



rsc
REGIONS FOR SUSTAINABLE CHANGE

Building a low-carbon economy

A handbook for European regions

Co-financed by European Regional Development Fund

INTERREG IVC

Made possible by the INTERREG IVC Programme






Foreword by Directorate General for Climate Action, European Commission

Regions play a very important role in the transition towards a low-carbon and climate-resilient economy. Through their cross-cutting responsibility for various elements of our environment such as public buildings, social housing, public transport, spatial planning and the protection of rural areas, regions can contribute to both greenhouse gas emissions reduction and adaptation to the adverse effects of climate change.

The 2050 Low-Carbon Roadmap released by the European Commission in March 2011 pointed out that the EU should prepare to reduce its domestic emissions by 80 percent by the middle of the century and invited relevant stakeholders to take this roadmap into account by the further development of policies on EU, national and regional level.

Until now, regional funding on climate-related projects was limited, and not sufficiently integrated as a strategic priority for regional development. There are, however, early movers showing the way. Networks such as the Covenant of Mayors or the ISLE pact, bringing together cities, regions and islands that have pledged to reduce emissions by at least 20 percent, provide positive examples of initiatives. However, stronger efforts to mobilise regions are necessary.

For the next multiannual financial framework the European Commission proposes that at least 20 percent of the EU budget should be climate related, which gives the right impetus for regions to capitalise on green growth. This should be achieved, inter alia, through a strong focus on climate and energy efficiency objectives in the EU's future cohesion policy, on which regions could draw to pursue low-carbon growth and jobs.

In this context the handbook developed by Regions for Sustainable Change (RSC) provides a timely and particularly useful practical guidance for regions on building a low-carbon economy. By providing various innovative tools, best-practice examples and recommendations, this publication shows how regions could develop their own strategy, building on their regional strengths and opportunities. We encourage regional authorities to take advantage of the insights provided by the RSC project and to make use of this handbook on their way towards a low-carbon economy.

Stefaan Vergote
Head of Unit, Strategy and Economic Assessment

Foreword by Directorate General for Regional Policy, European Commission

The EU's Europe 2020 strategy has set sustainable growth as one of its three priorities with the aim of supporting a shift towards a resource-efficient and low-carbon economy.

Sustainable growth is both a major challenge and an opportunity for all member states and regions in the EU. A more competitive and sustainable economy can boost jobs and market opportunities, in particular through the development of renewables, energy efficiency and resource efficiency as well as the mitigation of and adaptation to climate change. It helps EU economies out of the financial crisis while preventing environmental degradation and preserving natural assets. This approach should underpin all economic, social and territorial cohesion efforts. In this framework, success in achieving Europe 2020 goals will in large part depend on decisions taken at local and regional level as underlined in our Communication on Regional Policy Contributing to Sustainable Growth in Europe 2020. The partnership project Regions for Sustainable Change, co-financed by the European Regional Development Fund, has set this narrative into practice, through an analytical and strategic approach to a low-carbon economy at the regional level and, especially, in developing practical guidance and innovative tools to support the concrete implementation of policies. This is particularly welcome, since one of the major needs for the deployment of sustainable growth at local and regional level is the availability of practical and efficient tools as well as innovative approaches.

We want to congratulate all the partners of this project for their achievements so far and encourage them to carry on their efforts and further share their learning and experience with other regions across the European Union.

Mikel Landabaso
Head of Unit, Thematic Coordination and Innovation

Offering solutions for low-carbon growth

Climate change is a threat to socioeconomic development, thus combating its negative impacts is vitally important for European regions. At the same time, climate change presents a wide range of opportunities for regions to invest in green growth. European regions have huge potential to increase resilience to climate change and to pioneer a shift towards a low-carbon future by implementing climate change mitigation and adaptation measures at local level. By turning to low-carbon development built on energy efficiency, renewable energy and sustainable production and consumption, regions can combat climate change while at the same time strengthening the economy and creating jobs.

Introduction to the handbook

This handbook brings together outputs produced by the INTERREG IVC co-funded project Regions for Sustainable Change (RSC). The project, which is a three-year partnership of 12 organisations from eight European Union (EU) member states, focuses on providing regions with the methodological means to move towards economies with minimal greenhouse gas (GHG) emissions.

The partners' original intention was to focus on low-carbon development as a response to climate change. As adaptation became an equally important element of the response to climate change in the years following the launch of the project, and as it was a priority for some of the partners, some project activities were broadened to include adaptation where appropriate. This handbook is based on the premiss that adaptation should, whenever possible, complement mitigation efforts and be an integral part of a region's approach to climate change.

The handbook was designed to help and inspire regional bodies throughout Europe to shift towards low-carbon development. It presents tools, methods and guidance developed within the RSC project as well as good practice examples from RSC partner regions and beyond. This publication also serves as an introduction to the extended online version of the handbook, which contains the full set of materials, guidance, case studies and tools produced by the RSC project.

Regions for Sustainable Change: A response to the climate challenge

- **Climate change threatens socioeconomic development: the RSC project supports regions' efforts to tackle climate change through unlocking the potential of low-carbon growth in regional development programmes.**
- **Low-carbon investments pay in more ways than one: the RSC project shows that low-carbon growth is not only an environmental necessity, but also an economic and social opportunity.**
- **Through regional networking and cooperation, the RSC project stimulates innovative practical solutions for achieving low-carbon economies on a regional level.**
- **The RSC project builds the capacity of regional authorities to focus on innovative policy approaches and tools to combat climate change at regional level. The RSC partnership aims to serve as a model for other regions, promoting a Europe-wide shift to climate-friendly economies.**

The online, extended version of this handbook and all project materials are available on the project website:
www.rscproject.org

INSIGHTS

What is a low-carbon economy?

A low-carbon economy is one in which growth is achieved as a result of integrating all aspects of the economy around technologies and practices with low emissions, highly efficient energy solutions, clean and renewable energy, and green technological innovations; and in which communities, buildings, transportation, industries and agriculture use and/or generate energies and materials efficiently and dispose of or recycle their waste so as to minimise GHG emissions. Carbon dioxide (CO_2) is the most important GHG in terms of quantity, and other GHG emissions have been converted to carbon dioxide equivalent (CO_2eq). The low-carbon terminology thus embraces the total amount of GHGs, not only carbon.

Why act now? Costs and benefits

The benefits of a low-carbon transition (typically) far outweigh the challenges. The European Commission (EC) communication "A roadmap for moving towards a competitive low-carbon economy by 2050" (EC Roadmap 2050) notes that implementing a low-carbon economy has the potential to:

- increase the cost-effectiveness and competitiveness of industries and services by promoting energy and resource efficiency;
- create new jobs through increased renewable investments, giving a competitive advantage in clean-tech exports;
- stimulate innovation that leads to new techniques and products; and
- create new markets in low-carbon energy technologies — markets that will in turn be related to low-carbon goods and services.

The EC Roadmap 2050 stresses that, in order to make the transition to a low-carbon economy and enjoy long-term benefits such as reduced oil costs, the EU would need to invest 1.5 percent of annual gross domestic product (GDP) on average over the next four decades. The Stern Review on the Economics of Climate Change suggested that the costs of inaction would cripple the world economy, with decreased global GDP ranging between 5 and 20 percent annually.

What is the EU policy response to low-carbon development?

EU policies increasingly reflect the need to create a low-carbon economy in Europe, as pointed out in components of the EU 2020 Strategy, the EU Climate and Energy Package and the EC Roadmap 2050, which aims to make Europe the world leader in renewable energy and low-carbon technologies. According to the Climate and Energy Package, the following 20-20-20 targets are to be achieved by 2020:

- GHG emissions reductions of at least 20 percent below 1990 levels;
- 20 percent of EU energy consumption to come from renewable resources; and
- 20 percent reductions in primary energy use, compared with projected levels, to be achieved by improving energy efficiency.

However, to remain below a 2°C temperature increase compared to pre-industrial levels, global CO_2 emissions would need to be reduced by as much as 80 to 95 percent by 2050, according to the Fourth Assessment report of the IPCC. The EC Roadmap 2050 was developed in order to help achieve this.

Handbook structure

This publication offers a snapshot of the full-length online publication *Building a Low-Carbon Economy: A handbook for European regions.*

The various sections of the handbook cover the basic issues confronting any local or regional authority that is implementing low-carbon measures. The four main themes of the handbook represent steps towards low-carbon development: establishing a baseline, prioritising actions, strategic planning, and monitoring progress. The structure follows the logical order for regional development processes, and the tools and user guidelines are presented accordingly.

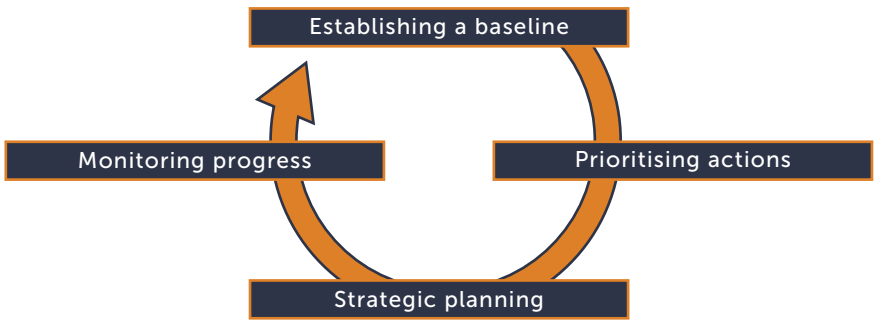
The handbook concludes with recommendations to support European regions on their way to a low-carbon future. The recommendations are also targeted at other involved or interested parties, such as the European Commission, national policy makers, experts and academics.

