

Knowledge base for Forward-Looking Information and Services (FLIS)

A platform to support long-term decision-making



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1 Why do policymakers need information about the future?

Our current development path is unsustainable. Human activity has exceeded or is close to exceeding many of our planet's biophysical limits. Continuing down this path will mean further biodiversity loss, climate change and other problems, severely impoverishing human society (Floyd and Zubevich, 2009).

We face challenges of great complexity, uncertainty and dynamism. If society is going to adapt to a more sustainable path we need to understand these challenges and their long-term implications better. Moreover, it is important not to delay action. As French diplomat Talleyrand remarked, 'when it is urgent it is already too late'. Policymakers need room for manoeuvre. And preparedness and timely action need a base of information on possible future pathways.

In a recent speech, EU Environment Commissioner Janez Potočnik said:

...we tend not to plan well for the future and lags prevent us from reaching our goals unless we act early. We have path-dependency. For future success in almost any area, we have to incorporate future effects into our current policymaking (EC, 2010).



Faced with considerable complexity and uncertainty, we need to strengthen institutional capacity significantly at all levels and perform relevant, credible and scientifically sound forward-looking assessments.

In order to strengthen long-term information for policymakers and encourage international cooperation in response to shared environmental challenges, several needs must be addressed. An EEA review (2007) of existing forward-looking studies and their use in environmental assessment revealed several important areas for work:

- Undertaking well-designed and sound future-oriented assessments that integrate environmental and socio-economic issues.
- More frequently including outlooks in national environmental reporting processes and adapting data information systems to capture forward-looking perspectives and emerging issues more regularly.
- Increasing the expertise and resources available to carry out forward-looking studies at national, European and international levels. Cooperation between countries and international organisations is indispensable to facilitate the sharing of experiences in forward-looking assessment.

The EEA has responded to these challenges and needs by starting to establish the **Knowledge base for Forward-Looking Information and Services (FLIS)**. It aims to enable the inclusion of long-term perspectives and preparedness in decision-making and environmental policy development (Figure 1.1).

Figure 1.1 Future process to integrate long-term perspectives in decision-making



Source: EEA.

1.1 Towards a knowledge base for Forward-Looking Information and Services (FLIS)

The **aim of FLIS** is to introduce forward-looking components and perspectives into existing environmental information systems to expand the knowledge base. This living knowledge base will support networking, including through the European Environment Information and Observation Network (Eionet, 2010a); encourage capacity-building and exchange of experiences; facilitate institutional change to ensure that appropriate knowledge and information is available and used in environmental policymaking; and enable relevant, credible and scientifically sound forward-looking assessments (see Box 1.1).

As highlighted in the quote above from Commissioner Potočník, FLIS will help meet the important need for timely, sufficient and clear information and approaches to better inform long-term decision making and environmental policy development. FLIS will provide a sound basis to inform country-level, European and international discussion and collaboration regarding long-term global environmental challenges — and the development of appropriate responses.

FLIS is an expanding and evolving knowledge base, which EEA has so far developed and populated with support from consultants. The vision is for FLIS to move gradually towards more decentralised management, with content managed and updated by EEA countries and relevant organisations.

FLIS will ultimately form part of the Shared Environmental Information System (SEIS — see Box 1.2 and Figure 1.2), which is a collaborative initiative of the European Commission, and the EEA and its member countries. Figure 1.2 visualises how FLIS fits with the other elements of SEIS.

Box 1.1 Forward-looking assessments

Forward-looking assessment can:

- frame policies by identifying priority warning signals and emerging issues;
- reflect on different options for the future;
- identify driving forces and uncertainties;
- check whether and how targets can be met;
- develop robust measures and precautionary actions;
- analyse cause-effect relationships;
- anticipate possible surprises, discontinuities and shocks;
- facilitate short- and long-term thinking in a structured way.

Box 1.2 The Shared Environmental Information System (SEIS)

Reliable, accessible and timely data on the environment is a key factor in formulating good policies. A vast range of environmental data is being collected across Europe, generating valuable information for policymakers, citizens and business. To maximise the use of this information, SEIS aims to connect existing databases and make data easily accessible to all.

