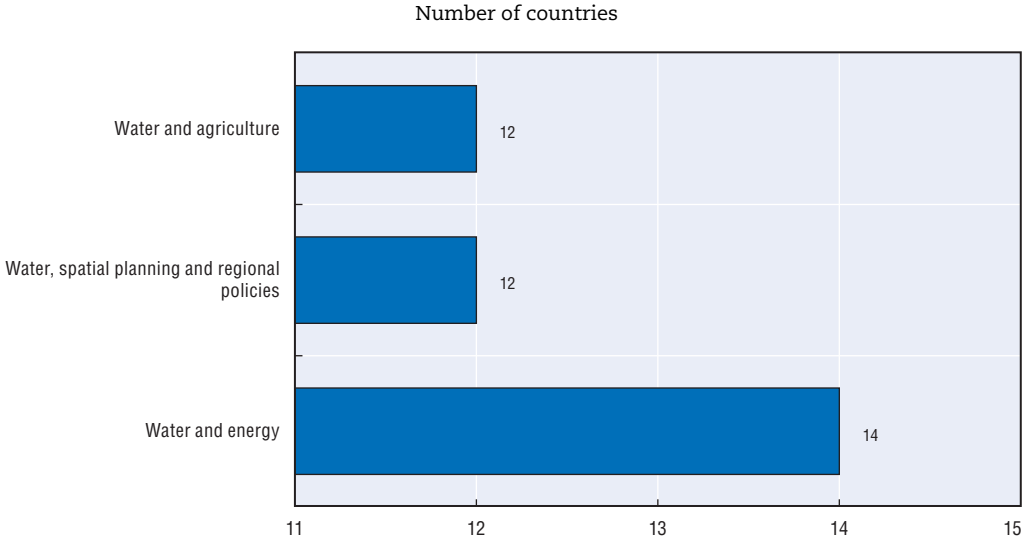
Central governments willing to move away from a sectoral approach to water policies face the issue of how to organise their action to embrace an integrated perspective. Inter-ministerial bodies, high-level structures, and line ministries are the main governance tools used in upper horizontal co-ordination of water policy. More than half of OECD countries surveyed have created these platforms for dialogue and action between public actors in charge of water policy at the central government level. For example, the Canadian Council of Ministers of the Environment (CCME) is comprised of the environment ministers from the federal, provincial and territorial governments. These 14 ministers normally meet at least once a year to discuss national environmental priorities and determine work to be

carried out under the auspices of CCME. The council seeks to achieve positive environmental results, focusing on issues that are national in scope and that require collective attention by a number of governments.

As Figure 5.11 shows, most OECD countries have engaged in efforts to co-ordinate water and other policy areas such as agriculture, energy and regional development. In the latter case, different tools were used. In Australia, the department responsible for regional development policy takes part in the Water Co-ordination Group, the central government primary co-ordination vehicle on water issues. Italy has set up a national strategic framework (NSF) within which the Ministry for the Environment, Land and Sea has identified quality standards for water services. In Mexico, CONAGUA and other federal institutions provide strong support for the *Desarrollos Urbanos Integrales Sustentables* (DUIS) for the building of cities with basic services that do not damage the environment and quality of life. In Korea, the government is building new cities with waterfronts and is restoring riversides by rehabilitating urban rivers into eco-friendly ones. In Israel, co-ordination of water and spatial planning authorities is guaranteed by law. Long-term forecasts are provided in "master plan" reports, according to spatial planning projections.

Figure 5.11. **Horizontal co-ordination efforts across water and other policy areas, 2010**

