

Annex 1 — Austria country case study

BLOSSOM: Support to analysis for long-term governance and institutional arrangements



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Acronyms

BLOSSOM	B ridging L ong-term S cenarios and S trategic analysis — O rganisation and M ethods
BMLFUM	Federal Ministry of Agriculture, Forestry, Environment and Water Management (Lebensministerium)
EEA	European Environment Agency
EU	European Union

1 Introduction

1.1 Introduction

This report sets out the current status of the main institutional and governance arrangements for futures thinking in Austria with respect to environmental — and environment-related — policymaking. It is based on a review of documentation and other available resources and a set of interviews with high-level officials and experts in relevant government departments, agencies and institutions. The aim has been to understand better how futures thinking is undertaken in Austria, the relationships between different futures programmes and how these relate to, and influence, environmental policymaking. The report particularly tries to identify the success factors in ensuring futures thinking is embedded in environmental policymaking; however, barriers to success are also identified. It does not seek to explore the whole range of futures work, only those aspects of most relevance to environmental

policymaking, and is focused on the institutional and governance structures, not the details of the futures studies or the quality of those studies. Further details can be found in the Appendices.

This report, along with similar reports for 11 other EU Member States, formed the basis for a further cross-country analysis in 2010 to identify common themes and issues in institutional and governance arrangements, as well as distinctive aspects of different cultural and administrative traditions and approaches to futures thinking.

This study presents the results of an attempt to synthesise and evaluate current practices: it is meant to shed light on important developments and stimulate discussion but it is not meant to be understood as a comprehensive and concluding assessment of futures-oriented studies or their impacts on decision-making.

2 The landscape for long-term thinking and governance in Austria

Since the end of the Second World War, Austria has undergone a successful catch-up process from a largely destroyed economy to an advanced industrial country. Today, Austria is a country with a well-developed social market economy and high living standards. Until the 1980s, many of the largest industrial companies were owned by the national government but, in recent years, these have largely been privatised, reducing state holdings as in many other European countries. International tourism is also an important part of the economy. Austria joined the European Union in 1995.

Austria is a federal republic based on a Federal Constitution from 1920, which was re-established in 1945. The country is divided into nine federal regions (*Bundesländer* or *Länder*). The regions are further subdivided into districts (*Bezirke*) and statutory cities (*Statutarstädte*). The districts are comprised of municipalities (*Gemeinden*). The regions have jurisdiction in several areas including culture, social care, youth, nature protection, hunting and construction, among others.

The head of state is the federal president (*Bundespräsident*) and the chairman of the federal government is the federal chancellor, who is appointed by the president. The parliament of Austria consists of two chambers: the Nationalrat and the Bundesrat. The first chamber plays the most important role in terms of the adoption of national legislation. The third judicial pillar of the Austrian political system, the Constitutional Court (*Verfassungsgerichtshof*), has considerable influence on the political system by ruling whether laws and ordinances comply with the Austrian Constitution. More detailed information on the policymaking process in Austria can be found in Section 2.1.

Environmental concerns arose on the political agenda in the late 1970s, due notably to concerns about dying forests caused by acidification from high levels of SO₂ emissions. These and other environmental issues, raised awareness throughout the 1980s, and environmental protection became a very high policy priority in the 1980s and 1990s. As

a result, actions were taken which resulted in the reduction of SO₂ emissions by about 80 %.

In addition, the high policy awareness prompted the beginning of systematic thinking about the future through the development and adoption of Austria's first National Environmental Plan (NUP) in 1994. The document stands out compared to previous strategic documents as its development involved a broad network of stakeholders and extensive consultations across the country.

Since that time, Austria has regularly used forward-looking analysis in policymaking decisions, and most of the strategic policy documents related to the environment have their roots in the NUP. Thus, for a broad range of environmental issues today (including air, water, soil, waste, biodiversity, spatial planning, climate change, energy, transport, biocides and chemicals), projections and scenarios are used on a regular basis when proposing new or revised strategic documents and implementation measures. In most cases, the environment-related policy documents are proposed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management in collaboration with the Environment Agency Austria, which also carries out most future-oriented studies. The process also involves a number of other competent government bodies, research institutions, universities and interest groups, prominent among which are the Austrian Energy Agency and the International Institute for Applied Systems Analysis (IIASA).

The methodology for building forecasts, projections and scenarios is thus well integrated in the legislative system, in particular in the environmental sector. The Austrian case study is characterised by a systematic approach to the use of forward-looking thinking in the development of policy documents and measures. This is due to a high level of political support within government and commitment to forward-looking analysis, the allocation of sufficient funds for carrying out forward-looking studies and the clear division of responsibilities and roles among the competent institutions and broad network of experts.

The limited resources and time frames for the production of this case study do not allow in-depth analysis across all environmental themes or policies. Thus, this study aims to provide an overview of key environmental themes that commonly use future-oriented studies and scenarios, as well as on the process itself linking forward-looking studies to decision-making. This report presents the key government bodies involved and examines forward-looking analysis related to a few recent strategic documents (e.g. the Climate Strategy and the Energy Strategy Austria). Finally, it briefly discusses the Austrian foresight programme.

2.1 Responsibilities: the government institutions involved in environmental future-looking studies

This section first describes the two leading institutions involved in preparing and using scenarios and future-oriented studies in environment and environmental-related fields.

The section then reviews key examples of the policy documents whose development incorporated forward-looking analysis: the National Environment Plan (NUP), the Climate Strategy and the Energy Strategy Austria (Section 2.1.2). Considering the large number of strategic documents for the environment sector that incorporate forward-looking analysis, this case study focuses on these three documents as the first played a key role in launching the use of forward-looking studies and the other two have been closely related.

At the same time, two other processes have been important: Austria's Strategy for Sustainable Development and the 'Delphi Austria' foresight

programme. These are briefly described in Section 2.1.3.

2.1.1 Key government institutions involved in the preparation of forward-looking studies and strategies for the environment

In Austria, the two leading institutions in terms of decision-making and preparation of forward-looking studies and scenarios for environmental issues are the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria. In addition, the responsible institution for energy issues is the Federal Ministry of Economy, Family and Youth.

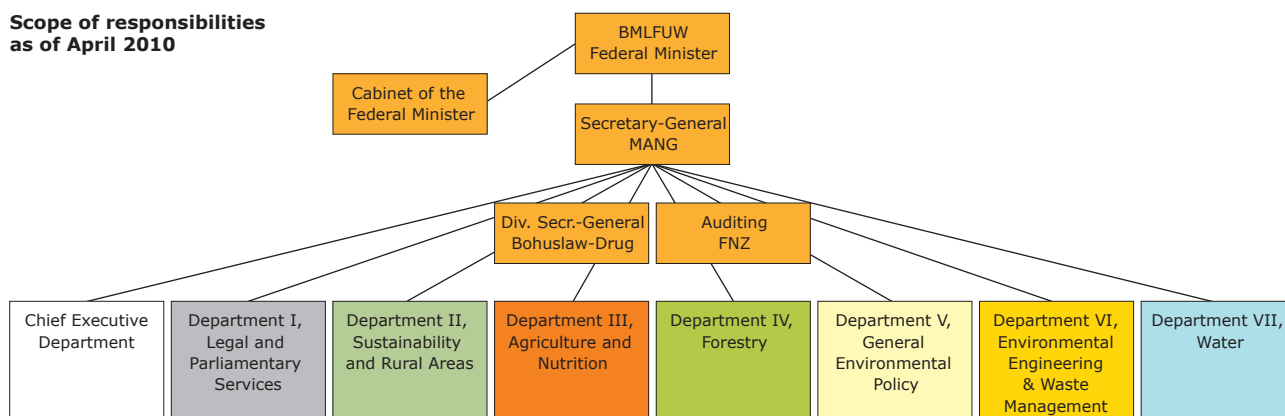
There is thus no central body or organisation with general responsibility for leading or coordinating forward-looking analyses and studies in Austria. Rather, the approach can be described as predominantly sectoral in nature with different institutions having responsibility for their own policy areas. Furthermore, forward-looking analysis is carried out on a regular basis and it can be considered an aspect of everyday working: as such, separate budget streams and staffing specifically for forward-looking analysis are not defined.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management (Lebensministerium, BMLFUW)

In 2000, Austria's federal ministries were reorganised and the responsibilities for environment, agriculture, forestry and water were merged to form the new Federal Ministry of Agriculture, Forestry, Environment and Water Management (Figure 1).

In 2010, the BMLFUW budget was approximately EUR 3 billion, of which EUR 31 million was