The RSC Handbook: Helping regions on the way to low-carbon development

The RSC partnership has developed a number of innovative, easy-to-use tools for all regions that are striving towards a low-carbon, climate-friendly economy. The low-carbon challenge varies a great deal from region to region, and as yet there is no unified solution or policy approach. The handbook identifies a number of approaches that will be effective in most cases, and that can be used by regions to meet low-carbon targets.

Although presented in specific sections, many of the tools and methodologies serve multiple purposes and can be used at other stages in the process. One innovative tool developed during the project — the Regional Climate Confidence Index (RCCI) — can be used both to establish a baseline and to repeatedly follow up and monitor a region's progress.

Steps towards a low-carbon economy



Steps towards a low-carbon economy: Methodologies and tools

Themes	Methodologies and tools	Uses
Establishing a baseline Methods for assessing the current situation and identifying the risks	**Regional baseline assessment** Tool: Evidence spreadsheet	By collecting key data, the assessment helps to establish the scale of the climate challenge in a region and to define focus areas.
	Regional Climate Confidence Index Tool: Online questionnaire	An online exercise that gives a snapshot of a region's capacity to manage climate change challenges and opportunities.
	Regional risk assessment Tool: Risk register	Scoring methodology that assists in the identification and assessment of a region's climate change risks.
Prioritising actions Prioritising actions, drawing up scenarios and setting low-carbon objectives for the future	**Scenarios and measures development** Tool: Scenario- and measure-building workshop structure	Illustrates the impacts of different low-carbon measures and explores interrelationships between economic growth and carbon emissions.
	Quantitative analysis Tool: Prioritising Actions for a Low-Carbon Economy (PACE)	Examines the cost efficiency of possible measures by comparing the impact on costs, jobs created and carbon savings.
Strategic planning Integrating low-carbon issues into strategic planning	**Discussion and guidance paper on integrating climate change into planning through SEA** Tool: Guidance on considering climate change issues in the SEA process as required by the EU SEA Directive	Provides guidance and recommendations on how to introduce climate and low-carbon issues into planning processes using the strategic environmental assessment (SEA) process.
Monitoring progress Low-carbon indicators and indices for monitoring a region's progress towards a low-carbon economy	**Low-Carbon Indicators Toolkit** Tool: Online Low-Carbon Indicators Library	Provides insight into the use of indicators for the monitoring of low-carbon development and offers a short questionnaire for self-evaluation.

Establishing a low-carbon baseline for European regions

This chapter provides insights on taking the first step towards a low-carbon economy and introduces tools developed within the RSC project that can be used by European regions to assess the baseline situation and measure the risks and opportunities inherent in low-carbon development: the Baseline Assessment Methodology, the Regional Climate Confidence Index (RCCI), and the Risk Assessment Register. The RCCI is one of the project's flagship tools and can be used to assess a region's strengths and weaknesses when responding to climate challenges and aiming for low-carbon growth. Assessing the regional situation is essential when defining and tailoring the steps needed to develop a low-carbon economy that best meets a region's needs.

Undertaking a regional baseline assessment

Creating regional baselines by collecting the available environmental and economic data will help policy makers and decision makers from individual regions to better understand their regional situation and reconcile economic and carbon-related objectives. A baseline scenario can help to identify a region's main emissions sources, highlight relationships between sectors in which GHG emissions are a concern and provide a basis for further research and encourage the production of additional data.

RSC BASELINE ASSESSMENT PROCESS

The RSC partnership developed and carried out a baseline assessment that examined and evaluated the climate confidence of the 10 European regions represented by the 12 RSC partners. The RSC baseline assessment focuses on:

- basic demographic data, such as population, area and GDP;
- energy and emissions — an energy profile of the regions' production and consumption, energy sources, existing and potential sources of renewables, GHG emissions and main GHG emitters;
- policy and legislation — summaries of national and regional targets and strategies established through national and/or regional policies, energy-related objectives and special programmes targeting the climate;
- the main institutions responsible for climate change at regional level and a self-evaluation of the effectiveness of those institutions;
- socio-political aspects — a self-evaluation of the awareness and readiness of populations and key stakeholder groups to take action on climate change; and
- financial instruments — financial subsidies, public funding programmes and other institutions and instruments available to fund climate and energy-related initiatives in the region.

Building on the RSC baseline report, even more detailed baseline data related to carbon emissions and the economy were collected and analysed for three partner regions within the framework of the macroeconomic analysis of the carbon emissions–related aspects of three economies. The original and the extended baseline assessments can be found in the online handbook.

Pilot projects implemented by RSC partners to measure the GHG emissions performance of their region

Some of the RSC partners carried out pilot studies to gather more accurate and up to date information on their region's emissions performance, as precise and detailed knowledge is of enormous value when formulating the appropriate policies to decrease emissions. The pilot projects are presented in the case studies on the right.

CASE STUDIES

Cornwall and the Isles of Scilly GHG inventory

The Cornwall and Isles of Scilly region implemented a pilot project to quantify and compare regional GHG emissions for the years 2007 and 2008 following the International Local Government GHG Emissions Analysis Protocol. The inventory is the first of its kind in the UK and is based on the most comprehensively available published data. In addition to covering emissions from energy sources in buildings, transport, agriculture and waste, it also extends to areas such as marine and aviation emissions. The production of this inventory provides an important opportunity for the region to actively measure and manage GHG emissions and it is anticipated that the inventory will be repeated in future years in order to review progress against national/European targets. The estimated emissions for the year 2008 were 4,726,000 tonnes of CO_2eq.

Measuring the GHG emissions balance in Italy's Liguria region

Within the framework of the RSC project, Italy's Liguria region implemented a pilot project in the Montemarcello Magra Regional Nature Park aimed at introducing effective regional climate change policies and achieving the goals of the Kyoto Protocol and the EU's 20-20-20 initiative. The pilot project was implemented in 21 towns with the aim of drawing up a precise CO_2 emissions balance according to the Intergovernmental Panel on Climate Change (IPCC) GHG emission guidelines. It takes emission sources into consideration, as well as the absorption ability of plants, in order to ensure the appropriate management of park territory, which has 50 percent forest cover. The data will be used to map areas where emissions are higher and where absorption can be increased by efficient forest management in order to counterbalance emissions from neighbouring areas.

The RCCI shows regions a reflection of themselves and each other so that they can make appropriate conclusions. Some will like what they see. Others will probably make some important choices and watch their "carbon waistline" more closely.

Sergei Golovkin ■ Malta Environment and Planning Authority

Identifying regional strengths and weaknesses: The Regional Climate Confidence Index (RCCI)

The RCCI, developed within the framework of the RSC project, is an innovative tool that allows European regions to gain a better understanding of their progress along the low-carbon path to economic development. After completion of a short online questionnaire, the index provides a snapshot of the region's climate confidence — that is, the status of GHG emissions and energy use, plus a subjective evaluation of the region's policy framework, institutional capacity, socio-political awareness and financial instruments to manage emissions and energy. The results of the index may help to identify strengths upon which the region can build when moving towards a low carbon economy; identify challenges that remain to be overcome; assess the region's status in terms of low-carbon efforts and determine areas where improvement or special focus is needed; and monitor progress (see chapter 5).

Based on the results, which are calculated online, the RCCI provides an opportunity to:

- compare the region with EU27 averages and others;
- obtain recommendations for policy actions and suggestions that could assist regions to improve their performance with respect to the RCCI's six key issues; and
- discover how to improve regional results.

The online index can be accessed at http://www.rscproject.org/indicators/

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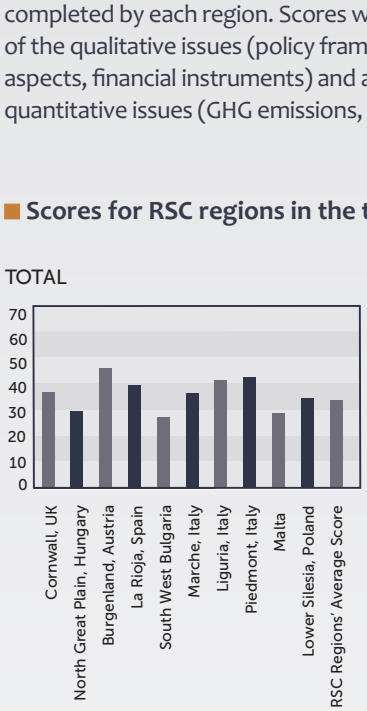
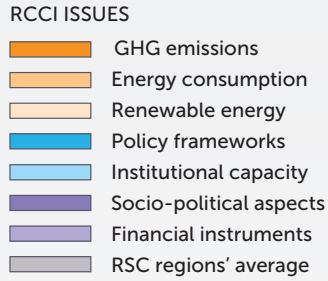
Evaluating the climate confidence of RSC regions