Principles of SEIS

1. Information should be managed as close as possible to its source.
2. Information should be collected once and shared with others for many purposes.
3. Information should be readily available to public authorities and enable them to easily fulfil their legal obligations.
4. Information should be readily accessible to end-users, primarily public authorities at all levels from local to European, to enable them to assess in a timely fashion the state of the environment and the effectiveness of their policies and to design new policy.
5. Information should also be accessible to enable end-users, both public authorities and citizens, to make comparisons at the appropriate geographical scale and to participate meaningfully in the development and implementation of environmental policy.
6. Information should be fully available to the general public, after due consideration of the appropriate level of aggregation and subject to appropriate confidentiality constraints, and at a national level in the relevant national language(s).
7. Information sharing and processing should be supported through common, free open-source standards and if possible software tools.

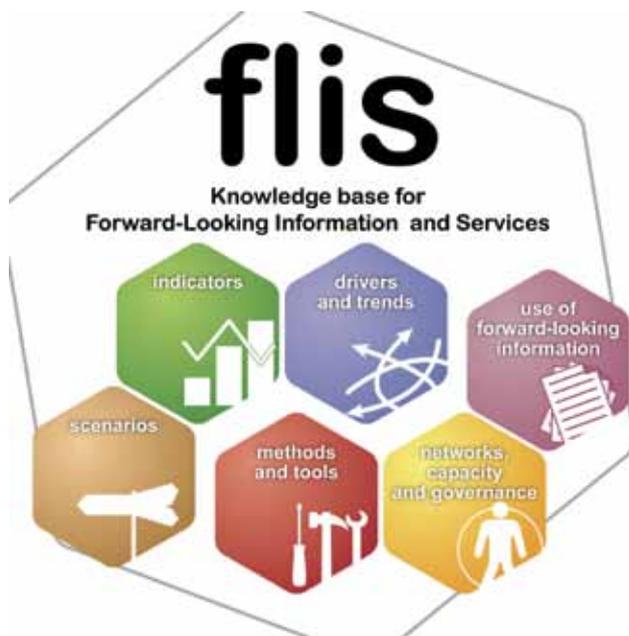
Figure 1.2 FLIS as part of SEIS



Source: EEA.

2 The building blocks of the knowledge base for Forward-Looking Information and Services (FLIS)

Figure 2.1 Main building blocks of FLIS



Source: EEA.

EEA started to develop FLIS in 2006 and has been collecting, updating and publishing information since then, with support from consultants. With the establishment of the Eionet national reference centres for forward-looking information and scenarios – NRC FLIS (Eionet, 2010b), it is expected that a system of shared information management will gradually develop in line with the SEIS principles (Box 1.2).

FLIS currently has six components:

- drivers and trends
- indicators
- scenarios
- methods and tools
- networking, capacity building and institutional setup
- forward-looking assessments.

In the future, additional components may be added, as for example horizon scanning and early warning signalling.

The information in the knowledge base for FLIS is organised in a structured way to allow users to easily access forward-looking information on specific sectors of human activity (such as transport, energy and agriculture) and specific environmental issues (such as air pollution, water, land and biodiversity) (Table 2.1). Search engines with advanced options are integrated in all FLIS content management systems and provide options for a search based on key words.

Figure 2.1 sets out the current FLIS components and the sections below describe each component in more detail as well as providing examples of existing information and its use, as well as relevant internet links.

Table 2.1 illustrates an example of the information available in the knowledge base FLIS related to the energy sector across all components.