Figure 1 The BMLFUW organisation chart, 2010



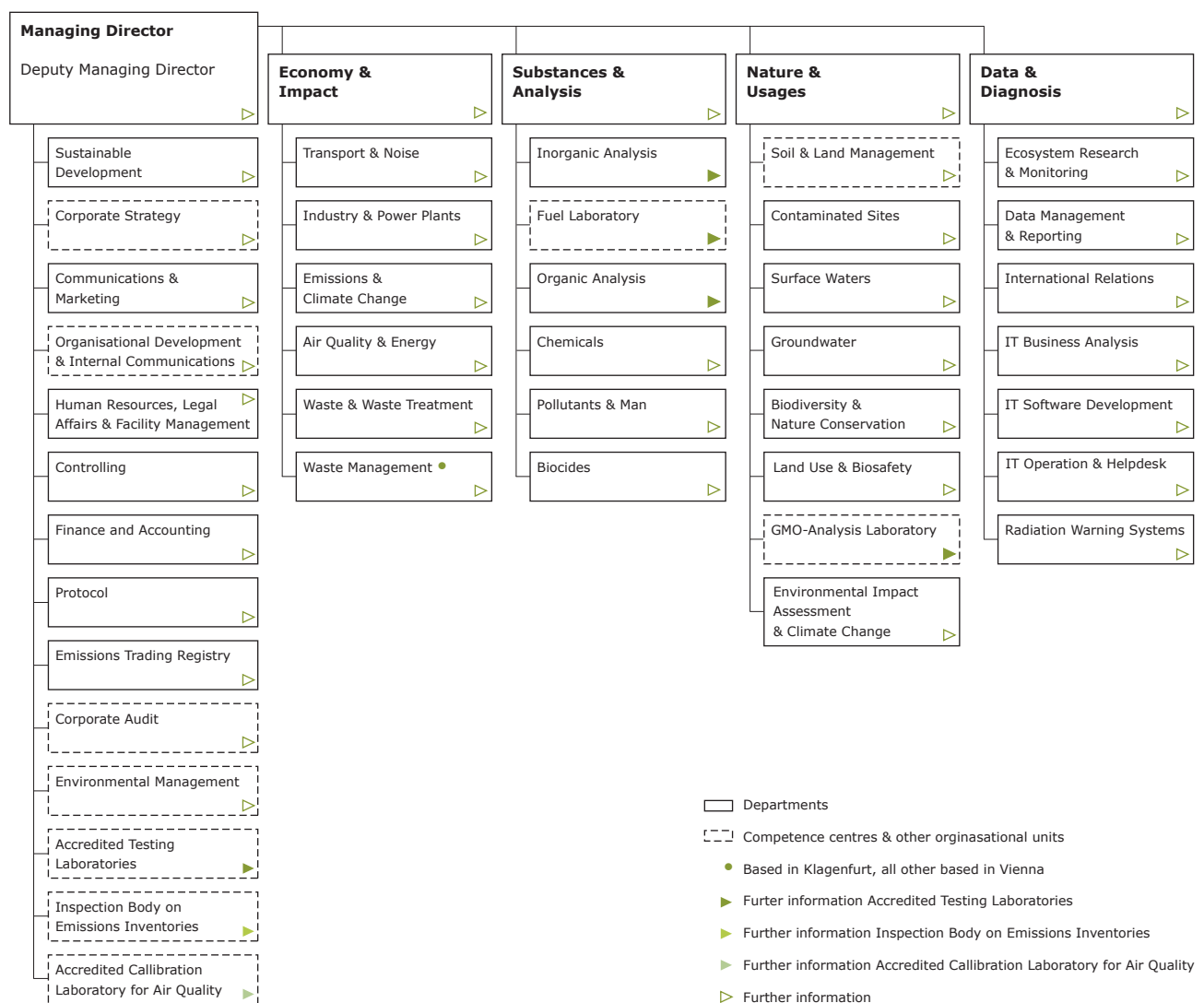
allocated for several environmental policy issues, such as activities in the framework of the Climate Strategy, the Master Plan for Environmental Technology (MUT), the development of electronic data management (EDM) and the maintenance of national parks. Moreover, considerable public money from the state budget is allocated to specific environmental programmes, including the Climate and Energy Fund (EUR 150 million in each of the years 2008, 2009 and 2010), JI/CDM programme (EUR 89 million in the year 2010), as well as several other programmes to promote national and international environmental measures.

The BMLFUW's role in processing strategic documents and its involvement in developing scenarios and forward-looking information is discussed further in Section 2.1.2.

The Environment Agency Austria (Umweltbundesamt GmbH)

The Environment Agency Austria was founded in 1985. In 1999, the Agency became a limited liability company (GmbH) that is fully owned by the Republic of Austria. It is the leading national expert organisation for all environmental and environment-related issues and its core tasks include the monitoring, management and evaluation of environmental data. The Environment Agency has an interdisciplinary staff of more than 480 employees, including natural and social scientists, economists, engineers, lawyers and IT experts with experience in several European countries. In 2009, the Agency's turnover was EUR 37.3 million. The organisation chart is presented in Figure 2.

Figure 2 The Environment Agency Austria organisation chart, November 2010



The Agency is organised in four major programmes, dealing with the diversified environmental issues:

- economy and impact (integrated air pollution control; industry and power plants, environmental technologies, transport and noise; climate protection and energy; waste and material flow management);
- substances and analysis (chemicals and biocides management; organic and inorganic analysis, substances and risk management);
- nature and usages (biodiversity and nature conservation; soil and land management; rural development; genetically modified organisms – risk management; environmental impact and climate change; groundwater and surface waters, contaminated sites);
- data and diagnosis (environmental information, data management and reporting, sustainable development).

The involvement of each programme and unit (Figure 2) in scenario-building for selected sectors is briefly summarised in Table 1.

The Agency's experts provide recommendations for decision-makers in policy, businesses and administration, as well as for the development of strategic perspectives and scenarios in order to achieve EU and Austrian policy targets. The Agency closely collaborates with the BMLFUW, as well as with other public and non-governmental institutions, universities and agencies on scenario development, using various state-of-the-art modelling tools.

Cooperation and synergies between the BMLFUW and the Environment Agency Austria on forward-looking studies and scenarios

In selected cases, the BMLFUW and the Environment Agency Austria work in close cooperation on relevant scenarios and forward-looking studies. Occasionally, the BMLFUW assigns a specific task to the Agency. A list of responsible departments, programmes and units in both institutions along with the specific environmental sectors is presented in Table 2 (refer to the organisation charts in Figures 1 and 2 for more information).

Table 1 List of the BMLFUW departments and the Environment Agency Austria programmes and units involved in future-oriented work linked to the policy development

Environmental theme	BMLFUW	Environment Agency Austria
Air pollution/ climate	Department V General Environmental Policy (V/4 Air Pollution Control and Climate Protection)	Economy and impact programme (Emissions and climate change unit, Air quality and energy unit); Nature and usages programme (Environmental impact assessment and climate change unit)
Energy	Department V General Environmental Policy V/10 Environmental Economics, Energy Policy	Economy and impact programme (Air quality and energy unit)
Water	Department VII Water VII/3 Water Balance	Nature and usages programme (Surface waters and groundwater units)
Waste	Department VI Environmental Engineering and Waste Management VI/3 Waste Treatment, Cleaning up of contaminated sites	Economy and impact programme (Waste and waste treatment unit, Waste management unit)
Transport	Department V General Environmental Policy V/5 Transport Mobility, Land Management, Noise	Economy and impact programme (Transport and noise unit)
Biodiversity	Department II Sustainability and Rural Areas II/4 Nature and Species Protection, National Parks	Nature and usages programme (Biodiversity and nature conservation unit)

Box 1 The International Institute for Applied Systems Analysis (IIASA)

The IIASA was founded in 1972 and represents an international research organisation that conducts policy-oriented research into problems that are too large or too complex to be solved by a single country or academic discipline, such as climate change at global level, and energy security, population ageing and sustainable development at national level. The IIASA has about 200 mathematicians, social scientists, natural scientists, economists and engineers who develop assessment and decision-support methodologies, global databases and analytical tools. The Institute focuses on three research themes ⁽¹⁾:

- environment and natural resources,
- population and society, and
- energy and technology.

In addition, the Environment Agency Austria, as a part of its data and diagnosis programme, carries out scenario work on the long-term ecosystem analysis by the ecosystem research monitoring unit. The Agency works closely with several outside institutes, including the IIASA (Box 1).

2.1.2. Selected environment-related strategic documents that incorporate forward-looking analysis

This section first describes the 1994 National Environmental Plan, which introduced the obligation ⁽²⁾ to use scenarios, forecasts and projections systematically in environmental policymaking in Austria. It then mentions several related policy documents and briefly summarises two strategic documents that have used scenarios, not only in their preparation but also for implementation, evaluation and update.

The 1994 National Environmental Plan (*Nationaler Umweltplan* – NUP)

Austria was the second country in the EU (after the Netherlands) to adopt a National Environmental Plan (NUP) ⁽³⁾. The NUP was prepared by the Ministry of Environment (later merged with other ministries). Its preparation was supported by seven working groups and experts for sustainable development issues. The key objective of the NUP was to define the necessary structural changes needed to integrate environmental concerns into all political levels of society. The NUP defines the main areas important for sustainable development in Austria, such as sustainable resource management, the public sector, consumers, energy, industry, transport, agriculture, forest, water and tourism. For all these target areas, environmental quality objectives (specifically quantitative targets), action plans and implementation strategies were identified ⁽⁴⁾.

The NUP represents a long-term approach (20–25 years) with a political commitment to integrate environmental considerations into key sectoral policies for areas including industry, transport and energy, agriculture, health, research and education, technology and tourism. Conceptually, the document was based on national, European and industrial standards, measures, experience and long-term objectives adapted for national circumstances.

The most interesting part of this analysis is the section on a range of instruments identified by NUP in order to achieve sustainability. These instruments include: (i) regulatory measures; (ii) market-based instruments; (iii) financial incentives; (iv) additional measures related to, for example, administrative changes, education, training, research; and (v) the most important to this case study — process-oriented instruments. The last area refers to instruments that have been developed by systems

⁽¹⁾ The International Institute for Applied Systems Analysis (IIASA) (http://www.iiasa.ac.at/docs/IIASA_Info.html).

⁽²⁾ Following the dying forest events in the 1970s and 1980s, Austria defined environmental protection as a key national priority, which resulted in extensive discussion and the development of the overarching National Environment Plan (NUP) which sought to integrate the environment to the heart of government and decision-making, and represents a political commitment to the integration of environmental considerations into key sectoral policies.

⁽³⁾ National Environmental Plan (NUP) (http://www.nachhaltigkeit.info/artikel/nationaler_umweltplan_nup_620.htm).

⁽⁴⁾ UNECE, 'Institutional aspects of sustainable development in Austria' (<http://www.un.org/esa/agenda21/natlinfo/countr/austria/inst.htm>).

Table 2 Examples of environmental policy documents that include scenarios and forward-looking studies

Document	Coverage	Website	Related forward-looking study/scenarios
The Climate Strategy (Klimastrategie), adopted in 2002 and amended in 2007	2008–2012	www.klimastrategie.at	Evaluation of the Climate Strategy 2002 (http://www.umweltbundesamt.at/aktuell/publikationen/publikationssuche/publikationsdetail/?&pub_id=1587)
The Energy Strategy Austria (EnergieStrategie Österreich), adopted in 2010	Until 2020	www.energiestrategie.at	'Energy input data and scenarios as a basis to meet the reporting requirements of the monitoring mechanisms' prepared by the Environment Agency Austria (http://www.umweltbundesamt.at/aktuell/publikationen/publikationssuche/publikationsdetail/?&pub_id=1809)
Federal Waste Management Plan (Der Bundesabfallwirtschaftsplan) (NB Drafting of the plan every five years is set in the Waste Management Act 2002 (AWG 2002)), adopted in 1992, 1995, 1998, 2001, 2006	Until 2011	www.bundesabfallwirtschaftsplan.at/article/articleview/52746/1/13192	See note 1 below
The Austrian Water Act (Wasserrechtsgesetz) was adapted to the WFD requirements in 2003.	Until 2015	www.stadt-salzburg.at/pdf/wasserrechtsgesetz_wrg_1959_idf_bgbl__i_.pdf	n.a.
Spatial plans (adopted by nine regions), Soil protection strategies (adopted by five regions), Nature conservation laws (adopted by nine regions) (federal regions jurisdiction)	n.a.	n.a.	n.a.