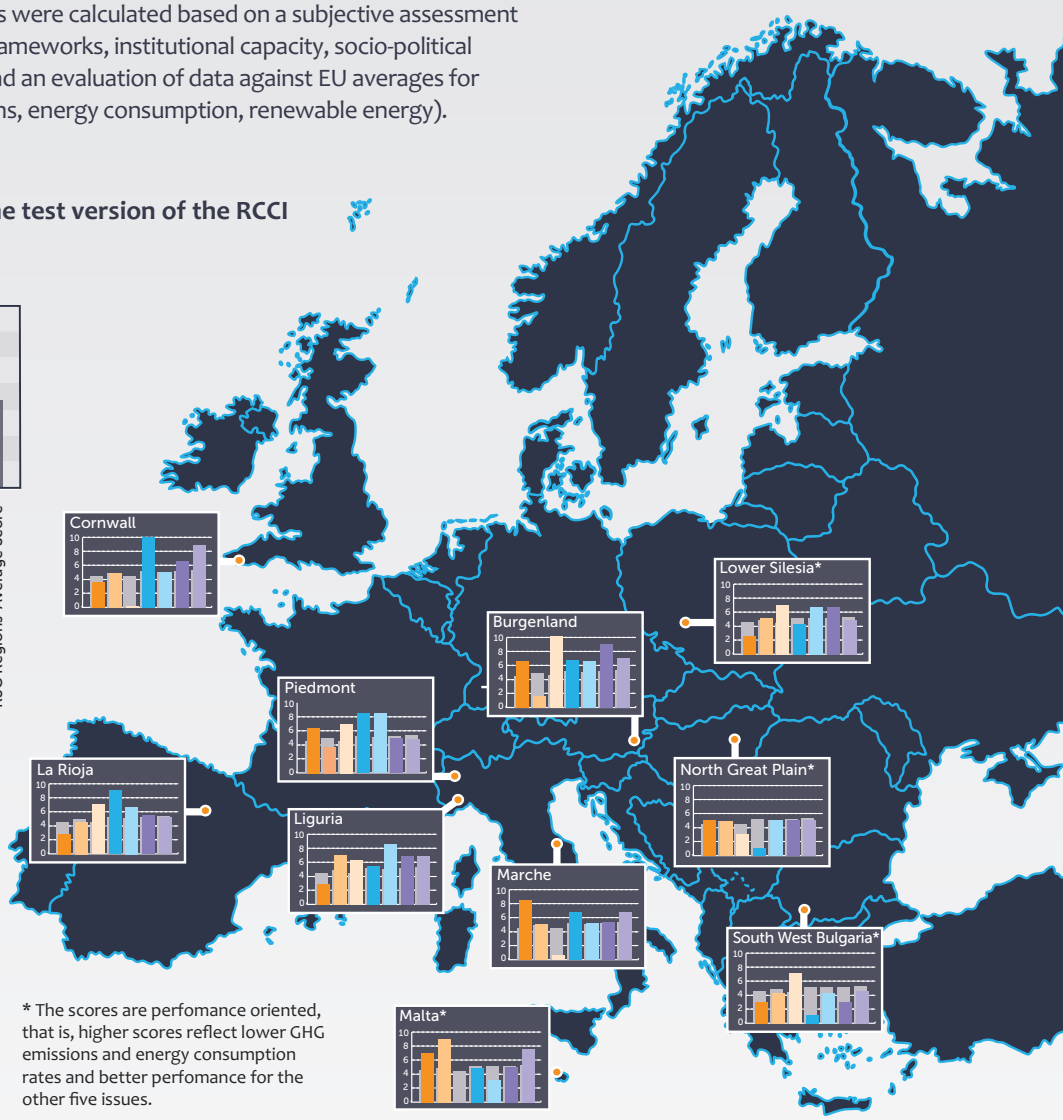
As part of the baseline assessment process, the 12 RSC partners evaluated their regional climate confidence through a test version of the RCCI. The results helped to identify the strengths and weaknesses of each region's climate change strategy, policies and management and to determine areas where improvement or special focus is needed.

Information required for the evaluation was collected through a questionnaire completed by each region. Scores were calculated based on a subjective assessment of the qualitative issues (policy frameworks, institutional capacity, socio-political aspects, financial instruments) and an evaluation of data against EU averages for quantitative issues (GHG emissions, energy consumption, renewable energy).

Scores for RSC regions in the test version of the RCCI

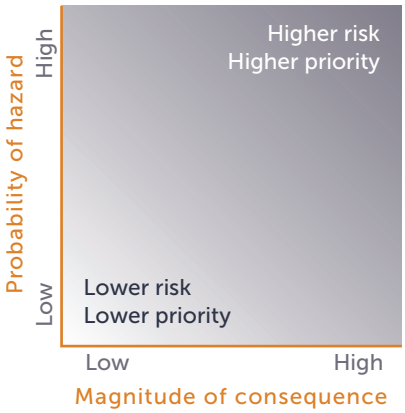






* The scores are perfomance oriented, that is, higher scores reflect lower GHG emissions and energy consumption rates and better perfomance for the other five issues.

Defining risk as the combination of two factors:
Likelihood and consequences of an occurrence



Source: UK Climate Impacts Programme (2003), Climate adaptation: Risk, uncertainty and decision making. Technical Report

Regional Climate Risk Assessment

Assessing climate risks is vital in order to gain an understanding of which climate-related risks exist in a region and to identify adequate methods for addressing them. Recognising the potential impacts and assessing the risk of occurrence are important steps in the development of a low-carbon policy framework.

Climate-related risks are risks that threaten human wellbeing, regional economic growth and the ability to reduce GHG emissions. The risks and opportunities presented by climate change are uncertain and vary for different parts of the world, different economic sectors, different businesses and different households. These changes are likely to have a multitude of impacts that might be evident in terms of: impacts on the natural environment, such as scarcer water resources; impacts on physical infrastructure, such as disruption to transport networks; or impacts on individuals or businesses, such as increased costs of emitting carbon or reduced productivity.

RSC RISK REGISTER: HELPING REGIONS TO ASSESS CLIMATE-RELATED RISKS

The risk register tool, developed within the RSC project, can assist in the identification and assessment of a region's climate change risks. The tool can contribute to the process of selecting priority areas and measures for moving towards a low-carbon economy. In addition to highlighting the potential negative impact of risks, risk events can also be identified that can be exploited to a region's advantage. The risks assessed by the register can be categorised as follows:

- Physical risks — associated with a physically changing climate.
- Energy risks — associated with the fluctuations of conventional and renewable energy markets.
- Regulatory risks — associated with changes in policy and regulation.

Initially, the risk register tool was tested in three pilot partner regions — Cornwall (UK), Burgenland (Austria) and Marche (Italy) — and was turned into a replicable tool that can be applied by any European region.

During the pilot phase, research was undertaken in order to identify the range of risks in each of the three regions, including a thorough review of regional studies and consultations with relevant experts and practitioners. This produced an assessment of the timeframe, likelihood and impacts (both carbon and economic) of potential risks in each region. The findings of the risk analysis will help these regions to select the most relevant priority measures and actions for meeting climate objectives and shifting towards a low-carbon economy.

Opposite is an example of how energy risks and opportunities were assessed for Marche.

CASE STUDY

Energy risks in Marche

RISKS	OPPORTUNITIES	LIKELIHOOD
Warming climate leading to even greater penetration of air conditioning in the residential sector, leading to further sharp increases in energy demand	• More efficient air conditioning method (heat pumps) and passive cooling systems • More energy efficient buildings (greater insulation and zero-emission buildings) • Smart building atmospheric control systems and related IT technology demand • Participation in and financing from the tradable energy efficiency certificates (TEEC) scheme	High
Increase in demand for energy in Marche which leads to higher emissions and impacts on targets	• Energy-saving education • Participation in and financing from the TEEC scheme • Changes in transportation pattern through investments in infrastructure and cultural change • Reduction in transport demand by e-working practices	High
Marche unlikely to achieve electricity autonomy by 2020		Low
Significant exposure of Marche's economy to increase of fossil fuel prices	• Unhindered development of renewables • Greater energy efficiency • Reduction in energy demand through changes in production and working practices	High

Source: Mercados EMI Europe

Defining the way forward and prioritising actions

Once the baseline situation has been analysed it is important to set out the desired development path for the region before actual planning takes place; to compare the costs and benefits of low-carbon actions; and to select the most appropriate ones. This chapter presents the process of analysing and prioritising actions based on the outcomes of an analysis of the carbon emissions–related aspects of the economies of three RSC regions. This process comprises narrative definitions of scenarios, the selection of measures and the prioritisation of measures. The main result of the study is the Prioritisation of Actions for a Low-Carbon Economy (PACE) tool, developed to assist regions to identify the cost efficiency of the various low-carbon measures.