Further information

General information on FLIS

EEA environmental scenarios information portal (EEA EnviroWindows):

- scenarios and other forward-looking studies
- indicators
- models
- methods
- Eionet NRC FLIS
- cooperation with other institutions
- reports

EEA thematic web pages on scenarios and forward-looking studies <http://www.eea.europa.eu/themes/scenarios/scenarios-and-forward-studies-eea-activities>

EEA Eionet site on cooperation with countries <http://www.eionet.europa.eu/countries>

Table 2.1 Example of how the knowledge base for FLIS can support access to information on energy

Access to information in FLIS – energy



Drivers and trends

Global megatrends

11 global megatrends are available to be used as drivers of change to support energy-related analyses



Indicators

All the forward-looking indicators listed below are available at:
<http://www.eea.europa.eu/data-and-maps/indicators>

EEA Core Set of Indicators (CSI) on energy: 5 indicators

Outlook indicators for energy: 10 indicators

Final energy consumption by sector (CSI27)

Final energy consumption – outlook from EEA (outlook 48)

Final energy consumption – outlook from IEA (outlook 11)

Total primary energy intensity (CSI28)

Total energy intensity – outlook from EEA (outlook 49)

Primary energy consumption by fuel (CSI29)

Total energy consumption – outlook from IEA (outlook 30)

Total energy consumption – outlook from EEA (outlook 50)

Total electricity consumption – outlook from EEA (outlook 51)

Total electricity consumption – outlook from IEA (outlook 28)

Renewable primary energy consumption (CSI30)

Renewable energy consumption – outlook from EEA (outlook 52)

Renewable energy consumption – outlook from IEA (outlook 39)

Renewable electricity consumption (CSI31)

Renewable electricity – outlook from EEA (outlook 53)



Scenarios

Energy scenario studies – seven studies

Energy to 2050: Scenarios for a Sustainable Future (IEA, 2003)
 (International Energy Agency – www.iea.org)

Shell Energy Scenarios to 2050 (Shell, 2008)
 (Shell Corporation – www.shell.com)

World Energy Outlook 2009 (IEA, 2009)
 (International Energy Agency – www.iea.org)

European Energy and Transport: Trends to 2030 – European Energy and Transport: Scenarios on Key Drivers
 (Mantzos et al., 2003)

Global Long-term Energy-Economy-Environment Scenarios with an Emphasis on Russia (Kryazhimskiy et al., 2005)
 (IIASA – <http://www.iiasa.ac.at>)

Strengthening Co-operation for Rational and Efficient Use of Water and Energy Resources in Central Asia
 (UNECE, 2004)

Programme of Energy Development to 2030 (Kazakhstan) – Scenarios (Government of Kazakhstan, 2007)
 (<http://www.carecinstitute.org/uploads/docs/KAZ-Power-Energy-Development-Abstract-en.pdf>)

Table 2.1 Example of how the knowledge base for FLIS can support access to information on energy (cont.)

Access to information in FLIS – energy	
	Capacity-building and networking
	Capacity-building – three events
	Scenario building workshop, Turkey, December 2006
	Scenario building workshop in cooperation with environment and security initiative: planning for energy security and sustainability in a changing world
	Eastern Europe: September, 2009/Central Asia: planned early 2011
	Scenario-building workshop in cooperation with OSCE Security Implications of Climate change: Energy in Eastern Europe
Planned for January 2011	
Networks involved: Eionet, ENVSEC, OSCE, DG EuropeAid, Asia–Europe partnership (ASEF)	
	Methods and tools
	Models related to energy – nine models
	All the models descriptions listed below are available at the EEA EnviroWindows website: http://scenarios.ew.eea.europa.eu
	Models providing projections on energy development in future
	WEM – IEA's World Energy Model
	Prometheus
	Models related to energy sector impacts on the environment
	ECO2-Regio
	ECO2-Privat
	RAINS-Europe (GAINS)
	Regional Air pollution Information and Simulation (RAINS)
	EcoSense
	Other models
V GAS (Virtu@alis)	
International Futures	
Scenario-building methods	
Downscaling of global scenarios to national situation and national strategies checking (Turkey)	
Scenario building on the bases of deductive approach – exploratory	

Note: The information resources cited in Table 2.1 are based on the existing FLIS components development and are expected to increase in the future.



2.1 Drivers and trends

Drivers or driving forces are the social, demographic technological, economic, environmental and political developments in societies that provoke changes in aggregate production and consumption. Through these changes, driving forces exert pressure on natural resource use and pollution output.