Note: Scenarios were used in several chapters of the document. For the management of waste from households and similar establishments, a scenario was used to evaluate future levels of recovery and disposal of waste and how such waste will be managed in 2009. The scenario was prepared by the Environment Agency Austria in 2005, based on the composition and volume of specific waste types generated in 2004.

Another example is the use of scenarios of forecasts for the cost of waste management. For this purpose, the Austrian Waste Management Model — Decision Supporting Tool (ÖAWM-DST) was developed. The tool is a computer model that assesses various measures applied in order to develop an optimal waste management strategy.

The document also examines linkages between waste and climate change and for that purpose a standard scenario was developed for 2010. This scenario represents the 'most likely development in waste data and data for waste treatment processes as the climatic relevance of waste management'. Moreover, the study 'Climatic Relevance of Waste Management II' highlights hypothetical scenarios.

science and that revolve around the central concept of modelling: they involve the collection of data, description of system properties, for forecasting, monitoring, control and optimisation ⁽⁵⁾.

Section 2.4 describes the use of scenarios in the development of the NUP.

Although the NUP has been extensively discussed since 1994, it has not been formally updated. The issues outlined by the NUP have since been used in strategies for specific thematic areas, as can be seen in the next sub-section, although this approach was not explicitly outlined in the original document.

Selected environmental policy documents that include forward-looking thinking and scenarios

As mentioned previously, all other environmental and environment-related strategic documents that nowadays commonly include scenarios and forward-looking studies for their preparation, implementation, evaluation and updating originate from the NUP. A selected list of documents with additional information is provided in Table 2.

The Austrian Climate Strategy (2008–2012)

A brief overview of the institutional set-up for climate change issues is necessary to better understand the current policy approach for this highly sensitive issue in Austria. Although the key institution responsible for overall Austrian policy on climate change is the Federal Ministry of Agriculture, Forestry, Environment and Water Management, other national entities have jurisdiction for proposing policies and measures for mitigating greenhouse gas emissions. These entities include ministries such as the Federal Ministry of Economy, Family and Youth, the Federal Ministry for Transport, Innovation and Technology, the Federal Ministry of Finance as well as the federal regions and municipalities. Furthermore, several committees have been established in order to provide assistance related to climate change research and to support the coordination between the federal state, federal provinces and municipalities. Two important committees are the Inter-ministerial Committee to Coordinate Measures to Protect Global Climate (IMC Climate Change) and the Kyoto Forum ⁽⁶⁾.

A national mitigation programme — the Climate Strategy — was adopted in 2002 (Climate Strategy I) and amended in 2007 (Climate Strategy II). A set of measures determined under the Climate Strategy I is included in the 2003 Energy Report, which represents the basis for the Austria's energy policy. Similarly, the results of the Climate Strategy II were included in the Energy Report that followed (the following section describes this process further). Based on the strategy, most federal regions have adopted their own regional climate change programmes adjusted to their specific circumstances and areas of competence. Implementation of the strategy is closely related to EU legislation, notably the European Emissions Trading Schemes (ETS), and to the Kyoto Protocol, including the Joint Implementation and the Clean Development Mechanism (CDM) (JI/CDM) programme ⁽⁷⁾.

The Climate Strategy II focuses on sectors including industry, housing and transport and includes objectives for the use of flexible instruments until 2012. It also includes measures concerning energy conservation and energy efficiency, renewable energy and environmental technology ⁽⁸⁾.

In 2007, a Climate Change Fund of EUR 500 million was established to support the achievement of the goals of the Climate Strategy: of this, EUR 50 million was to be allocated in 2007, and an additional EUR 150 million was anticipated for each of the following three years.

The Austrian Climate Adaptation Strategy ⁽⁹⁾

Due to the high sensitivity of the ecosystems in mountainous regions, Austria is expected to be very vulnerable to climate change so the development of a comprehensive adaptation strategy was initiated in 2007. The process was based on a study that described existing adaptation measures, climate change projections and vulnerability assessments and presented a portfolio of initial recommendations for further adaptation actions. Moreover, this study was based on a participatory process undertaken together with relevant stakeholders. Agriculture, forestry, water management, tourism and the power sector are sectors covered by the study and strategy. Expansion of the analysis to other vulnerable sectors will be considered in the near future.

⁽⁵⁾ The fifth Austrian national communication to the UNFCCC (http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php).

⁽⁶⁾ Nationale Anpassungsstrategie an den Klimawandel (<http://www.klimawandelanpassung.at/nationale-anpassungsstrategie/>).

⁽⁷⁾ Energy Strategy of Austria (EnergieStrategie Österreich) (<http://www.energiestrategie.at/>).

⁽⁸⁾ Klimastrategien 2008–2012 (<http://www.klimastrategie.at/>).

⁽⁹⁾ Nationale Anpassungsstrategie an den Klimawandel (<http://www.klimawandelanpassung.at/nationale-anpassungsstrategie/>).

Energy Strategy Austria (*EnergieStrategie Österreich*) (2010–2020)

The Energy Strategy Austria was mandated by the Austrian Federal Government and coordinated by the Federal Ministry of Economy, Family and Youth and the Federal Ministry of Agriculture, Forestry, Environment and Water Management. The strategy covers the period between 2010 and 2020, and it outlines the strategic priorities for the future energy and climate change policies. The goals of the strategy are in line with the EU energy and climate change objectives ⁽¹⁰⁾.

The aim of the strategy is to develop a sustainable energy system and secure energy services for private consumers and businesses and, at the same time, fulfil EU energy and climate change requirements. Some of the areas covered by the document include environmental sustainability, cost effectiveness, energy efficiency, social acceptability and competitiveness.

The Environment Agency Austria supported by the Federal Ministry of Agriculture, Forestry, Environment and Water, the Austrian Institute of Economic Research (WIFO), the Austrian Energy Agency and the Energy Economics Group prepared energy scenarios ('Energy input data and scenarios as a basis to meet the reporting requirements of the monitoring mechanisms'). These scenarios were used as a basis for the Energy Strategy Austria.

2.1.3. Other selected strategic programmes that incorporate forward-looking studies

This section briefly presents the Austrian strategy for sustainable development and also touches on the Austrian technology foresight programme.

A Sustainable Future for Austria – The Austrian Strategy for Sustainable Development (2002)

In preparation for the Austrian Strategy for Sustainable Development, the Green Paper *A Sustainable Future for Austria* was produced in 2001. The process was initiated by the Austrian Federal Government, and preparatory work was undertaken by the group of experts coming from ministries, stakeholders and selected scientists. The document aimed to establish political commitment to sustainable development and the inclusion of

this concept in ongoing government programmes, including at regional level. In particular, it sought to address overlapping responsibilities in the fields of spatial development and nature protection, to apply integrated approach across different sectors and to create new functional units. The document also set the conditions for addressing urban sprawl and for including local land-use plans in regional spatial planning and regional framework plans. 'Quantitative medium – to long-term financial plans have to be taken into account in land-use planning and coordination with regional plans' according to the document ⁽¹¹⁾.

Strongly linked to the NSDS (2002) and the currently developed Federal SD Strategy is the Local Agenda 21. In 1998, the first Local Agenda 21 processes (pilot processes) started in Austria. Currently, more than 430 processes at local level (covering about 18 % of municipalities) and 35 at regional or district level can be found. Each of the nine regions has developed its own coordinating office providing quality management, evaluation, training of moderators, subsidies in processes and projects, and communication.

The National Strategy for Sustainable Development was adopted by the Austrian government on 30 April 2002. The Federal Minister of Agriculture, Forestry, Environment and Water Management, who was mandated to coordinate the implementation policies at federal level, commissioned a 'Committee for a Sustainable Austria'. This committee, consisting of high-level representatives of all ministries, experts from the 'Socio-Economic Partnership' and several members from the federal state governments (*Länder*), prepares annual work programmes to be submitted to the Council of Ministers.

In 2008, a Federal SD Strategy (common strategy on both national and regional level) was developed and first adopted at regional level in 2009 and finally by the Council of Ministers in July 2010. It is the first common SD strategy on both national and regional levels in Europe (Box 2).

The document encourages public participation in policy planning and decision-making processes through traditional forms of participation, and also

⁽¹⁰⁾ Energy Strategy of Austria (*EnergieStrategie Österreich*) (<http://www.energiestrategie.at/>).

⁽¹¹⁾ A sustainable future for Austria – Green Paper on Austria's Strategy on Sustainable Development, 2001 (<http://wko.at/up/enet/stellung/eunachhaltigkeitendgenglisch.pdf>).

by using and developing innovative, long-term instruments, such as consensus conferences, workshops and scenario techniques.

The 'Delphi Austria' foresight programme (1996–1998)

Austria's first systematic foresight programme, 'Delphi Austria', was initiated and coordinated by the former Ministry of Science and Transport (now the Federal Ministry for Transport, Innovation and Technology) and carried out by the Institute of Technology Assessment (ITA) of the Austrian Academy of Science⁽¹²⁾. The programme ran between 1996 and 1998. It was selective in scope, set specific goals and put an emphasis on demand aspects. One of the innovative elements of the programme was that it was combined with a society and culture foresight programme, undertaken by the Institute of Trend Analysis (IK) in Vienna⁽¹³⁾.

The 'Delphi Austria' foresight programme (Box 3) used a series of preparatory studies, expert panels and two parallel Delphi exercises (see Section 2.2 for more information on its institutional structure). The programme was 'problem and demand-oriented as a response to the actual societal needs and, at the same time, targeted the identification of the most promising areas of innovation in which Austria could hope to achieve a leading position both in R&D and in terms of economic success'⁽¹⁴⁾. A further objective was to establish a broad network of experts not only in the field of technology field, but also for society and culture, and for that reason, it was combined with the society and culture foresight work.

The programme included a section on mega trends, and identified six different types of world views (from optimistic to pessimistic) of economic and ecological trends, national sovereignty and societal progress. In addition, the programme identified areas in which Austria has special opportunities to achieve leadership, including the recycling of composite materials and mixed materials; low noise equipment for railways; cleaner production technologies (metal and paper production); wood as a material in construction; and ecologically sound construction. It also highlighted key problem areas.