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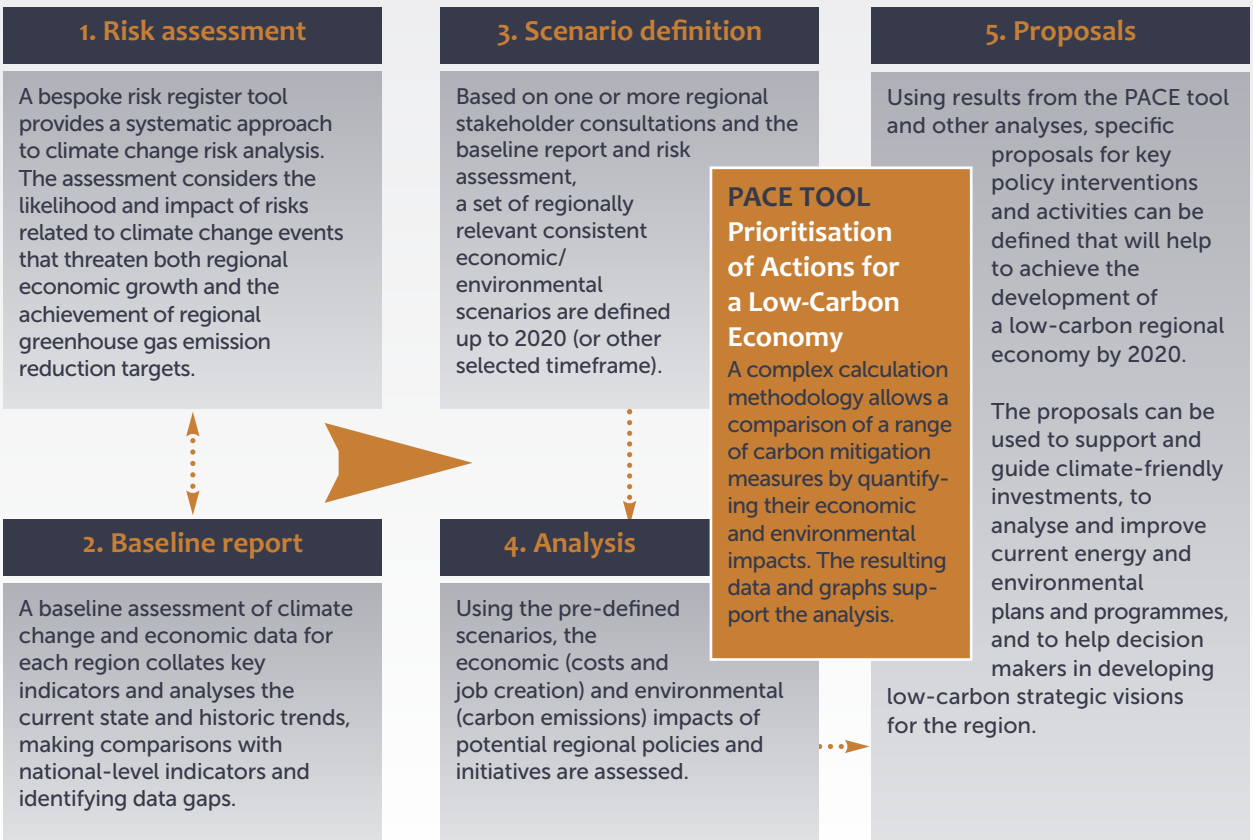
Assessing the carbon emissions–related aspects of three RSC regional economies

Within the framework of the RSC project, the consultants SQW, ICLEI–Europe and Mercados EMI were commissioned to analyse the carbon emissions–related aspects of the economies of three European regions: Cornwall (UK), Burgenland (Austria) and Marche (Italy). The in-depth macroeconomic analysis assessed the potential of carbon emissions reductions and the related costs and benefits for these regional economies. The study involved the broad participation of stakeholders, who played a critical role in successfully completing the project. The development of several innovative tools (such as the PACE tool and the risk register) was the study's biggest added value. Regions across Europe can use this kind of analysis to help them make their move towards a low-carbon economy.

Based on PACE tool analysis, a set of proposals was drafted for the three regions. In addition, recommendations were compiled on how, given their varying institutional powers and arrangements, regions can influence the transition to a low-carbon economy in ways that maximise impact while minimising cost. Outputs of the analysis are designed to directly inform future development strategies for the three regions. In addition, the results of the analysis are a useful illustration of the type of analysis that other regions can undertake. The baseline report and risk assessment report are presented in chapter 2 and the remaining elements of the process are discussed in this chapter.



The fight against climate change is a vital necessity and at the same time an economic development opportunity for a change in lifestyles.

Christian Ballaro ■ Environment Department, Piedmont region

Scenario narrative definition

A scenario is constructed by combining information about the current situation, future trends and climate change risk factors that a region might be facing, forming the background and context for any decoupling measures that the region chooses to deploy and thus enabling an informed selection process.

Scenarios illustrate the impacts, both positive and negative, of different measures for cutting emissions and help to explore possible interrelationships between carbon emissions, economic development and different sectors in society. A scenario is based on a high, medium or low assessment of a number of parameters, each of which has an impact on a region's carbon situation. Examples of variables relevant for low-carbon development include:

- energy price;
- carbon price;
- national policy framework;
- investment and finance;
- economic growth;
- technological change; and
- behavioural change.

The active involvement of relevant stakeholders, representing a broad range of society, is critical in building scenarios and for selecting the types of measures a region should implement to move towards a low-carbon economy. It is always better if stakeholders feel a sense of ownership of future measures, and if interest groups are able to air their opinions in public. During the workshop phase, trends and risks that can affect a region's ability to decouple economic growth and carbon emissions should be discussed and debated.

Selection of measures

Similar to the scenario development step, it is beneficial if the measure selection process is part of a stakeholder workshop. Issues to consider when selecting measures include:

- long-term perspectives as well as current risks and trends;
- the pros and cons of each measure in the context of a range of possible futures;
- rationales for supporting particular measures;
- areas of influence — key regional players and the levers at their disposal to influence emission reduction strategies, including financing mechanisms;
- gap analysis — the main policy and institutional capacity gaps that need to be filled to enable regional economic transition;
- quick wins (or "low-hanging fruit") — actions that can be taken that will provide immediate impact at relatively low cost;
- enabling support — exploring those areas where public sector intervention can yield tangible and long-term benefits through research and development, education and good governance;
- infrastructure requirements — critical infrastructure (e.g. transport, energy and water) that should be reinforced to sustain required levels of low-carbon economic growth; and
- ambitious targets — the extent to which each region has the appropriate powers and opportunities to increase various low-carbon targets (e.g. national) without risking high costs.

Prioritising low-carbon measures: The PACE tool for assessing cost efficiency

When selecting which low-carbon measures and activities to implement, priority should be given to win-win solutions with benefits for the climate, the economy and the social domain that can be realised in the most cost-effective way. Weighing cost-effectiveness against key parameters under different scenarios will enable regions to create an evidence base to inform the selection of low-carbon measures and activities

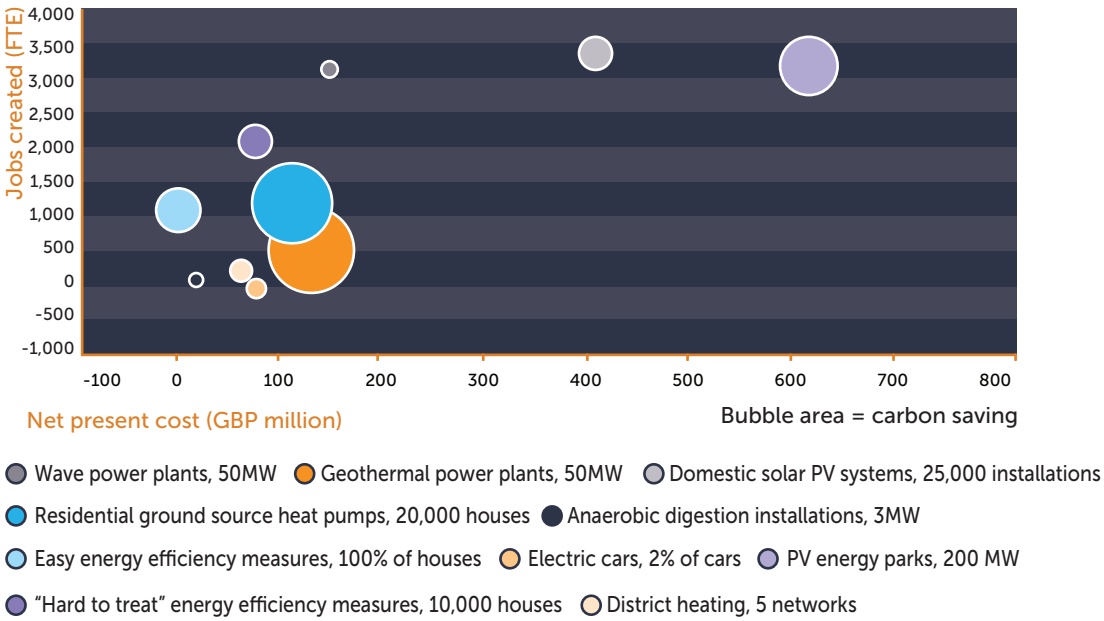
Within the RSC project, an innovative tool was developed to assess the cost effectiveness of low-carbon measures on a regional scale. The Prioritisation of Actions for a Low-Carbon Economy (PACE) tool is designed to compare a range of carbon mitigation activities that a region might be considering:

- installing renewable energy capacity (large, small and micro-scale electricity and heat);
- improving energy efficiency (domestic and business sectors);
- supporting modal transport shift or introducing low-carbon vehicles; and
- carbon sequestration (changes in land management and the creation of carbon sinks).

The PACE tool can help regions by:

- providing a comparative analysis with other measures under consideration;
- revealing the relative costs and/or benefits of a particular measure on a particular scale;
- ranking measures according to contribution to regional objectives (cutting emissions, creating jobs etc.);
- demonstrating the contribution of measures to short-term targets and extrapolating life-time impacts;
- reviewing the scale and balance of supported measures within an overall budget; and
- collating and consistently recording available evidence with respect to measures under consideration, and identifying evidence gaps.