A **trend** can be defined as the general direction in which something tends to move. Megatrends are trends or combinations of trends visible today that are expected to extend over decades, influencing numerous areas of human societies.

The aim of the drivers and trends component is to provide up-to-date information on important long-term drivers and trends at the different spatial scales relevant to the European environment.

A shared understanding of long-term drivers and trends and their influence on Europe's environment can be an important tool for developing appropriate short- and long-term national and European policy responses to tackle the drivers of environmental change.

What has been done so far and what information is available?

Research carried out in preparation for the 'Assessment of global megatrends', which is part of *The European environment — state and outlook 2010* report (SOER 2010) (EEA, 2010), identified 11 megatrends (Box 2.1). 'Assessment of global megatrends' includes information sheets for each megatrend, comprising a summary description, analysis of the megatrend's importance for Europe and key drivers and uncertainties.

Online content on drivers and trends is to be developed in 2011 as part of FLIS. This will include updated megatrend fact sheets and a management structure for information on drivers and trends gathered under SOER 2010 and previous EEA research ⁽¹⁾. As with other components of FLIS, the online information on trends and drivers will be updated and amended on a regular basis.

Further information

Drivers and trends	
EEA SOER 2010, Assessment of global megatrends; descriptive factsheets, impacts in Europe	http://www.eea.europa.eu/soer/europe-and-the-world
EEA research foresight — European drivers for long-term research strategy	http://ew.eea.europa.eu/research/drivers

⁽¹⁾ <http://ew.eea.europa.eu/research/>.

Box 2.1 Overview of global megatrends

SOER 2010 (EEA, 2010) identified global megatrends which influence future environmental change in Europe in terms of the 'STEEP' framework of social, technological, economic, environmental and political drivers.

Social

- increasing global divergence in population trends;
- living in an urban world: spreading cities and spiralling consumption;
- disease burden and the risk of new pandemics.

Technological

- accelerating technologies: racing into the unknown.

Economic

- continued economic growth;
- from a unipolar to a multipolar world;
- intensified global competition for resources.

Environmental

- decreasing stocks of natural resources;
- increasingly severe consequences of climate change;
- increasingly environmental pollution load.

Political

- environmental regulation and governance: increasing fragmentation and convergence.



2.2 Indicators

Forward-looking indicators are estimates of future developments. They are usually based on past and present trends and available models (EEA, 2008a). They present quantitative environmental information to inform forward-looking assessments.

Forward-looking indicators are intended for use by policymakers and others working with environmental issues to discuss short- and medium-term policy options, distance to target analyses and possible impacts under defined conditions and policy frameworks. They help improve the consistency of qualitative scenario-based assessments.

The aim of the indicators component is to complement the future perspectives of EEA indicators, streamline links with data at the country level and present European outlooks in the global context. It also aims to facilitate routine inclusion of future perspectives in regular environment reporting activities and help information systems capture data on future perspectives and emerging issues.

When using forward-looking indicators in environmental assessment or policy analysis, it is important to understand the relative methodological strengths and weaknesses of indicators. Transparency in communicating underlying uncertainties and assumptions of models used for to generate indicators is also necessary.

In the framework of the FLIS knowledge base, EEA has developed an online **model inventory**. Its primary aim is to provide information about modelling tools used to produce forward-looking indicators and analyses ^(?). The model inventory is intended to facilitate interaction between those providing modelling tools and those using models and generating results.

What has been done so far and what information is available?

Forward-looking indicators

EEA conducted a review to identify outlook indicators that can complement the EEA core set of indicators. The review identified 157 forward-looking indicators, of which 44 were selected based on relevance to the EEA core set of indicators and priority areas. These are published on the EEA scenario website and managed by the EEA Indicator Management System (IMS) for outlooks (Box 2.2). The indicators address the following topics:

- agriculture
- air pollution
- biodiversity
- climate change
- energy
- transport
- waste and material resources
- water
- socio-economics (e.g. population, GDP).