Box 2 Fields of action and key objectives of the Austrian Strategy for Sustainable Development (NSTRAT)

- Quality of life in Austria
Key objectives: a sustainable lifestyle; opportunities for the empowerment of all generations; gender equality; solutions through education and research; a decent life for present and future generations
- Austria — a dynamic business location
Key objectives: innovative structures promote competitiveness; a new understanding of business and administration; correct prices for resources and energy; successful management through eco-efficiency; strengthening sustainable products and services
- Living spaces in Austria
Key objectives: protection of environmental media and climate; preservation of the diversity of species and landscapes; responsible use of land and regional development; shaping sustainable mobility; optimising the transport system
- Austria's responsibility
Key objectives: fighting poverty, creating a social and economic balance; a globally sustainable economy; our world as a living space; international cooperation and financing; sustainability in the European Union

Box 3 Subject areas covered by the 'Delphi Austria' foresight programme

- new forms of housing and environment-oriented construction;
- lifelong learning;
- medical technology and support for elderly people;
- clean and sustainable production;
- organic food;
- physical mobility;
- characteristics-defined materials.

⁽¹²⁾ <http://www.oeaw.ac.at/ita/welcome.htm>.

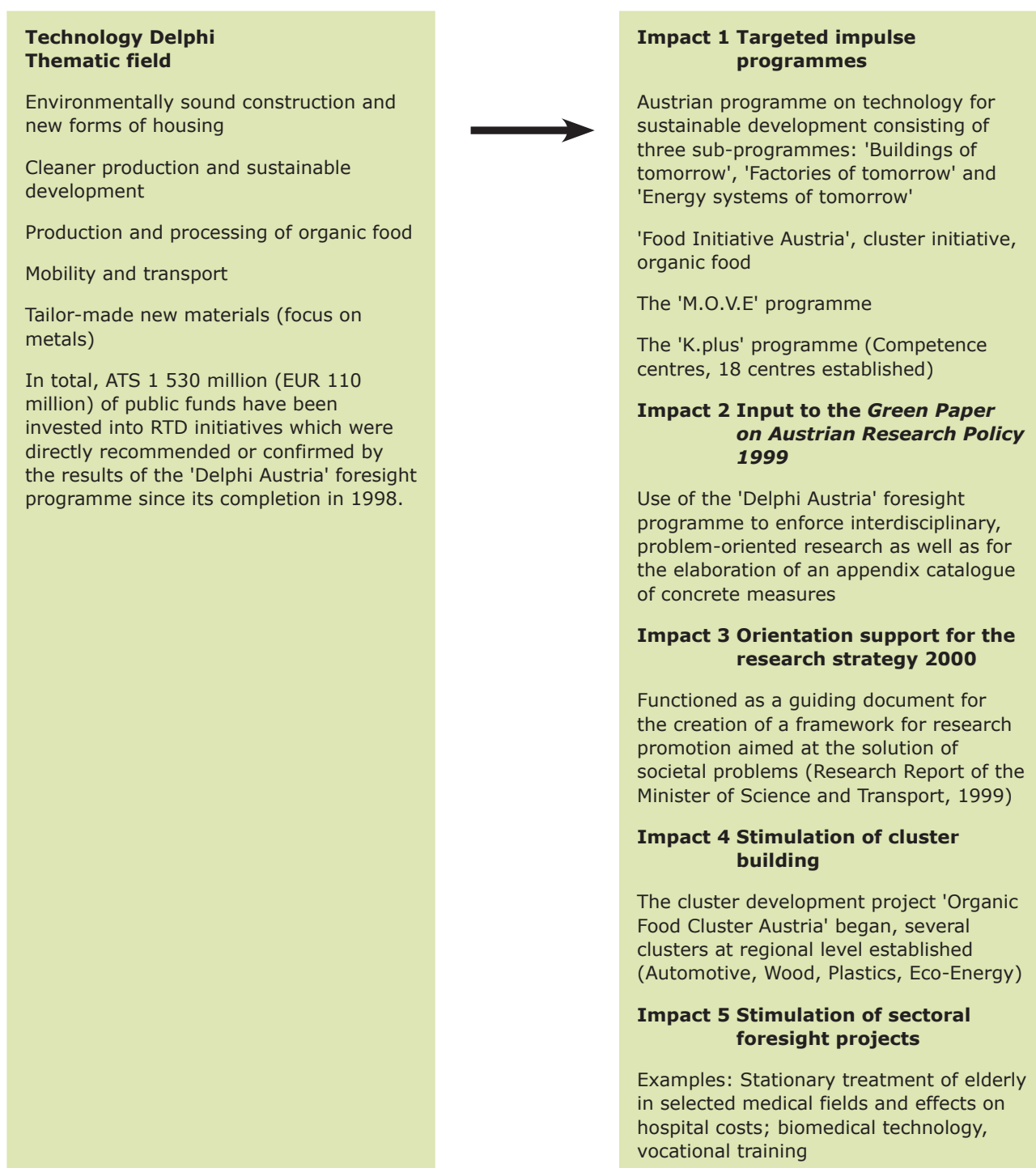
⁽¹³⁾ Aichholzer, G., 2001, Delphi Austria: An example of tailoring foresight to the needs of a small country (http://epub.oeaw.ac.at/ita/ita-manuscript/ita_01_02.pdf).

⁽¹⁴⁾ Aichholzer, G., 2001, *Delphi Austria: An example of tailoring foresight to the needs of a small country* (http://epub.oeaw.ac.at/ita/ita-manuscript/ita_01_02.pdf).

The programme achieved some important direct impacts related to the implementation of policy measures by the Ministry of Science and Transport (Figure 3). The Green Paper *Österreichische Forschungsstrategie 1999plus* setting out the main elements of a research strategy on sustainable development was based on the findings from the 'Delphi Austria' foresight programme. As a part of the resulting research strategy, the

Ministry of Science and Transport launched the 'Impulse' programme (programme on technology for sustainable development) that seeks to raise competitiveness and to improve living and environmental conditions for the present and future generations. The programme consists of three sub-programmes — 'Buildings of tomorrow', 'Factories of tomorrow' and 'Energy systems of

Figure 3 Impacts of the Austrian foresight programme



tomorrow' — where sustainable research projects are promoted and funded.

Moreover, 12 'Competence centres' were founded with the role of promoting cooperation between companies and research institutions on major innovative projects.

The most important measure suggested by the technology foresight is the strengthening of cooperation between research institutions and firms as well as among firms and research institutions themselves. Recommended measures include actions promoting the development of clusters in future-oriented core areas; the creation of new institutions for the coordination of interdisciplinary research focuses; a differentiation in research promotion between more routine and high-risk long-term projects; the prescription of targets and continuous evaluation in project promotion and the setting up of pilot projects, especially on organisational innovation.

The goal of the Austrian foresight exercise was not to detect the general outlines of emerging technologies but to map out those fields and niches in which Austria could reach a leading position within the next 15 years: in R&D, economic exploitation, or social and organisational implementation. For this task of field identification, a Decision Delphi was regarded the appropriate tool.

A Decision Delphi is an instrument to prepare decisions and to influence social developments: 'reality is not predicted or described; it is made'. A Decision Delphi is also described as more appropriate in fields which are shaped by a mix of individual decisions rather than by general rules. If developments are dominated by a multitude of independent and uncoordinated decision-makers, a Decision Delphi is recommended to structure and coordinate them towards the path to a desired future situation. The participants of a Decision Delphi are recruited primarily with regard to their actual position in the decision-making hierarchy and, in the second instance, to their expertise.

Recent forward-looking studies supported by the Federal Ministry for Transport, Innovation and Technology

The Federal Ministry for Transport, Innovation and Technology has initiated several research projects and development work focused on sustainability through publicly tendered projects. This work has been carried out in the framework of several

research programmes: Buildings of tomorrow; Factories of tomorrow; and Energy systems of tomorrow. The goal has been to facilitate the development of pilot projects. Between 2003 and 2005, in the framework of the research programme on the factory of tomorrow, the research company ACR Systems carried out a forward-looking study 'The transition to sustainable production systems — Austria 2020'; the study time frame focused on the period 2015 to 2020. The study developed future scenarios on the basis of which strategic options for research, industry and policy were explored.

Current developments

In October 2010, Austria and China signed a memorandum of understanding to establish permanent cooperation between leading research institutes in relation to foresight processes. After a round-table meeting organised by the Chinese Ministry of Science and Technology and the Austrian Federal Ministry for Transport, Innovation and Technology, both partners agreed on close cooperation between the Chinese Academy of Science and Technology for Development and the Foresight and Policy Development Department of the Austrian Institute of Technology. The agreement includes regular information exchanges, annual conferences, concerted projects and researcher exchange programmes.

Futures analysis at regional level

Regional authorities have also started to recognise the importance of forward-looking analysis. For example, the administration of the city of Linz sponsored the study 'Linz 21', undertaken by the companies Ars Electronica Center Linz and Z_punkt The Foresight Company. Between 2002 and 2004, several exploratory scenarios were developed that depicted the effects of various policy alternatives and aimed to support active and successful strategy developments to prepare the city for the challenges of the future. Experts from the government and public administration, the business community and the general public participated in the process.

2.2 Resources involved

The information available on resources and staff for the production of major future-oriented documents and studies varies greatly (Table 3).

Specific statistics on the exact number of people involved in foresight work or exact funds allocated have not been identified.

Table 3 Resources for key forward-looking policy documents and studies

Project/programme	Time frame	Resources
National Environmental Plan, adopted in 1994	Until 2030	Initiated by: the Ministry of Environment
Climate Strategy, adopted in 2002, amended in 2007	2008–2012	Prepared by: the Federal Ministry of Agriculture, Forestry, Environment and Water Management in cooperation with other competent authorities
Energy Strategy Austria, adopted in 2010	Until 2020	Staff: about 150 representatives from ministries, provinces and stakeholders from academia, industry, environment and society Prepared by: the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Economics and Labour
A Sustainable Future for Austria – The Austrian Strategy for Sustainable Development (2002)	Until 2020	Staff: about 40 representatives from the ministries, federal provinces and municipalities, social partners, interest groups and NGO platforms Prepared by: initiated by the Austrian Federal Government and coordinated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management
'Delphi Austria' foresight programme 1996–1998	15 years	Prepared by: the Ministry of Science and Transport (now the Federal Ministry for Transport, Innovation and Technology)

2.3 Stakeholders and external relationships

Stakeholders are closely involved in the development of government strategies through participatory approaches at several stages during drafting, as well as in the implementation, evaluation and updating of policy documents. Probably the best example is the consultative process organised for the development and implementation of the Austrian Strategy for Sustainable Development presented in this section. Stakeholders from all political, economic and social sectors were involved and consultation covered a wide range of topics and expertise. Special care was taken with regard to the cooperation between the federal state, federal provinces and municipalities.