Renewable and energy efficiency measures tested in the PACE tool for Cornwall — Total impacts to 2020, jobs versus cost



In order to provide a meaningful assessment, the impact of each measure is always calculated in comparison to a reference case (i.e. what would occur if the measure were not implemented). This means that the cost of installing an energy-efficient boiler, for example, must be compared to the cost of not fitting one, including the expense, such as higher fuel costs, of running an inefficient boiler.

The outputs of the analysis are presented as the net impacts on each of the three key parameters: cost, carbon and jobs. In each case, total impact is shown as well as regional impact. Draft outputs can be reviewed by comparing measures in the summary results charts and tables, or in more detail by examining particular data and analysis that have been used for each measure.

Following the first analysis, the PACE tool offers several possibilities for future use. A few examples of this can be mentioned from the RSC project partners. In Cornwall, the results will be used to channel investments to specific areas (namely for bids for funding and guiding investments), and for regular, long-term monitoring and reporting. Marche in Italy aims to improve its current energy and environmental plans and programmes based on the results of the analysis.

The results of scenario development, PACE spreadsheets and a user manual are available in the online version of this handbook.

The study will provide a valuable evidence base allowing the prioritisation of actions based on their cost-effectiveness and will be used to guide decision making and to ensure that the low-carbon initiatives supported are those that can achieve the best outcomes for the region.

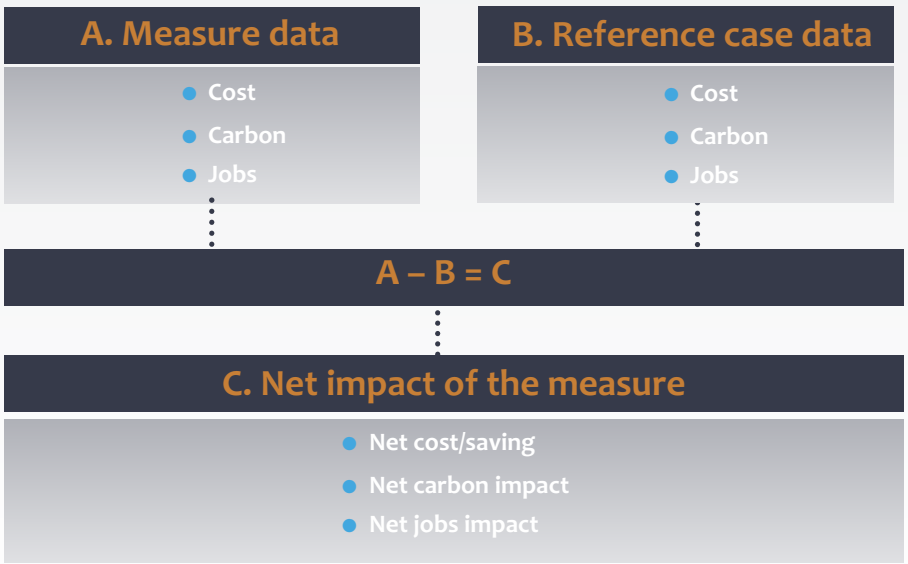
Stuart Farmer ■ Cornwall Development Company, UK

INSIGHTS

The main elements of the PACE analysis across all the measures are cost, carbon and jobs

PARAMETER	METRICS	DEFINITION
Cost	Lifetime costs	• The cost of implementing the measures taking into account upfront installation or construction costs and the operation and maintenance costs over the lifetime of the measure. • The cost-effectiveness of a measure allows the user to assess costs generally, as well as those borne specifically by the regional authority.
Carbon impact	Lifetime tonnes of CO_2eq	• The carbon impact of a measure shows the extent of carbon saving achieved by the measure over its lifetime, taking into consideration the production of emissions associated with delivering the measure, as well as the savings it will ultimately achieve.
Jobs impact	Lifetime job years	• The jobs impact of a measure assesses the extent to which the measure will create jobs and therefore contribute to a region's economic and environmental objectives. • Jobs resulting directly and indirectly from the production and installation or construction of the measure and its ongoing operation and maintenance are defined in terms of full-time equivalent job years.

Calculating net impacts in the PACE tool



Integrating climate change into regional planning

The analysis and prioritisation of actions provide the basis for climate change policy planning. The integration of climate change into strategic planning requires the right mix of top-down and bottom-up approaches, a well-planned funding scheme, the early involvement of stakeholders in the process, and dedicated institutions and leaders with a willingness to turn plans into reality. Both adaptation and mitigation concerns should be included in any climate change policy framework. This chapter highlights key aspects of climate change strategy development, the role of institutions, political leadership and financial mechanisms supporting low-carbon measures. It also discusses the potential of strategic assessments as tools for integrating climate concerns into regional planning. RSC guidance material on the topic is also presented.

Strategic planning for low-carbon development

The adoption of a European climate and energy legislative package has translated climate mitigation objectives into strict obligations on the part of all member states, and many of these obligations have been passed on to regional level. Vigorous region-level strategic planning is needed in order to deliver national commitments and to develop responses to specific regional opportunities for low-carbon development, as well as to possible vulnerabilities to the effects of climate change.

DEVELOPING COMPREHENSIVE CLIMATE CHANGE STRATEGIES

A key step in transforming a region into a stronghold of low-carbon economic and social sustainability is the development of a comprehensive regional climate change strategy or action plan that:

- addresses issues related to climate change and low-carbon economy, such as relevant national and/or regional climate and energy targets and obligations;
- addresses emissions reductions and energy efficiency improvements in various sectors (sustainable transport, industry, agriculture, waste and housing);
- addresses sustainable energy management issues (sustainable energy supply, production, use etc.);
- provides adequate mechanisms for spatial planning, climate change education, communication and financial mechanisms; and
- takes into account region-specific problems and needs (climate change and energy security and risks, the existing regional institutional set-up, stakeholder needs and exploitation).

Integrating adaptation into a strategic framework

"Climate change adaptation" is a term used to describe all activities aimed at preparing for or dealing with the inevitable impacts of climate change, such as heat waves, floods and droughts. Although the original focus of the RSC partnership was on low-carbon development, and adaptation fell outside the scope of many RSC activities, the partners shared the view that both mitigation and adaptation needed to be addressed simultaneously and integrated horizontally into regional policies and programmes. Regions and municipalities are affected in different ways by climate change, which means that appropriate adaptation planning and implementation are required. Adaptation policies cannot provide an adequate solution without there first being a clear understanding of a territory's particular vulnerabilities.

CASE STUDY

Selected elements of sectoral policy documents in RSC partner regions that integrate climate change issues

ENERGY	AGRICULTURE AND FORESTRY	TRANSPORT	HOUSING	WASTE
Reduction of the intensive use of traditional energy sources through increased production of RES, and the promotion of energy efficiency and energy savings. GHG emission reductions.	Energy production from agricultural biomass. Sustainable forestry management. Improvement of carbon sinks. Reforestation of non-agricultural areas.	Promotion of and incentives for sustainable mobility. Use of methane vehicles and emissions-control technologies.	Energy efficiency measures in the domestic sector. Tackling energy poverty.	Reduction of methane emissions from landfills. Improving systems for energy recovery of biogas in existing landfills. Introducing the waste hierarchy and waste reduction options.

VERTICAL AND HORIZONTAL INTEGRATION OF CLIMATE CHANGE ISSUES

In policy documents, climate change is most commonly addressed vertically through priorities and measures specifically focusing on climate and/or carbon objectives. These mainly include priorities related to renewable energy sources, energy efficiency or sustainable transport. Based on the findings of the RSC baseline assessment, regions usually find the horizontal integration of climate change and low-carbon issues across all areas of planning and programming phases (as opposed to those that specifically address climate-related measures) to be more challenging. In addition to specific climate change measures within policies, some regions have integrated cross-cutting themes into sectoral policies, such as:

- Climate change as an economic driver — opportunities for employment and economic growth through the transition to a low-carbon economy.
- Climate change and social inclusion — establishing links between climate change and social issues such as poverty reduction and the protection of low-income groups.
- Raising awareness for behavioural change — raising awareness of energy efficiency, climate change and what it means for society.

In Burgenland, 60 percent of electricity consumption is already supplied from renewables. But this is not enough: Burgenland has taken the political decision to become energy autonomous by 2020.

Georg Schachinger ■ General Manager of Regionalmanagement Burgenland GmbH, Austria

CASE STUDY

Burgenland region energy strategy: Achieving energy self-sufficiency through the exploitation of renewable energy potential

The Austrian region of Burgenland is implementing its energy strategy by pursuing long-term energy self-sufficiency through the exploitation of renewable energy and energy savings at municipal level. The region provides one example of how ambitious regional low-carbon targets can be achieved through action and commitment from municipalities, policy makers, businesses and citizens. Specifically, the Burgenland energy strategy envisions:

- **electricity autonomy in 2013;**
- **complete energy autonomy in 2020;**
- **the use of its own resources with added value;**
- **the introduction of new businesses and technologies;**
- **the avoidance of conflict with food production; and**
- **implementation at regional, municipal and private levels.**

This example shows that political ambitions and cooperation within the region facilitate implementation, and that this approach offers a possible way forward for many European regions.