Model inventory

In 2008 EEA published a report to help develop an inventory of models. The study focused in particular on models that are geared to support forward-looking environmental assessments and outlooks, and models that provide outlook indicators of environmental trends. It presented an overview of modelling tools currently available to simulate environmental change at a European scale, and was based on a review of more than 80 models in total, of which 39 were described in detail.

^(?) While indicators are an important product of modelling, models can also provide important input to scenarios and analysis of trends and drivers.

Box 2.2 EEA Indicator Management System (IMS) for outlooks

The IMS is a content management system for the EEA core set of indicators (CSI) and other indicator sets related to past trends. It has now been adapted to support the management of forward-looking indicators.

The IMS provides users with detailed information on indicators, including the methodologies and data used and uncertainties.

To start developing the online inventory, the 39 models were uploaded to the internet using specialist software. Many of the models included in the online inventory so far were used to generate the forward-looking indicators in the IMS.

The online inventory is currently available in draft format and is still under development. Its aim is to provide a basis for improved transparency and exchange, and a means to address gaps in the thematic coverage of modelling identified in the 2008 report. It is therefore intended to be added to and updated regularly, and a template and online interface have been developed for this purpose. The inclusion of a model in the inventory does not mean that it is endorsed by the EEA.

Further information

Indicators	
44 forward-looking indicators are published in the EEA Indicator Management System for outlooks	http://www.eea.europa.eu/data-and-maps/indicators http://www.eea.europa.eu/themes/scenarios/indicators
<i>Catalogue of forward-looking indicators from selected sources</i> , EEA Technical report No 8/2008	http://www.eea.europa.eu/publications/technical_report_2008_8
EEA environmental scenarios information portal (EEA EnviroWindows): <ul style="list-style-type: none">• indicators• models• online model inventory	http://scenarios.ew.eea.europa.eu
<i>Modelling environmental change in Europe: towards a model inventory</i> , EEA Technical report No 11/2008	http://www.eea.europa.eu/publications/technical_report_2008_11/



2.3 Scenarios

A scenario is a consistent and plausible picture of a possible future that can inform the main issues of a policy debate (EEA, 2009a). Scenario studies vary in terms of the number of scenarios they develop to explore alternative futures. Some studies build a small set of narrative 'storylines', while others, often quantitative studies, present many scenarios.

As part of FLIS, scenarios and scenario studies can provide a framework to assess future policies and management options. They can also be educational in nature to raise awareness and understanding of future perspectives.

The aim of the scenarios component in FLIS is to provide an overview of available scenario studies relevant to environmental assessment and decision-making in Europe. By categorising scenarios by type and geographical and sectoral focus, the online inventory of scenarios facilitates the use of scenarios in environmental assessments and in identifying and evaluating options for decision-making.

What has been done so far and what information is available?

The EEA made an overview of available scenario studies in the Pan-European region in 2006 and updated it in 2007 and again in 2008 (EEA, 2008b). Drawing on these earlier studies, in 2009 the EEA published *Looking back on looking forward: a review of evaluative scenario literature* (EEA, 2009a).

A catalogue of scenarios has been produced in 2011, which presents 51 scenario studies in factsheets comprising a summary, information on key characteristics and a description of the methodology used.

The catalogue provides the initial basis for an online inventory of scenarios with an enhanced search tool. Management tools will be based on the Assessment of Assessments tool or the SENSE system (Shared European and National State of the Environment information) which is under development.

Box 2.3 What is a scenario?

Key elements of scenarios include:

1. a representation of the initial situation, or baseline;
2. a description of drivers of change and uncertainties;
3. a description of changes, typically in time-steps;
4. a description of the 'end-state' and image of the future situation over a specified time frame;
5. a description of alternative pathways to the future — scenarios are generally developed as sets.

Source: Alcamo, 2008.