With regard to scenarios and other future-oriented studies, work is usually carried out by the group or network of experts and institutions and the results are presented to stakeholders for further discussion. Thus, stakeholders have only a limited opportunity to provide input to the design and methodological approach to specific studies.

The technology foresight programme represents an important exception: working groups were created that brought together experts from the public sector, industry, the scientific community and other areas, as well as representatives from the federal and provincial governments.

This section reviews the participative methods used in different forward-looking policies and studies.

The development of the **National Environmental Plan (NUP)**, prepared by the Ministry of Environment, was supported by seven sectoral working groups that included experts for sustainable development from science, business and politics. Action plans and instruments were elaborated in discussions with environmental groups and other stakeholders.

The preparation of the **Climate Strategy** involved several committees to provide assistance related to climate change research and to support the coordination between the federal state, the federal provinces and municipalities on policies and measures, such as the Inter-ministerial Committee to Coordinate Measures to Protect Global Climate (IMC Climate Change) and the Kyoto Forum, described above (Box 4). In 2005, a public consultation was conducted.

The **Energy Strategy Austria** was prepared with the active involvement of about 150 representatives from ministries, provinces and stakeholders from academia, industry, environment and society (Figure 4). This extensive discussion brought about 370 proposals for action. The discussion outcomes were summarised and classified by nine working groups. The measures proposed were used as the basis for drafting the Energy Strategy Austria. Its implementation was also discussed with the Interim High-level Group on Energy and Climate Policy.

Box 4 Working groups involved in the preparation of the Energy Strategy Austria

- renewable energies
- hydropower
- conventional production
- networks and storage
- building
- households and businesses
- energy intensive businesses
- mobility
- financial and R&D.

Working groups discussed and proposed concrete measures that will contribute to achieving the objectives of the Energy Strategy Austria. Proposed measures have been additionally evaluated from the legal and financial perspective.

project were not only provided at federal level, but also at regional and local levels, and cities' organisations.

The government seeks in particular to establish interfaces between the federal and provincial levels in line with the subsidiarity principle. Networks consisting of representatives from ministries, provinces and stakeholders seek to ensure consistency between the targets pursued at the EU, national, regional and local level. This approach is seen in the schematic presentation of the consultative process related to the Strategy for a Sustainable Austria (Figure 5).

The process can be described as follows:

- The federal ministries and stakeholders each nominate up to two people as members of the Committee for a Sustainable Austria (May 2002) set by the Austrian Federal Government. The provinces are invited to designate four delegates from the Expert Conference for Sustainability Coordinators to the Committee. The Committee's role is to support and coordinate implementation of the Strategy.
- The Committee nominated members for the Expert Panel (from umbrella organisations of the NGOs) with the role to support the implementation and advise the Committee.
- The Committee has had regular exchanges of information with the Austrian Council for Sustainable Development. The Council was responsible for national coordination with regard to the international activities for sustainable development.

The **Strategy for a Sustainable Austria** was drafted in cooperation with the relevant ministries and with the involvement of opinion leaders, NGOs and Austrian citizens by the end of 2001. The objective of the process was to ensure the participation of all stakeholder groups in the development of the strategy and to develop discussion among policymakers, administration and stakeholders through public dialogue. As the result, many actors have been informed and involved (e.g. policymakers, economic decision-makers, consumers, scientists, NGOs, opinion leaders) about the objectives and concerns presented in the Green Paper. All these actors are also involved in shaping the process. Contributions to this future-oriented

Figure 4 Process of drafting the Austrian Strategy for Sustainable Development, 2002

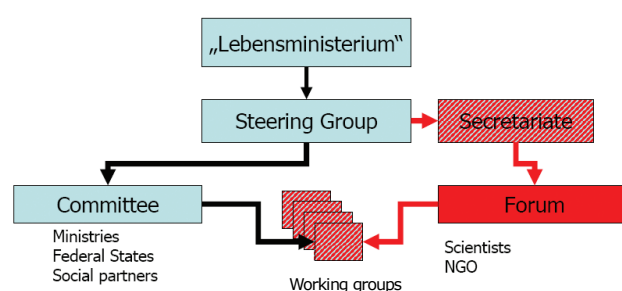
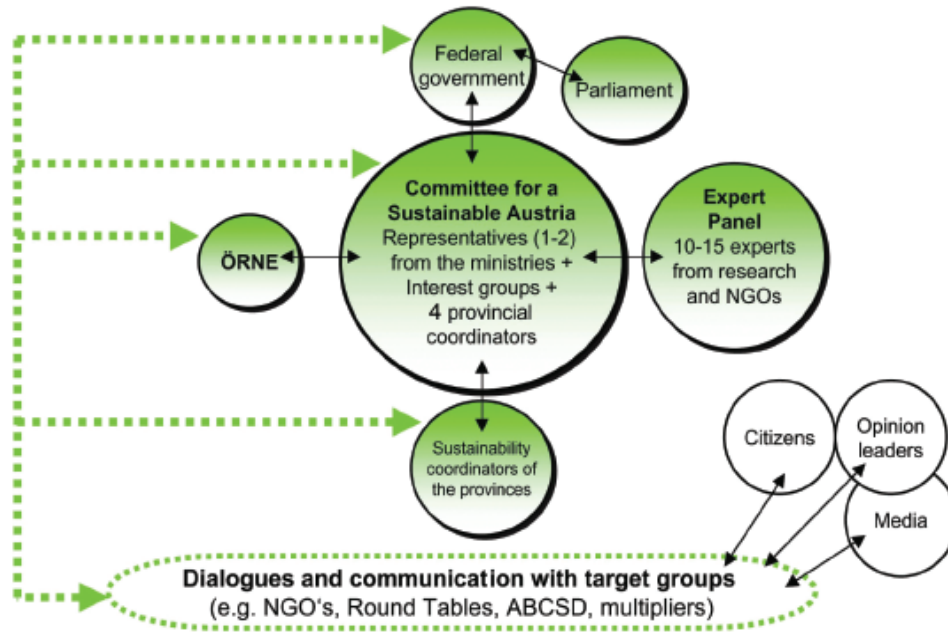


Figure 5 Consultative process on the implementation of the Strategy for a Sustainable Austria



- The Austrian Federal Government is informed on the implementation status annually through the progress reports by the chairman of the Committee.
- The Austrian Federal Government regularly informed the parliament about progress of the Strategy implementation.

- three external research teams;
- a steering committee at ministerial level that included high-level officials from departments of the Science Ministry, a representative of the Austrian Academy of Sciences and a science journalist with experience as a former minister.

The drafting of other strategic documents such as the National Environmental Plan (NUP), the Climate Strategy and the Energy Strategy Austria also involved the participation of many actors at federal, regional and local level drawn from different sectors, including government institutions and stakeholders (including environmental NGOs): experts were brought into preparatory working groups.

Stakeholders also have been included alongside government bodies as part of the overall coordination structure for sustainable development, such as the Forum for a Sustainable Austria.

The 'Delphi Austria' foresight programme was initiated by the former Ministry of Science and Transport. The programme tasks were distributed among:

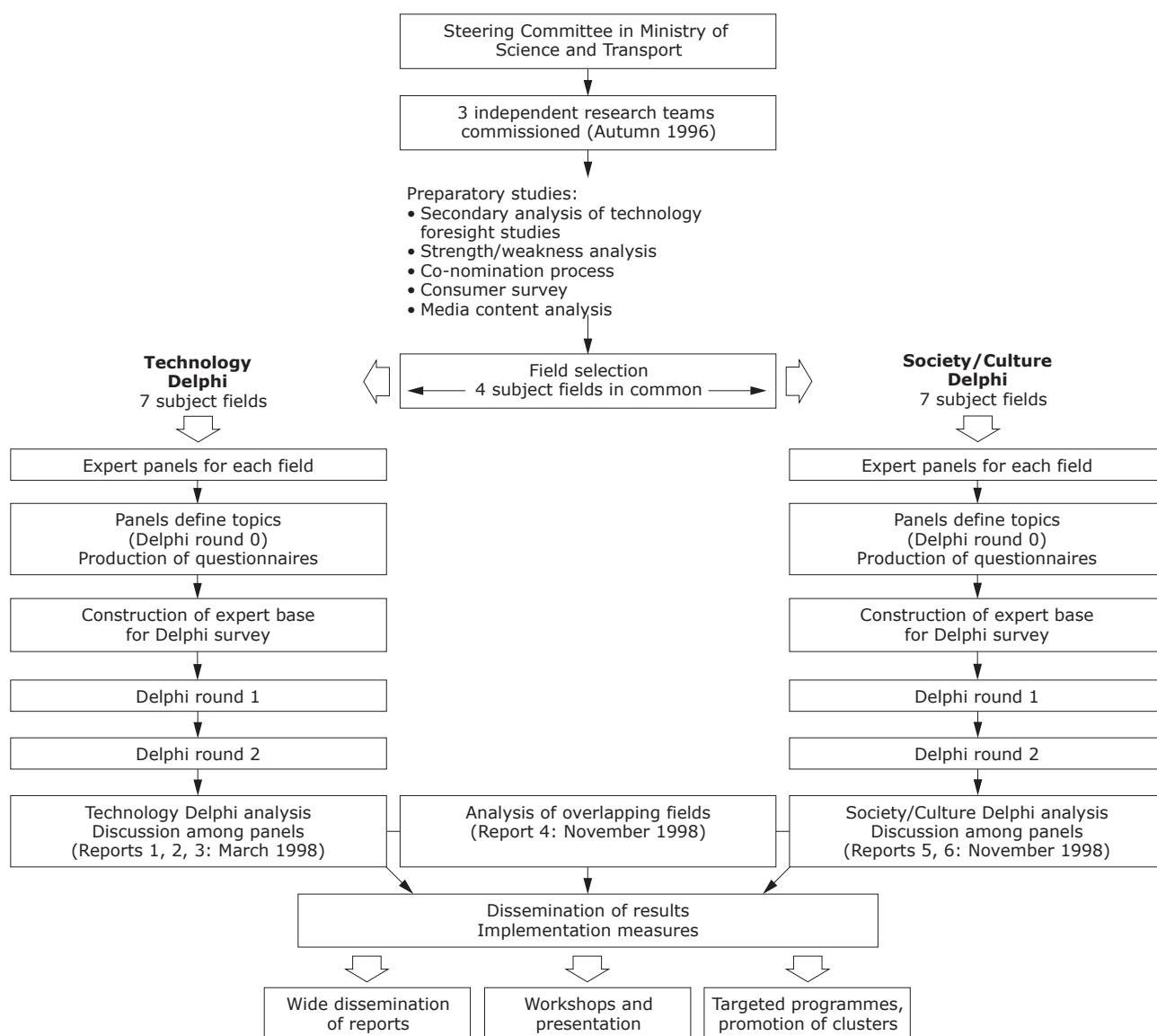
The organisation of the foresight programme is presented in Figure 6.