The role of strategic assessments as tools for integrating climate change into regional planning

Strategic assessments, such as strategic environmental assessment (SEA) and sustainability appraisal (SA), have great potential as a tool for addressing climate change in the strategic policy framework. SEA is mandatory for plans and programmes that are likely to have a significant impact on the environment — for example in relation to agriculture, land use, energy, transport and wastewater management, as outlined in the SEA Directive (2001/42/EC). The aim of the directive is to contribute to the integration of environmental considerations into the policy planning process.

A survey undertaken in RSC partner regions shows that a large proportion of regional-level experience with SEA was for Cohesion Policy planning documents prepared and assessed in 2006 for the current funding period (2007-2013) — before climate change became the EU agenda priority that it is today. This is one of the reasons why full advantage was not taken of SEA potential for the integration of climate concerns into regional planning.

When carried out in parallel with the planning process, SEA helped in many RSC regions to modify initial development proposals in order to better focus on environmental protection, the preservation of natural resources and the inclusion of sustainable development aspects. The SEA process has also helped to incorporate specific indicators for monitoring climate change into the planning process.

Climate change questions that can be addressed at regional level through SEA

- **What are the likely manifestations of climate change at the regional level?**
- **In what ways are the region's ecosystems, economy, infrastructure and society vulnerable to the various impacts of climate change?**
- **Are the key developments proposed in the region feasible in the face of changing climatic conditions?**
- **Do proposed developments enhance or reduce the region's resilience to expected changes in the climate?**
- **How can individuals and societies adjust their behaviour to cope with the onset of climate change?**
- **Do the proposed developments reduce or increase the region's contribution to climate change?**

RSC guidance on the integration of climate change issues into SEA: Key steps in the SEA process and tips

STEP	SPECIFICS	TIPS
1. Identification of key concerns	• Defines scope of the assessment, existing environmental problems and environmental protection objectives. • Carried out in consultation with relevant environmental authorities.	• Consider extreme climatic situations that may occur in the future. • Take into account concerns articulated in the higher-level environmental and climate change objectives. • Select indicators for analysing baseline trends.
2. Analysis of baseline trends	• Identifies relevant aspects of a region's climate and its environment, as well as the likely evolution of these aspects.	• Concentrate on the main environmental issues that have been identified. Gather just enough information to answer the questions related to the baseline trend, its current status and future evolution.
3. Assessment of consistency of proposed plan or programme with relevant environmental objectives	• Uses a set of environmental objectives as a reference for analysing synergies or conflicts between the proposed plan and the higher-level orientations of these objectives.	• Objectives should consider both mitigation and adaptation aspects and include directions for minimising both GHG emissions and regions' vulnerability to climate change.
4. Assessment of cumulative impacts of proposed plans or programmes on evolving baseline trends	• Estimates the potential impacts of the plan or programme's proposed measures on the key priority concerns.	• Deploy trend analysis approach. • Review all identified impacts on one baseline trend. • Use scenarios to describe the best- and worst-case situations that may occur under different assumptions.
5. Consideration of alternatives, recommendations for adjustment	• Explains the contributions of different options to addressing climate change.	• Ask the following questions: - Is the development in the proposed plan or programme needed? - How and when should it be carried out?
6. Recommendations for monitoring arrangements	• Monitors the major environmental effects of the implementation of plans/programmes to identify unforeseen adverse impacts.	• Use existing monitoring activities to identify relevant data that already exist. If additional climate change indicators are needed, this should be justified in the draft.
7. Compilation of SEA report and its public review	• Encompasses the entire process and includes a technical summary. • Public consultation on the report.	• Ask the following questions: - How have climate change issues been identified? - How have climate change impacts been assessed and ranked by importance? • Provide authorities with a copy of the SEA report and consider inputs received in decision making.

HOW TO INTEGRATE CLIMATE CHANGE INTO REGIONAL PLANNING THROUGH THE USE OF SEA: RSC GUIDANCE

The RSC document "Opportunities for Integrating Climate Change Concerns into Regional Planning through Strategic Environmental Assessment" provides advice to regional planners on ensuring the proper integration of climate change issues into regional planning through different assessment activities. It is based on methods, good practice examples, a literature review, the RSC survey and discussions with RSC project partners and external experts. The guidance is organised in seven sections, according to the groups of typical activities in an SEA process. Further details can be found in the online RSC handbook.

CASE STUDIES

Mainstreaming climate change into Malta's land-use planning process

The Malta Environment and Planning Authority (MEPA) carried out a review of its national land-use planning structure and system in the context of climate change impacts. Among other things, the study revealed that SEA might not always be sufficient to "climate proof" policies — that is, the SEA process does not necessarily ensure that policies will perform successfully in a changing climate. A combination of assessment methodologies might therefore be necessary, such as an SEA to assess the impacts of the plan on climatic factors, and the application of a so-called climate change lens. A sample climate change lens, which is essentially a checklist for climate proofing policies, has been designed for this purpose.

Guidelines for local authorities in Piedmont: Integration of climate change into SEAs

A study by the Piedmont region in Italy explored the potential for integrating climate change issues into local SEA plans and programmes. A qualitative assessment on experiences from the SEA process of municipal urban plans in the region revealed that in most cases climate change is not taken into account or is considered in a superficial way. The results of the study were thus developed into an easy-to-use working tool, in the form of guidelines, providing criteria and practical approaches to climate change integration at local level. The exercise also had the objectives of achieving greater political, social and cultural awareness of climate change issues and of strengthening the role of SEA in local planning. Further details about the study can be found in the online RSC handbook.

Efficient institutions and political leadership

In order to effectively manage a region's low-carbon economic development, strong political leadership is essential, as is the availability of sufficient human resources within the regional authority. In order to be effective, a regional policy must shift the political agenda towards the prioritisation of climate change action. Once it becomes a priority issue within the region, measures are likely to be implemented that tackle climate change head on. Public education and partnerships with key stakeholder groups, such as businesses and industry, educational institutes and non-governmental organisations (NGOs), can help to achieve this. The set-up of, and authority vested in, regional-level institutions responsible for climate change vary across different EU regions, as identified in the baseline assessment of the RSC partners.

INSIGHTS

Low-carbon institutions in RSC regions

Among the RSC regions, different approaches have been taken to establish institutions with responsibility for low-carbon development.

GROUP	TYPE OF INSTITUTION RESPONSIBLE FOR CLIMATE CHANGE	SPECIFICS
1	Specialised institution(s) in place at the regional/national level are primarily responsible for climate change policy making and implementation. Cornwall (UK), Malta	These institutions can harness skills and expertise and help to establish partnerships with various authorities, businesses and other stakeholders in the planning and implementation processes. This can be crucial in achieving climate policy objectives and targets.
2	A department within the regional authority is primarily responsible for climate change policy making and implementation. Burgenland (AT), Liguria (IT), Marche (IT), Piedmont (IT), Lower Silesia (PL)	RSC partners in this group demonstrate higher levels of capacity, financing, regulatory mandate, and access to research.
3	A local/regional branch of the environment ministry, inspectorate or other national-level institution has primary responsibility for managing climate change for the region. La Rioja (ES), North Great Plain (HU), South West Bulgaria	Regional authorities have a limited role in policy making and may or may not be responsible for implementation.

Financial mechanisms supporting regional and local authorities to implement low-carbon economic development

Climate change mitigation and adaptation generally require high capital expenditure. Without the appropriate allocation and use of regional budgets and funds for mitigation and adaptation, it will be virtually impossible to achieve significant GHG reductions or move towards developing a low-carbon economy. When markets fail to account for the full environmental and social costs of an economic activity, market-based instruments are used to correct these failures in a cost-effective way. Possible national-level financial mechanisms include:

- credit lines to local commercial financial institutions (CFIs) to provide project financing;
- guarantees to share commercial lending risks with CFIs;
- venture capital funds investing risk capital in technological innovation;
- grants for sharing project development costs;
- loan-softening programmes to mobilise domestic sources of capital; and
- inducement schemes to stimulate R&D and technological development.

Other available market-based instruments have gained in popularity throughout the EU, including feed-in tariffs; sales tax, energy tax, excise tax or value added tax (VAT) reduction (environmental taxes); public competitive bidding; and green procurement.

EU Cohesion Policy: A wealth of opportunities for funding climate-related measures

The EU Cohesion Policy, a large-scale public funding programme targeted at regions, has earmarked nearly EUR 350 billion for the period 2007 to 2013 (http://ec.europa.eu/regional_policy). A significant amount of this funding — EUR 48 billion — has been earmarked through national and regional strategies and programmes for climate and low-carbon-related measures (DG Regio press release, March 9, 2009). Funds are targeted at regions that lag behind in development, including many of the RSC regions. In many cases, Cohesion Policy funds and the strategic planning and programming processes that govern their use are important overall drivers of regional development. The extent to which climate change and low-carbon objectives and measures can be integrated into the programmes is therefore critical for making progress on these issues.

Monitoring progress towards climate-friendly development

Setting the right policies, establishing efficient institutions and using an appropriate mix of financial means and incentives are necessary but not sufficient in themselves to ensure a region's low-carbon growth. The constant and precise monitoring of the success of climate change strategies, policies and actions is crucial, since the results might reveal previously unknown conditions or new developments, which in turn may require modifications and improvements to plans and strategies. This chapter looks at monitoring practices with the support of different indicators and criteria and introduces the RSC project's Low-Carbon Indicators Toolkit, which can support regions in reviewing existing indicators and inspire them to develop new ones.