Further information

Scenarios

EEA environmental scenarios information portal (EEA EnviroWindows) <http://scenarios.ew.eea.europa.eu>

Catalogue of scenario studies, EEA Technical report No 1/2011 <http://www.eea.europa.eu/publications>

Europe's environment assessment of assessments: <http://aoa.ew.eea.europa.eu>
• virtual library



2.4 Methods and tools

While other components of FLIS provide structured information about the future itself, this component is dedicated to the practical methods and tools used in studying the future ⁽³⁾. Several methodological approaches and a variety of methods and tools exist to help structure our thinking about plausible futures (Figure 2.2).

There is no single set of methods applicable to all forward-looking assessments. The factors that govern the selection of methods and tools to analyse a specific issue include the degree of uncertainty, the complexity of the underlying system, the purpose of the assessment and the resources available.

The aim of the methods and tools component is to present descriptions of available methods and tools, and provide guidance on their use in forward-looking environmental assessments.

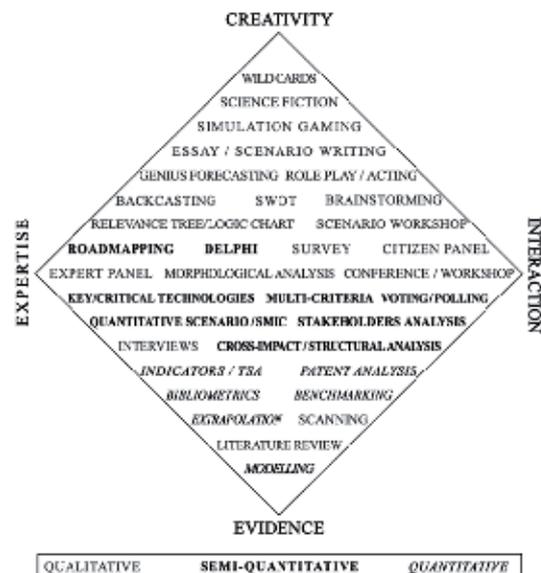
What has been done so far and what information is available?

An online inventory of methods and glossary has been completed in 2010. The component will also include links to important sources of information, such as a study on using models and scenarios to explore the development of biodiversity and ecosystems (IIEP, 2009), the UNEP Integrated Environmental Assessment (IEA) Manual (UNEP, 2007), and the UNEP Millennium Ecosystem

Assessment's methods manual: Ecosystems and Human Well-Being — A Manual for Assessment Practitioners (UNEP, 2010).

Consideration is also being given to developing specific guidelines for inclusion in this component to assist countries in selecting and using appropriate methods and tools for forward-looking assessments.

Figure 2.2 Foresight methods diamond



Source: Popper, 2008.

Further information

Methods and tools	
EEA environmental scenarios information portal (EEA EnviroWindows)	http://scenarios.ew.eea.europa.eu
GEMET — GEneral Multilingual Environmental Thesaurus (EEA Eionet web page)	http://www.eionet.europa.eu/gemet
EEA glossary	http://glossary.eea.europa.eu

⁽³⁾ Models are an example of a method or tool but within FLIS, models have been grouped with forward-looking indicators due to the importance of modelling in producing indicators.



2.5 Networking, capacity-building and governance

The EEA aims to strengthen cooperation with countries and other organisations involved in forward-looking information and services. The aim is to form strategic partnerships to promote capacity-building, facilitate exchange of experiences, improve methodological approaches and extend them to business and NGOs where relevant ⁽⁴⁾. This is achieved both using existing formal and informal networks and by building new partnerships.

Networking

Cooperation between EEA member countries and collaborating countries ⁽⁵⁾ is organised through the European environmental information and observation network (Eionet). Eionet consists of the EEA itself, five European Topic Centres (ETCs) and a network of around 900 experts from 38 countries in over 300 national environment agencies and other bodies dealing with environmental information. These are the National Focal Points (NFPs) and the National Reference Centres (NRCs). National Reference Centres for Forward-Looking Information and Scenarios (NRC FLIS) were established in 2009 (Eionet, 2010a).

Cooperation with countries and regions outside the EU is organised by linking and conducting joint events and activities with other international organisations and initiatives such as United Nations Development Programme (UNDP), the Organisation for Security and Cooperation in Europe (OSCE), the Environment and Security Initiative and the Asian European Foundation (ASEF). EEA has also established an informal network of contact persons in eastern Europe, the Caucasus, and central Asia.