The participation of the general public in the Climate Adaptation Strategy

In contrast to the inclusion of stakeholders, the participation of the general public in strategies and programmes is only just starting, and until recently the general public was only informed about the outcomes.

A completely new approach was used in the Austrian Climate Adaptation Strategy: via a website, an online participatory process was initiated to include the general public in the elaboration of the strategy. The goal was to obtain proposals and arrange them according to priority and relevance at an early stage of discussions on the strategy. Interest was considerable: between August and November 2009, 1 162 persons used this opportunity to give their inputs and opinions.

Figure 6 Organisation of the 'Delphi Austria' foresight programme



2.4 Relative balance between quantitative and qualitative approaches

While both quantitative and qualitative approaches (including the participatory methods described above) have been used in the development of forward-looking studies and strategies, the studies themselves have used a mostly quantitative approach. This has been the case in particular for studies on environmental themes and related issues.

The National Environmental Plan (NUP)

Drafting of the National Environmental Plan brought together a broad pool of expertise. The work integrated several methods, including

brainstorming, cross-impact analysis, participatory approaches and modelling. An example of scenario development is shown in Box 5.

The Austrian Climate Strategy

For the Climate Strategy 2002, one of the preparatory studies developing energy scenarios was prepared by the WIFO. Based on a model for energy demand and conversion, DAEDALU III, WIFO prepared three scenarios to establish a long-term forecast of the development of energy consumption and CO₂ emissions⁽¹⁵⁾. Both the Kyoto and sustainability scenarios are associated with substantial costs, but GDP and employment are higher than in the baseline scenario.

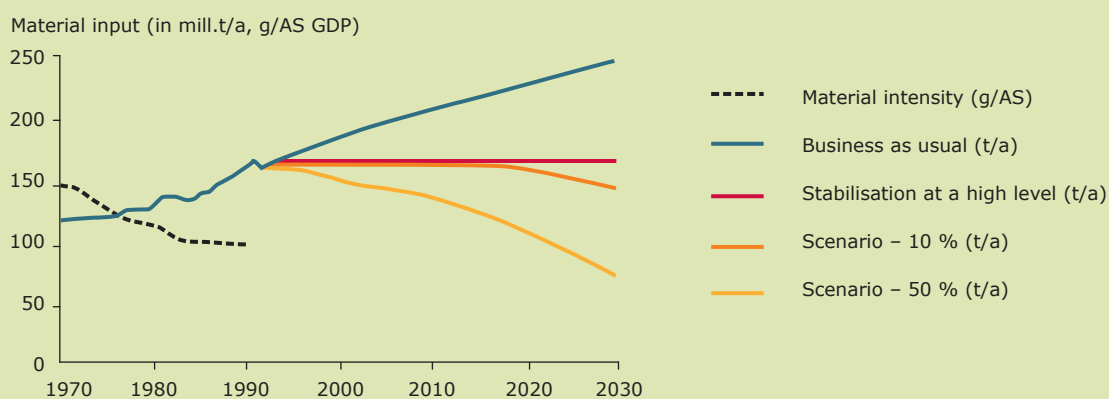
⁽¹⁵⁾ Energieszenarien bis 2020, WIFO, 2001. [http://www.wifo.ac.at/wwa/downloadController/displayDbDoc.htm?item=MB_2001_10_06_ENERGIESZENARIEN\\$.PDF](http://www.wifo.ac.at/wwa/downloadController/displayDbDoc.htm?item=MB_2001_10_06_ENERGIESZENARIEN$.PDF).

Box 5 Development of scenarios in the National Environmental Plan

In order to assess the effectiveness of the measures proposed in the NUP, an input-output analysis (or material flow model) of the Austrian economic system was developed. The model used a life-cycle approach, i.e. the whole process from raw material to final product and its eventual disposal was considered in terms of impacts. In drafting the NUP, a decoupling between the consumption of raw material and products flows from economic growth was identified as a key prerequisite for achieving sustainable development. Several quantitative scenarios were developed of the use of raw materials.

Figure 7 summarises the scenarios for raw materials consumption to 2030. In the 'business as usual' scenario, material flow is expected to continuously increase as new policy measures are not introduced. The second scenario, 'stabilisation at a high level', involves reduction measures that should stabilise material flow to the level seen in the early 1990s. Other scenarios project a decrease in material flows, based on an increase in efficiency at all levels.

Figure 7 Options for the future development of society's material needs



Source: National Environmental Plan (NUP), 1994.

The revision of the Climate Strategy in 2007 was mainly based on a forward-looking¹ study conducted by Umweltbundesamt and the Austrian Energy Agency (Evaluierungsbericht zur Klimastrategie 2002, Umweltbundesamt, 2006).

The Energy Strategy Austria

As a basis for this strategy, projections of energy consumption and national greenhouse gas emissions were developed in 2008–2009; these were constructed around two scenarios to 2020:

- (i) 'with measures' (wm), and
- (ii) 'with additional measures' (wam).

A 'without measures' scenario (wom) was not considered. The 'with measures' scenario includes the implementation of those climate change mitigation measures adopted under the Climate Change Strategies I and II (2002, 2007). The 'with additional measures' scenario comprises planned policies and measures (PaMs) with 'a realistic chance of being adopted and implemented in time to influence the emissions'. The emission projections were calculated by the Environment Agency Austria within the framework of the EMIPRO project⁽¹⁶⁾. Box 6 shows further details.

⁽¹⁶⁾ The fifth Austrian national communication to the UNFCCC (http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php).

Table 4 Scenarios for the Austrian Climate Strategy

Scenario	Description
Baseline scenario: assumes continuation of current developments	An increase in consumption of fuels, electricity and gas combined with more electricity generated by thermal power plants leads to an increase in CO ₂ emissions by about 3.2 million tonnes annually by 2010.
Kyoto scenario: reflects the effects of the current Austrian strategy to prevent climate change	An increase in energy efficiency and the use of renewable energy sources could achieve the goal to decrease CO ₂ emissions by about 13 million tonnes against the baseline by 2010.
Sustainability scenario: based on the adoption of international approaches to implement socially compatible measures aimed at minimising energy consumption and accelerating technological progress	Until 2010, energy consumption and CO ₂ emissions decrease by more or less the same amounts as under the Kyoto scenario, but by 2010, CO ₂ emissions drop to 63 % of the year 2000 level.

Source: Energieszenarien bis 2020, WIFO, 2001.

Various models and methods have been used for calculating principal sectoral forecasts of activities:

- The energy forecast was based on the National Energy Balance of Statistics Austria and on the macroeconomic model of the Austrian Institute of Economic Research (IER), using the models BALMOREL, LEA (AEA) and ERNSTL (EEG). The energy scenarios prepared by the IER were based on earlier work carried out the Federal Ministry of Economics and Labour.
- The transport forecast was based on the national transport model GLOBEMI and was carried out by the Technical University of Graz.
- Forecasts of emissions from industry and waste sectors were carried out by the Environment Agency Austria, among others.

The 'energy strategy scenario' was further developed with strong stakeholder involvement. This scenario (<http://www.energiestrategie.at>) is fully compatible with Austria's national requirements laid down in the climate and energy package:

- a reduction of GHG emissions of 16 % by 2020, compared to 2005;
- an increase in energy efficiency of 20 %;
- a share of renewable energy sources of at least 34 % by 2020.

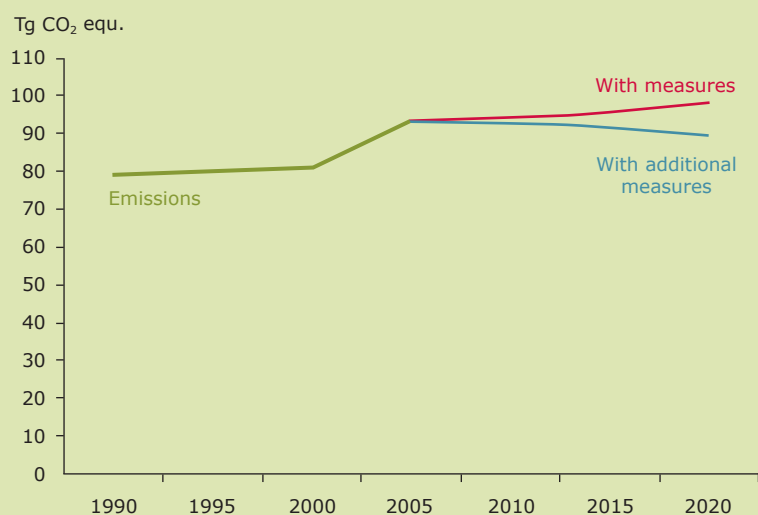
Box 6 Austrian greenhouse gas emission projections

In the 'with measures' scenario, greenhouse gas emissions increase by about 7 % between 2006 and 2008, whereas in the 'with additional measures' scenario, emissions decrease by 2 %.

Table 5 Projected greenhouse gas emissions 2005-2020 in Tg (million tonnes) CO₂ equ.

	Emissions					With measures			With additional measures		
	1990	1995	2000	2006	2007	2010	2015	2020	2010	2015	2020
Total	79.04	80.51	81.08	92.83	87.96	93.87	95.47	98.11	92.87	91.58	89.61

Figure 8 Projected greenhouse gas emissions in Austria



Note: Emission projections are based on economic scenarios that had been developed before the financial and economic crisis.

Source: The fifth Austrian national communication to the UNFCCC, 2009.

3 Analysis

Chapter 2 has shown that similar approaches to future analyses are used in several areas of government in Austria; moreover, long-term thinking, including strategic planning, has in recent decades become a common practice in many sectors including environment.

3.1 Impact of future-oriented approach on policymaking

As outlined in Chapter 2, environmental and environment-related policy documents in Austria commonly use future-oriented studies and scenarios in their drafting and implementation. Since 1994, a broad range of policy documents – on themes including energy, climate change, water, waste, biodiversity and transport – have been adopted, implemented, evaluated and updated using forward-looking tools such as forecasts, scenarios, projections and future studies.