Measuring progress

Indicators play a key role in tracking trends and progress during the regional implementation of a low-carbon development strategy, since they can express changes in numerical form that occur within complex environmental systems. Monitoring indicators on a regular basis provides useful guidance for regional action by assessing its emissions and the energy performance as well as the strengths and weaknesses of its climate change policy.

QUANTITATIVE INDICATORS

A region's GHG emissions performance and any efforts taken to decrease emissions are essential in moving towards a low-carbon economy. The regular and detailed measurement of harmful emissions allows policy makers to understand how to integrate crucial low-carbon issues into strategies and policies. Since in most economies, the energy sector accounts for a large part of GHG emissions, the mix of energy sources and energy efficiency are also important aspects to be monitored.

QUALITATIVE INDICATORS

In order to manage the transition to a lower-carbon economy and to achieve progress in reducing GHG emissions and energy use, it is vital for regions to examine the degree to which the region in question has the leadership, institutions, systems and practices in place to manage such a transition. In addition to national and local governments, it is important to consider the role of businesses, investment promotion agencies, citizens and consumer groups and other key stakeholders. Due largely to the inevitable subjectivity of measuring qualitative progress, indicators available for measuring the capacity of a region to address climate change are, in general, less developed than quantitative indicators. However, it is possible to assess relevant aspects.

What is an environmental indicator?

An environmental indicator is defined as a parameter, or a value derived from parameters, that points to, provides information about, and describes the state of a phenomenon, environment or area. To provide useful guidance for regional decisions, indicators need to follow the standard accounting principles, such as relevance, completeness, consistency, accuracy and transparency. As there is no unique set of indicators for monitoring a region's progress on climate change issues, selected indicators should always reflect on the situation and should depend on relevance to policy, analytical soundness and measurability. Quantitative indicators of climate change pressures and conditions are generally available and measurable, but most indicators reflecting qualitative aspects of social responses are still being developed (both conceptually and statistically).

INSIGHTS

Indicators related to GHG emissions and energy

INDICATOR	MEASUREMENT UNIT
GHG emissions (total and by sector)	tCO2 or CO2eq
GHG/CO2 emissions per capita	tCO2eq
GHG/CO2 emissions intensity	tCO2eq/unit of GDP
Final energy consumption (FEC), also shown with breakdown by type of fuel	toe
Gross inland consumption (GIC), equals total primary energy supply (TPES) and total energy consumption, also by fuel	toe
Total/final energy intensity	toe/units of GDP
Total/final energy/electricity use per capita	toe per capita
Electricity consumption	toe or kWh
Renewable energy consumption (share in GIC)	toe or percentage
Share of renewables in final energy consumption (also by sector)	percentage
Renewable electricity production/gross (or total) electricity consumption	percentage
Electricity generated from renewable sources (also as a percentage of electricity output)	kWh
Capacity installed for renewable energy production (including all hydro)	kWh

Examples of indicators for institutional capacity

INDICATOR	DESCRIPTION
Climate change institutions	Monitors the stage of institutional development in implementing the Kyoto Protocol.
Overall responsibility assigned for decisions related to climate change	Examines the extent to which official responsibility is vested for reviewing policies and committing to plans and performance measures.
Energy efficiency agencies or renewable energy associations	Tracks whether such agencies exist and assesses their quality and functions.
Legal framework in the areas of renewable energy and energy efficiency	Tracks the existence and scope of specific laws that support renewable technologies and energy efficiency measures.
Existence of specific sectoral regulations on renewable energy	Assesses the existence of specific sectoral regulations, such as obligations with respect to renewables, licensing for green generators and priority access to the grid.
Uptake of green standards	Assesses countries' performance in promoting energy efficiency standards.
Effective enforcement of electricity pricing policies	Assesses collection rates of electricity bills, and transmission and distribution losses in the electricity system.
E-government online availability	Shows the proportion of the 20 basic services that are fully available online.
E-government usage by individuals	Measures the percentage of individuals aged between 16 and 74 who have used the Internet in the last three months for interaction with public authorities.

Good to know: Adaptation indicators

Adaptation indicators assess vulnerability to climate change or represent the effects of adaptation. Indicators assessing vulnerability can provide a better understanding of the ecosystems and sectors most affected by climate change and can therefore identify areas where action is needed most urgently. Indicators measuring the effects of adaptation can be used to evaluate policies; justify and monitor adaptation funding and programmes; inform future adaptation policy development; communicate adaptation measures to the general public; and provide information to climate change negotiators in the international arena.

POSSIBLE APPLICATIONS OF LOW-CARBON INDICATORS

Methodologically well founded, carefully developed and precisely measured low-carbon indicators can be used to:

- assess progress in certain sustainable development or environmental areas — for example progress towards a low-carbon economy, sustainable transportation, organic agriculture or sustainable energy use;
- support the monitoring and assessment of the general situation or of certain topics, while developing a holistic approach to low-carbon development;
- provide simple but comprehensive information for evaluating environmental conditions;
- educate the general public and raise awareness of urgent environmental problems such as global climate change, drinking water shortages, malnutrition and desertification; and
- benchmark regions against other similar regions across the EU and worldwide.

Further information about low-carbon indicators can be found in the online handbook.

Pilot monitoring of progress towards low-carbon economies by RSC regions

Based on the RCCI methodology (see chapter 2), some of the RSC partners developed specialised monitoring tools aimed at measuring the results and the success of their policies to promote climate-friendly development. The pilot projects are presented on the following page.

CASE STUDIES

Evaluation of the regional development programmes and action plans of the North Great Plain region, Hungary

A pilot project developed by the University of Debrecen's Centre for Environmental Management and Policy involved the study of existing regional development programmes in the North Great Plain region of Hungary. The National Development Plan's operational programmes for 2011–2013 were evaluated in cooperation with regional stakeholders through a specially developed matrix and on the basis of the seven RCCI issues. Direct and indirect impacts were assessed using a five-point scale (from -2 for significant negative impacts to +2 for significant positive impacts). Stakeholder interviews were then conducted to obtain additional information. The subsequent report indicates the expected impacts of development programmes on the seven RCCI issues, and the information will be used to formulate recommendations for regional planners and decision makers with the aim of improving the climate confidence of regional development during the next programming period.

Adapted RCCI for the Bulgarian monitoring system

The RCCI can be used as a basis for analysis by adapting the index in order to meet a region's specific needs. The Bulgarian Ministry of Regional Development and Public Works adapted and integrated the RCCI into the monitoring of regional development plans in Bulgaria. The indicators were modified in order to reach compatibility with the data available in the country. Finally, the six NUTS 2 regions in Bulgaria were given scores for the seven issues using the adapted methodology, and the results for each region were analysed. Having obtained a clear awareness of the challenges, the RCCI will be integrated into the monitoring procedure in the next planning period, helping to assess the progress that Bulgaria makes on the key issues identified.

The RSC Low-Carbon Indicators Toolkit

The Low-Carbon Indicators Toolkit, developed within the framework of the RSC project, aims to inspire and assist European regions in reviewing existing low-carbon indicators and developing new ones. As such, it is designed to help regional authorities to select indicators for developing or revising their climate monitoring system.

Toolkit users will be able to:

- find guidelines on low-carbon growth and the use of indicators (including selection principles, development methodology and categorisation) to assist them in creating new indicator sets or reviewing existing sets;
- read about existing indicator-related initiatives at international, national, regional and local level that can be adapted to their needs;
- browse a thematic list of low-carbon indicators and select from among them to create their own unique indicator set;
- assess and monitor the effectiveness of their policies via a simple questionnaire; and
- gain inspiration from good practice examples in European regions and elsewhere to improve existing policies.

The toolkit comprises two modules: the Low-Carbon Indicators Library and the Regional Climate Confidence Index (RCCI) (see chapter 2 for a detailed description of the index).

In the Low-Carbon Indicators Library, policy makers can find resources on regional, national and international indicator sets; a large collection of low-carbon indicators; as well as guidelines on how these indicators can be applied in different settings.

The fine-tuned version of the RCCI was developed into an online questionnaire to monitor European regions' ability to manage climate change issues and move towards a low-carbon economy. It also contains detailed information on the implications of the results of the RCCI and provides useful tips to further improve these results.

Further information about the RSC Low-Carbon Indicators Library can be found at http://www.rscproject.org/indicators, where you can also evaluate your region using the RCCI.

Toolkit structure

Low-Carbon Indicators Toolkit

Low-Carbon Indicators Library

An extensive review of existing sustainability or environmental indicators and indices relevant to low-carbon economic development used by international organisations, national governments and other entities. It is made more user friendly through guidelines, a search engine and hyperlinks that enable easy access to additional information.

Low-carbon economy

An overview of the benefits of moving towards a low-carbon economy, and how indicators can help the process.

Indicator initiatives

An overview of international, national and regional sets of sustainable development and environmental indicators, relevant to low-carbon economy.

Guidelines for indicators

A guidance document that provides context to the use of indicators. It summarises the methods of indicator identification, selection, categorisation and application.