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*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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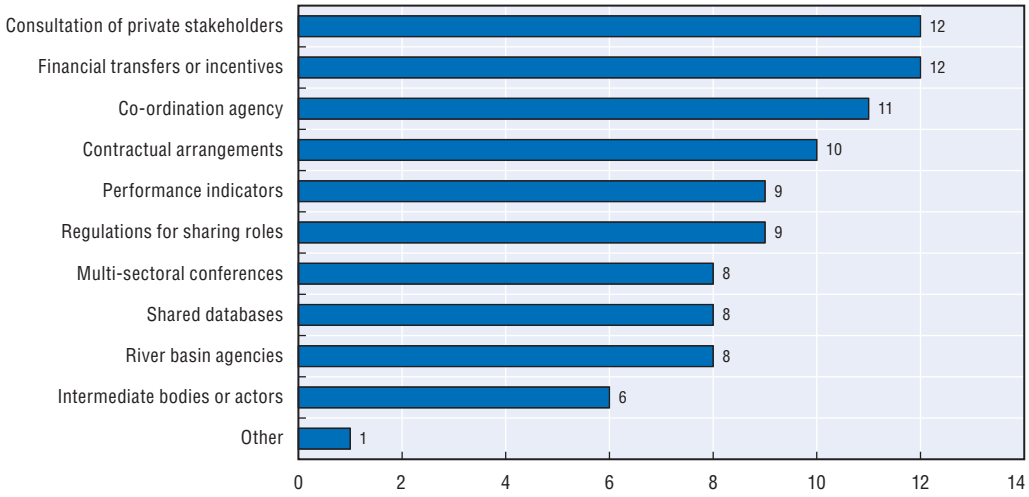
### *Vertical co-ordination across levels of government*

Several OECD countries have adopted co-ordinated actions across levels of government to integrate water policy at different territorial levels (Figure 5.12). Two illustrations of information systems (including monitoring tools) and river basin agencies are provided in Boxes 5.2 and 5.3. Their current use in OECD countries highlights the need for territorial indicators and further economic, social and institutional data collection.

Figure 5.12. **Vertical mechanisms to co-ordinate water policy in OECD countries, 2010**

Number of countries

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*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

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### *Horizontal co-ordination across local actors*

Co-ordination across local actors can take different forms, as Figure 5.13 shows. A prominent example is inter-municipal collaboration, which is often used by sub-national governments as a means to reach a "critical mass", increase efficiency, enhance capacity in water policy and foster lower horizontal co-ordination. It helps bridge a number of gaps, including capacity, administrative, and funding to meet the important financing needs required by the construction, operation and maintenance of water and sanitation infrastructure. Most OECD countries are concerned with the question of "relevant municipal scale" for public services and inter-municipal collaboration is clearly evidenced in metropolitan areas where there is an agglomeration effect arising from a set of municipalities that alone are much smaller than the metropolitan whole. Individually their capacity to design, carry out and implement water policies may be limited, but as a group (inter-municipal bodies, etc.), they can be a strong player in the relationship among levels of government while pooling resources, skills and technical expertise. However, when the metropolitan and water boundaries do not match, additional actors at basin and sub-basin levels have to be taken into account when it comes to aligning views, interests and motivations. This also raises the question of the relevance of administrative boundaries in metropolitan regions, for instance where there is barely a metropolitan authority, but a multiplicity of cities and regions implied in governance.

To summarise, it is crucial to address multi-level governance challenges in order to envision long-term strategies for integrated water policy at territorial levels, and to reform current practices. OECD has designed generic guidelines, which intend to serve as a tool for policy makers when engaging in water reform (OECD, 2011c). They will contribute to the

### Box 5.2. **Bridging the information gap: The need for water information systems and performance measurement**

Information systems and databases are key mechanisms for sharing water-policy needs in different areas, and measuring the performance of water policies. Most countries have engaged efforts to improve hydrological data (knowledge of the connections between groundwater and surface water, environmental flows in the context of climate change, etc.). But there is still a need to collect further economic, financial and institutional information in the water sector.

In Australia for instance, under the Water Act 2007, water accounting and reporting functions are conferred on the Bureau of Meteorology, which compiles and maintains water accounts; issues national water information standards; holds, manages, interprets and disseminates water information; and provides regular reports on the status of water resources and patterns of water-resource usage.

| Country, region, etc. | Existing database or water information system |
|---|---|
| Worldwide | AQUASTAT, global information system on water and agriculture. |
| European Union | Water Information System Europe. |
| Euro-Mediterranean region | Euro-Mediterranean Information System on know-how in the water sector (EMWIS). |
| Australia | Australian Water Resources Information System (AWRIS). |
| Austria | Water Information System Austria (WISA). |
| France | National System of Water Information (web portal, online metadata catalogue). |
| Japan | Water Information Portal Site. |
| Korea | Rural and Agricultural Water Resource Information System. |
| Mexico | National Water Information System. |
| New Zealand | Water Monitoring and Reporting Programme. |
| Spain | Spanish Integrated Water Information System (SIA). |
| Turkey | Water Database Project. |

*Source:* OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, OECD Publishing, Paris, forthcoming.

debate on "good governance" during the 6th World Water Forum (March 2012, Marseille), which is expected to provide "innovative institutional solutions" and action plans to make water reform happen while involving local actors, including citizens and operators.