This report has identified several notable examples. These include the following:

1. The update of the Climate Strategy in 2007 was based on an evaluation of the Climate Strategy 2002 conducted by the Environment Agency Austria and the Energy Agency Austria. The report integrated quantitative greenhouse gas emission projections and quantitative assessments of impacts of already implemented and potential measures to reduce greenhouse gas emissions based upon scenario exercises managed by the Environment Agency Austria.
2. As a basis for the Energy Strategy Austria, projections of energy consumption and national greenhouse gas emissions were developed in 2008–2009. The emission projections were calculated by the Environment Agency Austria. The Energy Strategy Austria uses further models and methods for calculating forecasts for key sectoral activities.
3. The Federal Waste Management Plan uses scenarios developed by the Environment Agency

Austria for the evaluation of future levels of recovery and disposal of waste from households and similar establishments and for projections of management needs. Additionally, the Decision Supporting Tool (ÖAWM-DST) developed for the Federal Ministry of Agriculture, Forestry, Environment and Water Management was used to project future waste management costs on the basis of an assessment of various applied and potential measures.

4. The 'Delphi Austria' foresight programme influenced the implementation of policy measures by the Ministry of Science and Transport. A Green Paper setting out the main elements of a research strategy on sustainable development was based on the findings from the 'Delphi Austria' foresight programme. As a part of the resulting research strategy, the Ministry of Science and Transport launched the 'Impulse' programme (Austrian programme on technology for sustainable development) that seeks to raise competitiveness and to improve living and environmental conditions for present and future generations.

3.2 Linkages between future-oriented policy documents

Scenarios and projections developed for environmental themes and closely related issues are often used for other themes and sectors. An example is the close interrelationship between climate and energy policies. Austria's energy policy, set out in the 2003 Energy Report, outlined measures that correspond to those prescribed in the Climate Strategy I, just as the Climate Strategy II included findings from the subsequent Energy Report. Scenarios prepared for the Climate Strategy by the Environment Agency Austria were used also in the Energy Strategy Austria. Similar examples can be seen in policy studies and documents in other sectors.

Another example deals with linkages between waste and climate change policies and corresponding

projections. The National Climate Strategy II envisaged a reduction in CO₂ equivalent emissions from 77.64 (baseline year 1990) to 70.55 million tonnes in CO₂eq. in 2010 through national measures. It foresaw that the waste management sector should achieve a reduction of 2.56 million tonnes of CO₂eq.

or approximately 36 % of total emissions. These figures derived from the Federal Waste Management Plan (2006) show that waste management plays 'a vital role in implementing the National Climate Strategy II' ⁽¹⁷⁾.

⁽¹⁷⁾ <http://www.wifo.ac.at/wwa/jsp/index.jsp?&language=2>.

4 Conclusions

Over the past 15 years, future-oriented analysis and studies have become an important part of the environmental policymaking process in Austria. Following the call to use forward-looking approaches in the 1994 National Environment Plan (NUP), Austria has developed a strong system and structure for the production and updating of forward-looking studies and scenarios of environmental themes.

4.1 Success factors

There are several success factors behind the integration of future-oriented thinking in policymaking processes in Austria.

One important factor is a political commitment to use forward-looking analysis, set out in the NUP. As a result, the development of projections and scenarios has become a regular element of environmental policymaking.

Another is that from the start, Austria could draw on research institutions outside government with strong expertise in quantitative methods, such as the Austrian Institute of Economic Research (WIFO) ⁽¹⁸⁾.

A further element of success is the relatively long time frame during which this approach was developed (now more than two decades, also considering its use in developing the NUP). This period has also allowed for ongoing improvements, including the development of necessary instruments, tools and institutional collaboration.

A fourth factor has been the integrated nature of foresight analysis within organisations — by carrying out foresight work as an aspect of day-to-day working, there is greater certainty concerning the availability of resources for studies and of competent staff in government institutions.

As a result, the pool of expertise has grown over the years, both within government bodies as well as in independent research institutes.

In addition, a participative approach has been used for several studies, bringing in expertise from other government bodies and from stakeholders.

One important factor in the environmental field has been the growth of institutional collaboration among the key organisations. In particular, departments, programmes and units of the Federal Ministry of Agriculture, Forestry, Environment and Water Management collaborate closely with the Environment Agency Austria with regard to the development of forward-looking studies related to the environment. In some cases, the Ministry calls on the Agency to coordinate specific activities with other institutions or universities (e.g. in case of the energy strategy, WIFO, IIASA and the Austrian Energy Agency, among others). This collaboration is linked to the clear division of responsibility between policymaking (in the Ministry) and analysis (led by the Environment Agency Austria and outside institutes).

4.2 Barriers to success

One barrier is that most environmental issues have fallen on the political agenda since the adoption of the NUP in 1994. As a result, while forward-looking studies are used regularly, Austria has not continued the ambitious, broad-based approach seen in the NUP (with the important exception of climate change). Furthermore, the NUP has not been updated since 1994 and national legislation does not provide for its regular review by independent bodies. This hinders the updating of the NUP to current developments as well as an unbiased assessment of its effectiveness and the progress of its implementation.

⁽¹⁸⁾ <http://www.wifo.ac.at/www/jsp/index.jsp?&language=2>.

Another weakness is the relatively short time frame of most forward-looking strategies and of the related analysis. For example, the Energy Strategy Austria and the Strategy for Sustainable Development have a time frame of 2020, and the Climate Strategy focuses on the period from 2008 to 2012. Taking into account a longer-term perspective, for example to 2050, would allow policymakers to consider their decisions in a broader perspective and explain their decisions in terms of long-term developments.

A further issue is that the participation of outside stakeholders, while it has grown, has overall been relatively low. Scenarios and forward-looking studies are mainly prepared and carried out by experts and institutions, and stakeholders are mainly involved in consultations on the outcomes.

As yet, stakeholders rarely participate in the design of studies. The involvement of stakeholders in the early stages of the preparation of forward-looking studies could facilitate the preparation of scenarios and forward-looking studies on a broader and more diverse basis of information. One important example was seen in the development of Austrian Climate Adaption Strategy, where the general public was encouraged to contribute via the Internet.

Finally, most of the forward-looking studies scrutinised have used quantitative approaches, in particular computer modelling. While this is a strength in Austria, it appears that more open, qualitative approaches to futures thinking are not often employed.

5 References

Policy documents:

'A Sustainable Future for Austria – The Austrian Strategy for Sustainable Development (2002)':

- *A Sustainable Future for Austria – Green Paper for Austria's Strategy on Sustainable Development*, mandated by the Austrian Federal Government, 2001 (<http://wko.at/up/enet/stellung/eunachhaltigkeitdenglisch.pdf>)
- 'A Sustainable Future for Austria – The Austrian Strategy for Sustainable Development (2002)' (<http://www.nachhaltigkeit.at/article/archive/26469>)
- UNECE, 'Institutional aspects of sustainable development in Austria' (<http://www.un.org/esa/agenda21/natlinfo/countr/austria/inst.htm>)

'Delphi Austria' foresight programme (1996–1998):

- Aichholzer, G., 2001, **Delphi Austria: An Example of Tailoring Foresight to the Needs of a Small Countries** (http://epub.oeaw.ac.at/ita/ita-manuscript/ita_01_02.pdf)

Federal Waste Management Plan (Der Bundesabfallwirtschaftsplan) (2006):

- Federal Waste Management Plan (2006) (<http://www.bundesabfallwirtschaftsplan.at/article/articleview/52746/1/13192/>)

National Environmental Plan (Nationaler Umweltplan) (NUP) (1994):

- *National Environmental Plan* (http://www.nachhaltigkeit.info/artikel/nationaler_umweltplan_nup_620.htm)

The Climate Strategy (Klimastrategie) (2008–2012):

- 'Austrian Climate Strategy' (<http://www.acc.gov.at/strategie.htm>)
- 'The Fifth National Communication of Austria to the UNFCCC' (http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php)

The Energy Strategy Austria (Energie Strategie Österreich) (2010–2020):

- 'Energy Strategy Austria' (<http://www.energiestrategie.at/>)

- *Energiewirtschaftliche Inputdaten und Szenarien als Grundlage zur Erfüllung der Berichtspflichten des Monitoring Mechanisms, 2009* (<http://www.umweltbundesamt.at/fileadmin/site/publikationen/REP0237.pdf>)

Competent authorities:

- Federal Ministry of Agriculture, Forestry, Environment and Water Management (Lebensministerium, BMLFUW) (<http://www.lebensministerium.at/en>)
- Environment Agency Austria (Umweltbundesamt) (<http://www.umweltbundesamt.at/en/>)
- Federal Ministry of Economy, Family and Youth (Bundesministerium für Wirtschaft, Familie und Jugend – BMWFJ) (<http://www.en.bmwfj.gv.at/EN/default.htm>)
- Federal Ministry for Transport, Innovation and Technology (<http://www.bmvit.gv.at/en/index.html>)
- Federal Ministry for Education, Arts and Culture (<http://www.bmukk.gv.at/>)
- Austrian Development Cooperation (<http://www.entwicklung.at/>)
- Austrian Energy Agency (<http://www.energyagency.at/>)
- Austrian Academy of Sciences (<http://www.oeaw.ac.at/english/home.html>)
- Austrian Institute of Economic Research (WIFO) (<http://www.wifo.ac.at/www/jsp/index.jsp?&language=2>)
- IK Vienna School of Governance (<http://vigo.univie.ac.at/index.php?id=15331>)
- Energy Economics Group (<http://www.bioenergytrade.org/t40members/0000009610121840e/0000009ab80d5770d/index.html>)
- Institute of Technology Assessment (ITA) (<http://www.oeaw.ac.at/ita/welcome.htm>)
- Institute of Meteorology of the University of Natural Resources and Applied Life Sciences, Vienna (<http://www.aquamedia.at/templates/index.cfm/id/1834>)
- International Institute for Applied Systems Analysis (IIASA) (http://www.iiasa.ac.at/docs/IIASA_Info.html)