Capacity-building

The development and processing of forward-looking information varies considerably among EEA countries. To address this, EEA promotes and implements various capacity-building initiatives focusing on:

- facilitating exchange of experiences between different countries and regions;
- raising awareness about existing methods to understand the future and use forward-looking information;
- enhancing stakeholder participation and promoting the use of forward-looking methods in long-term decision-making;
- providing a platform for politicians and policymakers to discuss options for the future.

Examples of EEA capacity-building activities include scenario and capacity-building workshops

⁽⁴⁾ See the EEA Strategy 2009–2013 (EEA, 2009), strategic area 3.5.

⁽⁵⁾ EEA cooperating countries are: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Montenegro and Serbia.

Governance

'Governance' means rules, processes and behaviour that affect the way in which powers are exercised at the European level, particularly as regards openness, participation, accountability, effectiveness and coherence (EC, 2001).

In 2008, the EEA started to analyse the success factors and barriers to a long-term perspective in public policymaking, with particular reference to environmental planning, in the Blossom project (Bridging Long-term Scenario and Strategy analysis — Organisation and Methods). Blossom is the first systematic comparison at the European level of how futures studies are used to inform environmental policymaking.

The Blossom project includes a study analysing 12 countries' ⁽⁶⁾ institutional approaches to embedding futures thinking in environmental policy making. It therefore represents a detailed study into the governance of forward-looking information and assessments at the national level. The project will report in early 2011.

FLIS will draw on the outcomes of the Blossom project to inform and support existing activities and resources relating to governance and institutional set-up, and develop new ones.

Further information

Networking, capacity-building and governance	
Eionet website • roles, primary contact points and national reference centres	http://eionet.europa.eu
EPA network — Network of the Heads of Environment Protection Agencies	http://epanet.ew.eea.europa.eu
<i>Looking back on looking forward: a review of evaluative scenario literature</i> , EEA Technical report No 3/2009	http://www.eea.europa.eu/publications/looking-back-on-looking-forward-a-review-of-evaluative-scenario-literature
Bridging Long-term Scenario and Strategy analysis — Organisation and Methods (Blossom) report, including 12 country case studies	http://www.eea.europa.eu/publications
EEA environmental scenarios information portal (EEA EnviroWindows): • cooperation with countries • Eionet NRC FLIS • links (institutions, organisations, networks)	http://scenarios.ew.eea.europa.eu

⁽⁶⁾ Case study countries include Austria, Finland, France, Germany, Hungary, the Netherlands, Poland, Portugal, Slovenia, Spain, Sweden and the United Kingdom.



2.6 Use of forward-looking information

Forward-looking information is increasingly accepted and used by policymakers, governments and the scientific community in the context of:

- broad policy-oriented forward-looking assessments;
- strategic planning and decision-making;
- education, information science and research.

Broad policy-oriented forward-looking assessments

The EEA carries out forward-looking assessments as part of its work to inform policymakers and the public about how Europe's natural environment is changing, the socio-economic activities driving these changes and the policies that will best help prepare for these changes and mitigate negative impacts.

These assessments support high profile reporting, such as: *The pan-European environment – glimpses into an uncertain future* (EEA, 2007), *Environmental trends and perspectives in the Western Balkans: future production and consumption patterns* (EEA, 2010a, see Box 2.4); and SOER 2010 (EEA, 2010b).

Strategic planning and decision-making

Many of today's pressing societal problems are long-term policy challenges. Policymakers often face strategic decisions with uncertain future outcomes. Environmental policymaking is a good example of a field with highly complex and uncertain future developments. Problems often unfold over decades and cut across spatial scales influenced by a myriad of driving forces.

A number of tools have been developed to assist policymakers in making long-term decisions more robust, ranging from horizon scanning approaches to model-based projections and comprehensive scenario planning approaches.