In the absence of the optimum, the response to water-governance challenges relies on place-based approaches that take into account territorial specificities and local concerns. But a common vision strategy for all levels of government, as developed by the 2030 Water Agenda recently adopted by Mexico, is still required to overcome fragmentation; design shared objectives, including with civil society; craft governance structures; and create institutional incentives to think out of the "water box". In this regard, effective public governance and regional policy supporting the contribution of local authorities to water-policy design and implementation are key assets.

### Box 5.3. **River basin agencies in response to the administrative gap**

In recent years, under the EU Water Framework Directive (WFD), river basin management has been proposed as one element for addressing the administrative gap, while ensuring a holistic and hydrological approach to harmonise water policy across sub-national actors and between levels of government. The basin perspective helps integrate physical, environmental, social and economic influences on water resource, as effective water policy implementation raises the question of the "relevant scale" for service delivery and resources management. In all OECD countries where they exist, river basin organisations are significant actors in the co-ordination of water policy across levels of government. The "maturity" of river basin organisations also varies across OECD countries, especially for co-ordinating competing uses, which requires equitable approaches to resolving conflicts in the political and legal arenas.

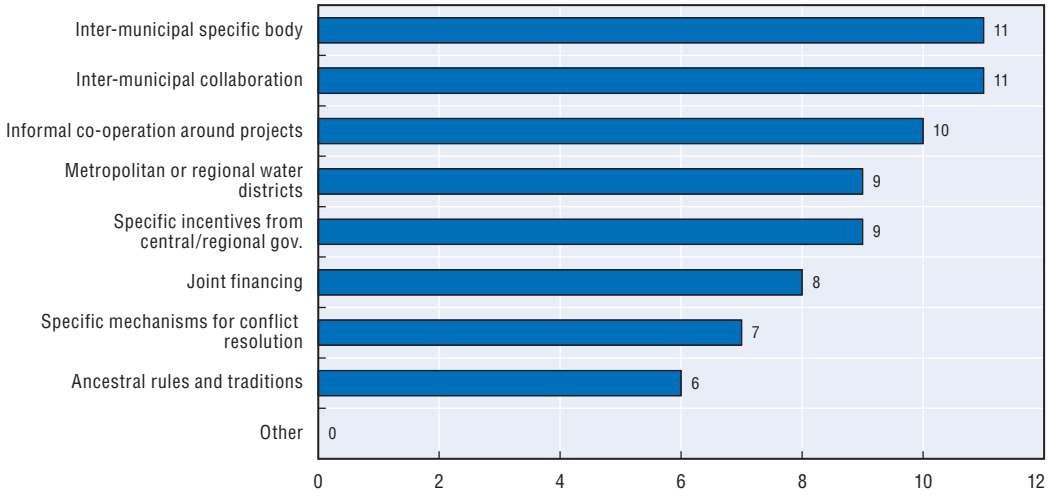
Missions, constituencies and financing modalities of river basin organisations also vary from one country to another. While all river basin authorities in countries surveyed have functions related to planning, data collection, harmonisation of water polices and monitoring, their role in the allocation of water uses, prevention of pollution, co-ordination, financing and regulation is not systematic. In France, water agencies are spread throughout the territory while in other countries (Australia) they are concentrated in a specific area. In most cases they are accountable to central government ministries and public agencies, and/or local and regional authorities and financed through autonomous budget and grants from the central government, which explains their high degree of dependence to the central government. In some cases sub-national governments also contribute to finance basin authorities. This is the case in Australia, Italy, Mexico, the Netherlands, Spain and the United States.

In principle, starting January 2010 all EU countries should have moved from the "preparation" stage to the "implementation" phase of the Water Framework Directive. However, the European Commission has noticed serious delays in the delivery of river basin management plans (RBMP). In several EU countries, consultation processes are still ongoing, while in others (Portugal, Malta and Greece), they have not even started. To date, 91 hydrographical districts have published their plans, out of 170, which represents only 14 countries delivering their RBMP on time. International district management plans have been published for the Danube, Rhine, Elbe, Ems, Meuse and Escaut rivers.