Appendix 1

Approaches to futures studies

Country: Austria	
Title of 'futures' programme(s):	<p>Selection of plans and strategies that contain elements of forward-looking approaches in Austria:</p> <ul style="list-style-type: none"> • National Environmental Plan • Austrian Strategy for Sustainable Development • the Energy Strategy Austria • the Climate Strategy.
1. Overall governance culture of country	<p>Description</p> <p>Austria is a federal republic based on a federal constitution from 1920, which was re-established in 1945. The country is divided into nine federal regions (<i>Bundesländer or Länder</i>). The regions are further subdivided into districts (<i>Bezirke</i>) and statutory cities (<i>Statutarstädte</i>). The districts are comprised of municipalities (<i>Gemeinden</i>). The regions have jurisdiction in several areas including culture, social care, youth, nature protection, hunting and construction, among others.</p> <p>The head of state is the federal president (<i>Bundespräsident</i>) and the chairman of the federal government is the federal chancellor, who is appointed by the president. The parliament consists of two chambers: the Nationalrat and the Bundesrat. The first chamber plays the most important role in terms of the adoption national legislation. The third judicial pillar of the Austrian political system, the Constitutional Court (<i>Verfassungsgerichtshof</i>), has considerable influence on the political system by ruling whether laws and ordinances comply with the Austrian Constitution.</p> <p>Austria follows a cooperative approach in the process of elaborating long-term strategies, e.g. the Federal Ministry of Agriculture, Forestry, Environment and Water Management cooperated with the Federal Ministry of Economy, Family and Youth in the preparation of the Energy Strategy Austria. The Federal Ministry of Agriculture, Forestry, Environment and Water Management commissions and utilises the scientific studies of the Environment Agency Austria to underscore its strategies.</p> <p>Stakeholder participation is a key element of strategy development processes in the Federal Ministry of Agriculture, Forestry, Environment and Water Management. However, until recently, this was restricted to the participation of interest groups. In the context of the Austrian climate adaptation strategy, the general public had, for the first time, the chance to contribute to this strategy via the Internet at an early stage of its development.</p>
	<p>Nature of futures organisation(s)</p> <p>There is no central body or organisation with general responsibility for leading or coordinating forward-looking analysis and studies in Austria. Rather, the approach can be described as predominantly sectoral in nature with different institutions having responsibility in different policy areas.</p> <p>In Austria, the two leading institutions in terms of decision-making and preparing forward-looking studies and scenarios for environmental issues are the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria.</p> <p>Between 1996 and 1998, the Federal Ministry for Transport, Innovation and Technology carried out the 'Delphi Austria' foresight programme.</p> <p>Additionally, futures studies are conducted by research institutes and universities including the International Institute for Applied Systems Analysis (IIASA) and the Austrian Institute of Economic Research. Studies are either commissioned by a ministry, the Environment Agency Austria or the research institutes themselves.</p>

Country: Austria

<i>Date programme(s) introduced</i>	The National Environmental Plan (NUP) adopted in 1994 calls for the use of forward-looking analysis in policymaking. The Austrian Sustainable Development Strategy and the Climate Strategy (updated in 2007) were adopted in 2002; the Energy Strategy Austria was first published in 2009.
<i>Responsibility</i>	<p>The National Environment Plan from 1994 was initiated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and adopted by the Federal Government.</p> <p>The Federal Ministry of Agriculture, Forestry, Environment and Water Management is responsible for coordinating the Austrian Sustainable Development Strategy that was adopted by the federal government.</p> <p>Initiated by the Federal Government, the Federal Ministry of Agriculture, Forestry, Environment and Water Management in cooperation with the Federal Ministry of Economy, Family and Youth drafted the Energy Strategy Austria.</p> <p>The Climate Strategy 2002 (updated in 2007) was drafted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management.</p>
<i>Resources</i>	Neither the Federal Ministry of Agriculture, Forestry, Environment and Water Management nor the Environment Agency Austria separate budget streams or staffing specifically for forward-looking strategies and studies have been identified.
<i>Tradition</i>	<p>Austrian's National Environmental Plan was adopted in 1994 and identifies process-oriented solutions including modelling as an instrument to develop national environmental policy. From this point in time, forward-looking studies and modelling were integrated into the elaboration process of national environmental strategies, e.g. in the Strategy for Sustainable Development, the Climate Strategy and the Energy Strategy Austria from 2010.</p> <p>The Federal Ministry for Transport, Innovation and Technology's first foresight programme, 'Delphi Austria', ran between 1996 and 1998. Follow-up programmes were not identified.</p>
<i>Parliament</i>	In the context of the development process of the Austrian Strategy for Sustainable Development, the Austrian Federal Government informed the parliament about the progress of the strategy implementation on a regular basis. Parliamentary control mechanisms were not identified.
<i>Advisory councils</i>	In the process of drafting the National Environmental Plan, the Austrian Strategy for Sustainable Development, the Climate Strategy and the Energy Strategy Austria experts and interest groups were organised in working groups that contributed to the elaboration processes.
<i>Legal framework</i>	There is no legal obligation to conduct long-term analysis in Austria.
<i>Political framework</i>	<p>Austrian's National Environmental Plan was adopted in 1994 and identifies process-oriented solutions including modelling as an instrument for the development of national environmental policy. From this time on, forward-looking studies and long-term strategies have become integral parts of the Austrian environmental policy.</p> <p>In 2001, Austria adopted its Strategy for a Sustainable Development which was complemented in 2009/2010 by a common strategy addressing the federal and the regional level. Additionally, Austria comprises many long-term sectorial strategies, including climate and energy as well as water and waste management.</p>

Country: Austria	
	<p>Role of environmental research/ foresight programmes in providing futures thinking</p> <p>Taking into account that there is no central body or research programme exclusively dedicated to forward-looking work, a number of different bodies provide for inputs of forward-looking thinking.</p> <p>The National Environmental Plan has the strongest impact in providing forward-looking thinking because it identifies process-oriented research including modelling as one tool for environmental policymaking.</p> <p>The Federal Ministry of Agriculture, Forestry, Environment and Water Management is responsible for drafting environmental policy documents and the Environment Agency Austria adds scientific input to these strategies.</p> <p>The 'Delphi Austria' foresight programme (1996–1998) also contributed to promote futures thinking by identifying new fields for innovation.</p> <p>Additionally, other ministries, research institutions, universities and interest groups, prominent among which are the Austrian Energy Agency and the International Institute for Applied Systems Analysis (IIASA) also provide forward-looking work.</p>
	<p>Actors</p> <p>The main actors are the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria at governmental level and universities and research institutes at non-governmental level. The UBA also cooperates with research institutes at non-governmental level in the preparation of forward-looking studies.</p>
	<p>Perceived institutional need</p> <p>The need for an additional forward-looking programme was not identified. The NUP institutionalises forward-looking approaches. This is reflected in the fact that the Environment Agency integrates forward-looking studies in its day-to-day work and that the Federal Ministry of Agriculture, Forestry, Environment and Water Management bases its long-term strategies on these studies.</p>
2. Institutional structure for environmental policymaking	<p>Relevant government departments, ministers, agencies, etc.</p> <p>The Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Environment Agency Austria are the main institutions for environmental policymaking.</p> <p>The Environment Agency Austria prepares forward-looking studies that influence and are incorporated into long-term strategies adopted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, e.g. the update of the Climate Strategy in 2007 was based on an evaluation by the Environment Agency Austria.</p>
3. Foresight/ scenario culture traditions	<p>Approach to futures thinking</p> <p>The approaches to futures thinking are multifaceted. Foresight, normative and exploratory approaches have been identified. A broader vision for Austria determining long-term goals until 2050 is missing.</p>
	<p>Thematic or issue</p> <p>The Austrian Strategy for Sustainable Development includes 20 key objectives covering various policy fields and include, in relation to the environment: successful management through eco-efficiency, protection of the environmental media and climate, preserving the diversity of species and landscape, responsible use of land and regional development as well as shaping sustainable mobility.</p> <p>Forward-looking studies and strategies have been elaborated for a high number of sectorial and cross-sectorial environmental fields, e.g. air, water, soil, waste, biodiversity, climate change and energy.</p> <p>The 'Delphi Austria' foresight programme (1996–1998) was demand-oriented and aim to identify new fields for innovation.</p>
4. Summary of programme(s) as a whole, including within agencies	<p>The main part of the study contains summaries of major environment-related long-term strategies.</p>

Appendix 2

Example of a long-term strategy

Country: Austria

Institution responsible for the Strategy of Sustainable Development: Federal Chancellery

1. Description/ characteristics of futures studies	Examples of specific studies	Energy Strategy Austria
	Exploratory/ normative?	The Energy Strategy Austria uses projections of energy consumption and national greenhouse gas emissions developed by the Environment Agency Austria and models and methods for calculating principal sectoral forecasts of activities developed by research institutes and universities.
	Qualitative/ quantitative?	The strategy is predominately of quantitative nature.
	Thematic focus?	Energy
	Specific issue focus?	Specific issues covered by this strategy are environmental sustainability, cost effectiveness, energy efficiency, social acceptability and competitiveness.
	Spatial/ temporal scale	The timescale of the Energy Strategy Austria is 2010 to 2020.
	Ad hoc/ongoing established futures process?	The strategy will be adjusted on the basis of new information.
	Sector/cross-sector-based?	Covers all sectors relevant for energy
	Science-based/ multiple stakeholders?	The Energy Strategy Austria is based on stakeholder consultation including NGOs and companies as well as scientific research.
2. Original purpose and application	For what purpose? (objectives)	The strategy aims to develop a sustainable energy system and secure energy services for private consumers and businesses and to fulfil EU energy and climate change requirements.
	Requested by a specific entity?	The Federal Government of Austria mandated the Ministry of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Economy, Family and Youth to prepare the Energy Strategy Austria.
	How used?	As guideline for policy decisions
	By whom?	Policymakers
3. Outcomes (immediate and long term)	Where and how used in policy (if at all)	It is too early to assess impacts of the strategy.

Country: Austria

4. Evaluation	Any formal evaluation of effectiveness or updates	Regular evaluations and updates are required.
	Success factors/drivers	<ol style="list-style-type: none"> 1. Large stakeholder consultation in the elaboration of this strategy at an early stage of the process. 2. Cooperation between the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Economy, Family and Youth. 3. Setting of verifiable targets until 2020. 4. Cross-cutting approach covering all energy related fields. 5. Use of a set of different studies to underline its conclusions.
	Barriers to success	<ol style="list-style-type: none"> 1. No consultation of the general public in the preparation of the strategy. 2. The envisaged timescale until 2020 is too short. Policy strategies in the sector of energy should consider and plan developments until 2050.
5. References	<p>http://www.energiestrategie.at/images/stories/pdf/longversion/energiestrategie_oesterreich.pdf</p> <p>Summary in English (http://www.bmwfj.gv.at/EnergieUndBergbau/Energiebericht/Documents/Energy%20Strategy%20Austria%20(engl%20Kurzfassung)%20(2).pdf)</p>	

European Environment Agency

Annex 1 — Austria country case study

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