Low-carbon indicators

An overview of low-carbon indicators on GHG emissions, energy and other sectors and criteria for assessing the ability of national and regional/local authorities to manage low-carbon issues.

Regional Climate Confidence Index

An assessment tool, which can support any European region in measuring its status and progress towards targets of low-carbon economic development. It also provides additional materials for a better understanding of the received results and scoring methodology.

Questionnaire

It contains a series of questions including a quantitative assessment of regions' emissions and energy performance and a qualitative assessment of regions' policy framework, institutional capacity, socio-political awareness and financial means for climate change measures.

Results

After completing the questionnaire, the website automatically produces a score, based on the RCCI scoring methodology. The scores are displayed in tabular and graphical format.

Understand the results

This part contains an explanation of the implications of high/low scores for each issue and sub-issue. The displayed explanations correspond to the results received.

Improve the results

This is a set of policy actions and suggestions, linked to the RCCI issues and a series of case studies, showcasing how other regions have achieved good scores in elements of the RCCI.

Scoring method

This presents the detailed methodology and scoring method for calculating the scores for each of the RCCI issues.

Key messages

Ideally, a low-carbon economy should be the result of radical paradigm shifts in individual behaviour and in the functioning of the economy. However, since countries, regions and individuals may not be ready to radically modify their way of life, a lower-carbon economy is still a good means of bringing about incremental change. There are many aspects to a low-carbon economy, and every region, city or organisation should therefore choose those that are most closely related to their current state or desired goal.

Taking steps towards low-carbon development

The RSC partnership has summarised 10 key actions that regions should undertake to move towards a low-carbon economy:

Development steps

1. Ensure the availability of adequate and regularly updated information and data on the regions' emissions characteristics.
2. Decouple emissions and energy use from growth through multiple energy efficiency and renewable energy solutions.
3. Develop policies for energy efficiency and increase the use of renewables.
4. Develop integrated strategic and policy planning for low-carbon development.
5. Prioritise cost-effective low-carbon measures that have benefits for the climate, the economy and the social domain.
6. Establish adequate institutions with delineated responsibility and secure strong regional leadership for achieving low-carbon growth.
7. Actively involve business stakeholders, scientists, academics and the public in the decision-making process.
8. Raise awareness among the public and the business sector to encourage low-carbon consumer and production choices.
9. Use regional public investment funds as a catalyst for investing in low-carbon development by prioritising spending in stimulating the decarbonisation of the economy.
10. Regularly monitor the region's emissions performance to identify where reductions are most efficient.

We believe that in a low-carbon society, innovative technologies will create new industries and bring wealth to the cities and regions.

Bogdan Lukaszewicz ■ Department of Environment and Agriculture, Municipality of Wroclaw, Poland

Key areas for further analysis

Making the transition to a greener and decarbonised economy will require the collaborative effort of policy makers, businesses, civil society and citizens in rethinking and redefining the traditional drivers of prosperity and wealth. With this in mind, the RSC partnership has identified some areas that require further analysis.

Planning regime

- Study how to ensure the proper integration of different climate change issues into policy documents.
- Examine the links between EU and national policy targets and local circumstances to understand how to translate objectives into local policies.
- Benchmark regional performance to identify good performers, and analyse success factors that can motivate progress among lower performers.
- Review public procurement strategies for stimulating low-carbon products and services.

Creating green jobs and promoting low-carbon technologies

- Analyse the potential of economic sectors for creating green jobs.
- Assess key threats to the population and economic growth deriving from resource limits, including energy and materials.
- Analyse the impact of the economic crisis and financial resource constraints on capacity building for low-carbon development.
- Assess the possibility of employing innovative financing mechanisms to shift consumer preferences and promote investments in low-carbon technologies.

Addressing climate change adaptation and mitigation in a holistic way

Analyse possibilities for the systematic integration of mitigation and adaptation, since both aspects are strengthened when synergies are created. Opportunities for synergies exist in urban planning, decentralised energy production, and areas where local action is highly important. While considerable progress has been achieved in addressing mitigation aspects, an adaptation-related framework is still very much lacking. Climate impacts will vary across different regions and will require the estimation of specific vulnerabilities and necessitate adaptation planning and implementation at local and regional levels.

Conclusion

The RSC partners believe that the experience, lessons learnt and findings from the project can support policy makers to develop better integrated solutions for low-carbon development and may directly help European regions in making the shift to climate-friendly growth. Further discussion about making this change for the better can be found in the RSC online handbook.

Visit the RSC online handbook at www.rscproject.org/handbook

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Glossary

Adaptation — the adjustment of ecological, social and economic systems in response to the current or expected impacts of climate change in order to moderate or offset possible damage and exploit beneficial opportunities.

Climate confidence — a term coined by the RSC project to refer to the goal of fostering regions secure in their ability to manage climate change impacts and risks and able to benefit from the opportunities of a low-carbon economy.

Cohesion Policy — an instrument of economic integration introduced by the EU for member states with gross national income per inhabitant at less than 90 percent of the Community average, to reduce their social and economic disparities compared with more affluent regions.

Greenhouse gases (GHG) — atmospheric gases contributing to the naturally occurring greenhouse effect through absorption of infrared radiation and responsible for causing climate change and global warming; these gases include carbon dioxide, methane, nitrous oxide, hydrocarbons, perfluorocarbons and sulphur hexafluoride.

Gross domestic product (GDP) — the total market value of all the goods and services produced nationwide during a specified period of time.

INTERREG Programme — an EU initiative that aims to strengthen economic and social cohesion by promoting international and cross-border cooperation. The programme has the overall aim of advancing the Lisbon and Gothenburg agendas. Some of the issues addressed relate to innovation, entrepreneurship, the knowledge economy, climate change, sustainable development and the creation of more and better jobs.

Kyoto Protocol — an international agreement linked to the United Nations Framework Convention on Climate Change, which set binding targets for reducing greenhouse gas emissions for 37 industrialised countries and the European Union.

Low-carbon economy — an economy in which growth is achieved as a result of integrating all aspects of the economy around technologies and practices with low emissions, highly efficient energy solutions, clean and renewable energy and green technological innovations and where communities, buildings, transportation, industries and agriculture use and/or generate energy and materials efficiently and dispose of or recycle their waste so as to minimise GHG emissions.

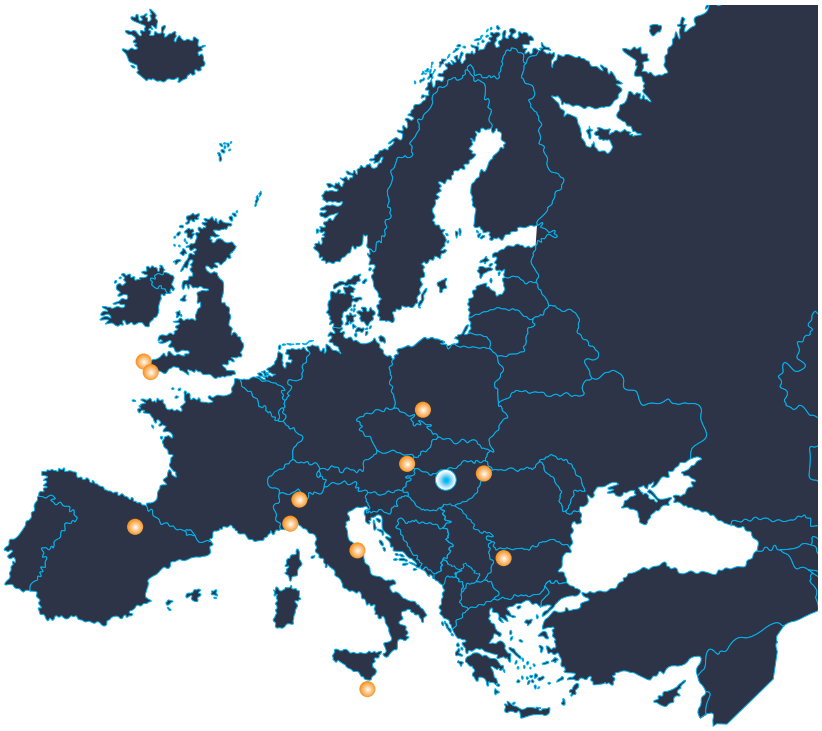
Low-Carbon Roadmap 2050 — an initiative of the EC to go beyond the 2020 objectives and cut most of Europe's GHG emissions by 2050. It shows how the sectors responsible for Europe's emissions (power generation, industry, transportation, buildings, construction and agriculture) can make the transition to a low-carbon economy over the coming decades.

Mitigation — human intervention to reduce GHG emissions and to enhance sinks aimed at reducing the impacts of climate change.

Stern Review — a report, released in October 2006, on the economics of climate change. The report discusses the effects of climate change and global warming on the world economy, the principal message being that the world must act now on climate change or face devastating economic consequences.

Strategic environmental assessment (SEA) — formal environmental impact assessment applied at the level of programmes, plans and policies in order to identify, evaluate, modify, avoid or minimise their adverse environmental effects prior to implementation.

White Paper on Climate Change Adaptation — document issued by the EC setting out a framework for reducing the EU's vulnerability to climate change and outlining actions needed to strengthen the EU's resilience to climate change through nationally and regionally applied adaptation measures widely integrated in EU key policy areas such as the Cohesion Policy.



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REGIONS FOR SUSTAINABLE CHANGE

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