Yet, improvements are still needed in the international district management plans, which too often consist in a compilation of national "pieces", each member states being, *in fine*, accountable to the European Commission. Better governance is a crucial challenge in to transpose the WFD into national law. Interestingly, countries "late" in the WFD implementation process are not newcomers in the EU but either states facing challenging political resistances (rivalries between territories/levels of government) or countries that have engaged significant parallel reforms in the water sector, delaying the enforcement of EU requirements (*e.g.* Portugal). Capacity gaps are thus not the only explanatory factors. A major obstacle to the implementation of the WFD lies in the additional financial cost estimated up to 30% in some water districts, which may require an equivalent increase of water tariffs unless other sources of financing can be mobilised.

Figure 5.13. **Tools to manage the interface between sub-national actors in water policy, 2010**

Number of countries

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## Conclusion

Tackling the challenges of climate change and environmental degradation will, to be sure, require policy responses at different scales – international, national, regional and local. There is no denying the importance of international co-operation or the need for economy-wide policies to promote greener growth. Nevertheless, to overlook the wide range of opportunities confronting sub-national policy makers, at both regional and local levels, would be a mistake. Urban policies clearly have a role to play in curbing greenhouse gas emissions and other environmental "bads" in specific ways that national policy makers may support but often cannot realise directly. Many of these are aimed at simply reducing the emissions associated with consumption in urban areas, but that is far from the whole story: there are also a wide range of growth opportunities associated with greener urban policies. For rural areas, the rapid growth of renewable energy sources offers considerable opportunities, but, as is clear from the foregoing analysis, a large dose of realism is required when approaching such projects. Even when renewables projects move forward, it is not always a simple matter to ensure that the affected communities reap the economic benefits.

In both urban and rural settings, making the most of opportunities for greener growth requires an understanding of the characteristics of particular places – hence the limits of a space-blind, top-down approach. In both settings, too, issues of multi-level governance are at the heart of the search for environmentally sustainable models of growth. "Disconnects" between government levels can undermine policy effectiveness or even thwart implementation altogether. This gives recent OECD work on water governance a broader relevance. Many of the issues addressed in the final part of this chapter are not unique to water alone, and the principles derived from this work can provide a useful starting point for addressing multi-level governance issues in respect of other environmentally sensitive goods.

### *Notes*

1. This can be mainly explained by the lower level of economic development and consumption per capita.
2. This modelling exercise developed by Fabio Grazi and Henri Waisman (CIRED) has been carried out by employing the spatialised version of the IMACLIM-R CGE model (Crassous *et al.*, 2006). IMACLIM-R allows simulating the interactions between changes in energy consumption, carbon emissions and economic growth, given a set of policies and other exogenous factors. In this model, carbon emissions are reduced relative to the baseline following the implementation of densification policies and congestion charges, a form of road toll of the type already implemented in some metropolitan regions (London and Stockholm among others). While densification and congestion charges are not the only effective tools to reduce energy demand and carbon emissions, they are important as they do not have a detrimental effect on long-term economic growth, when innovation is taken into account.
3. The employment multiplier associated with a particular regional economic stimulus is designed to yield an estimate of the total employment attributable to the stimulus per job or man-year of employment directly created.
4. There is a possibility that different sources of renewable energy are developed in sequence and in this case the impact on the labour market is larger and does not decline immediately. Extremadura (Spain), for example, began with the development of photovoltaic power between 2007 and 2009 and then started developing high-temperature thermo-solar, maintaining the high momentum for the construction and manufacturing industries.
5. This dynamic, for instance, may be observed in Extremadura, Spain, where local manufacturing firms producing metallic structures for electricity transmission lines diversified part of their production in structures for photovoltaic and concentrating solar thermal, as these sectors are booming in the region. These firms are located in rural areas, and are relatively labour-intensive. Their presence in Extremadura depends on the dense power lines that characterise the region and is due to the presence of a nuclear plant and a large hydroelectric plant.
6. In Puglia, Italy, both the legacy of a large industrial pole in the steel industry and the regional specialisation in electricity production (the region is home to the largest coal power plant in Europe) are supporting renewable energy deployment.

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