Forward-looking information can provide a platform for evaluating the implications of different options and pathways, and for improved strategic planning and policy decisions, particularly those spanning more than one legislative period.

Box 2.4 EEA work on forward-looking assessment – an example from the western Balkans

A recent EEA study (2010a), examines current environmental trends and explores the forces shaping the future of the environment in the western Balkans. Where available, forward-looking indicators are used to describe key drivers such as demographic changes.

The study identifies ongoing trends that are increasing pressures and risks for the region's environment, such as growing consumption, but concludes that these pressures and their impacts are not inevitable.

To shape a sustainable environmental future, the actors in the region need to cooperate with each other and with neighbouring countries to tackle challenges such as pollution and health impacts, climate change consequences and ecosystem threats. Today's choices will influence not only the region's environment in the coming decades but also the environment in other European countries.

Forward-looking information can serve two distinct purposes in relation to policy:

- **agenda setting**, including identifying issues for policy attention and exploring uncertainties;
- **policy development**, including long-term (regulatory) impact assessment of policies (see Box 2.5).

Education, information, science and research

In addition to broad and specific policy and strategic planning uses, forward-looking information can play an important role in:

- Education, for example use in the classroom by academics and students, as well as in the educating policymakers and others on long-term issues and options. Models (in particular software and web-based models) can be interactive in nature, providing a mechanism for users to learn and explore implications of different options and decisions. Equally, participative scenario-building processes that bring different groups together can play a role in learning and information exchange.
- Informing, by raising awareness and providing accessible and clear information about the future to policymakers, stakeholders and the public. Prelude scenarios stories in an easy-to-understand way (multimedia) and at the same time also allow for deeper analyses (<http://www.eea.europa.eu/multimedia/interactive/prelude-scenarios/prelude>).
- Science and research, by enabling researchers and scientists to identify long-term research and innovation priorities based on scenarios of future developments in science, technology, society and the economy. Scenario-building exercises, for example, can provide a useful mechanism and framework to identify and explore information about specific long-term issues and problems (Box 2.5).

Box 2.5 Forward-looking information in policymaking – an example from the Blossom study

Energy scenarios for an energy concept of the Federal Government – Germany:

In its coalition agreement, the German government that took power in 2009 announced its plan to adopt a new energy 'concept' – roadmap to the era of renewable energy – based of an analysis of various scenarios.

The German government commissioned a consortium of research institutes to prepare a study of energy scenarios. The study included one reference scenario and eight target scenarios that project different developments of the energy sector taking up to 2050.

Once published the study was extensively discussed in political circles and the adopted energy concept explicitly identified the study as its scientific basis, alongside other studies in the fields of climate change and energy.

For more information, see: http://www.bmu.de/english/current_press_releases/pm/46420.php.

Glossary

Blossom	Bridging Long-term Scenario and Strategy analysis — Organisation and Methods	Inspire	Infrastructure for Spatial Information in the European Community
CSI	EEA Core Set of Indicators	NFP	National focal point
EEA	European Environment Agency	NGO	Non-governmental organisation
Eionet	European Environment Information and Observation Network	NRC	National reference centre
EPA Network	Network of the Heads of Environment Protection Agencies	NRC FLIS	National reference centres for forward-looking information and scenarios
ETC	European Topic Centre	OSCE	Organization for Security and Co-operation in Europe
EU	European Union	SEIS	Shared Environmental Information System
EU-SDI	EU Sustainable Development Indicators	SENSE	Shared European & National State of the Environment information system
FLIS	Knowledge-base for Forward-Looking Information and Services	SOER 2010	'The European environment — state and outlook 2010' report
GEMET	General Multilingual Environmental Thesaurus	STEEP	Social, Technological, Economic, Environmental, Political (drivers)
GMES	Global Monitoring for Environment and Security	SWOT	Strengths, Weaknesses, Opportunities and Threats (analysis)
IEA	International Energy Agency	UNECE	United Nations Economic Commission for Europe
IIASA	International Institute for Applied Systems Analysis	UNEP	United Nations Environment Programme
IMS	EEA Indicator Management System		

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