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The European Union at the crossroads: Foresight as a tool to inform RTD-Policy in the area of Sustainable Development

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„The earth has enough for everybody's needs,
but not for everybody's wants.“

(Mahatma Ghandi)

“Those who have knowledge don’t predict. Those who predict, don’t have knowledge”

(Lao Tzu, 6th century BC Chines Poet)

Content

1 Summary

The science/public/policy relationship is subject to deep changes. Taking these changes as a starting point, the following paper examines the changing foresight landscape in the European Union, both from an institutional and from a methodological perspective. The necessity for a reorganisation of these foresight activities is –among other factors- due to the limited impact of current foresight to inform RTD policy[1] in the area of sustainable development.

Thus, the paper identifies four key challenges in the use of foresight tools and techniques for sustainable development in EU RTD:

1. *Increasing the impact of Foresight on RTD policy.* Foresight techniques in the past have had a limited positive effect on RTD policy in the EU, in part through poor design and understanding of how the outcomes of foresight techniques can be used.
2. *From technology bias to serving the over-arching goal of sustainable development.* RTD policy has arguably been focused too heavily on technology and has tended to ignore the wider social and economic goals that technological development is "designed" to serve. The European Commission has set sustainable development as the central objective of all sectors and policies.
3. *Developing adequate methodologies.* Sustainable development is a complex concept and requires foresight methodologies that are capable of integrating a large number of factors. However, foresight techniques for RTD have tended to take a reductivist approach that ignores the full range of impacts. Needed is an adequate form of "reduction of complexity".
4. *Practical conduct of foresight activities.* The current foresight system faces severe difficulties in making practical use of the vast amounts of knowledge available. The involvement and co-ordination of many different stakeholders with limited resources in terms of time, money and personnel is a difficult task and a major challenge.

2 The Changing Science/Policy/Public Relationship

Only a few decades ago the Science/Policy/Public Relationship in modern European societies was characterised by segmented activities, which reflected the differentiation into separated institutions, disciplines and responsibilities. The concept of sustainable development conceives the social and ecological crisis as symptoms, which originate from isolated and uncoordinated short-term logics and action towards different directions. In the case of RTD policy the links between the development of industrial

[1] RTD policy: Research and Technological Development Policy

products and societal needs have been very weak. Hence, conflicts and reactive add-on solutions are an effect of this RTD policy concept.

In general, the need for a "socially more robust knowledge production"[2] has become a broad consensus among scientists, citizens and politicians. The normative principle sustainable development is only one driver among others for the changing science/policy/public relationship, but it brings the main changes we can partially observe to the point: Interdisciplinary and holistic approaches, the long-term perspective, stakeholder integration, participation and transparency, practice- and result-orientation, local - global nexus and international networking all ask for new relationships among the spheres science/policy/public. We notice an increasingly more intense discourse between these three societal segments, the proactive mainstreaming of RTD policy with societal needs and empowerment of societal actors in the knowledge society. All this aims at a "democratisation of science".

The changing science/policy/public relationship poses new challenges to foresight activities in terms of time horizons, accelerating speed/dynamics, geographical boundaries, actor constellations, actors and subjects. In addition, with the increasing incorporation and institutionalisation of Sustainable Development on the EU level via the so-called Cardiff-process and other important steps (Declaration of Gothenburg, etc.) an increasing number of major players will be stimulated or even urged to communicate and discuss more of their views and concepts with other segments of society. On the basis of broad empirical knowledge and practical experience this tendency will challenge the relationship between science, policy, and the public considerably.[3]

3 Foresight Activities in the EU

Rapid social, economic and technological change and the awareness of complex structural problems, such as harsh competition and climate change, have induced a growing demand for foresight studies in the European Union. Foresight activities in the EU are moving away from forecasting to futures studies, increasingly they are broken down to spatial dimensions, and there are institutional innovations to achieve a European Foresight area by improving efficiency and quality of foresight processes.[4]

Foresight activities, relevant for the information of RTD policy, can be either grasped by an institutional or a methodological perspective. The methodological perspective shows the heterogeneity of foresight approaches. The institutional perspective unveils the changing stakeholders relevant for foresight and RTD in the EU.

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[2] Sheila Jasanoff: The Fifth Branch: Science Advisors as Policy Makers. Cambridge, Mass/USA 1990; Helga Nowotny, Peter Scott, Michael Gibbons: Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty. Cambridge 2001

[3] Frank Fischer: Reframing Public Policy. Discursive Politics and Deliberative Practices. Oxford: Oxford University Press 2003

[4] van Langenhove, L.: What Future Do We Want For Science and Technology Foresight? In: Technikfolgenabschätzung. Theorie und Praxis. 2003

The heterogeneity of foresight activities requires a brief sketch of basic approaches in order to identify key challenges for future foresight activities:

a) Technology focussed approaches

A broad screening of technologies aims at the identification of promising technology options, which can be studied further in detail. Moreover megatrends, such as demography, globalisation of the economy etc., are investigated. The instrument of Technology Assessment is designed to integrate implications for environment, economy, society and culture at an early stage, and to point out both, hindering factors for innovation and potentials for application. Finally questions of implementation and transfer are treated usually.

b) Subject- or problem-focussed approaches

These approaches respond to a requirement or need, usually by interdisciplinary research and participatory processes. The driving force is not the technology, but a vision or normative concept, such as sustainable development, ecology or One-World. Different technologies are means among others to meet social demands.

There are many attempts to characterise and improve the conduct of foresight activities. The Technology Future Analysis Methods Working Group mainly focuses on emerging methodological issues.[5] In practice a variety of methods is used, which has implications for the process how foresight activities are conducted. Extensive profiling criteria for foresight have been elaborated and published in the Handbook of Knowledge Society Foresight.[6] It also clarifies what outputs and deliverables can be expected from knowledge society foresight.

The criteria to assess foresight studies can be grouped into methodological quality, analytical quality and usability.[7] Among the key characteristics of foresight activities - taking into account the changing science/policy/public relationship- are:

- goals and target groups
- level and type of institutional integration[8]
- level and type of stakeholder involvement
- level and type of methodological integration[9]
- transparency, coherency and consistency[10]

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[5] A rough typology distinguishes expert opinions, modelling and simulation, scenarios, descriptive methods and matrices, creative methods, statistical methods, monitoring and intelligence, trend analysis and evaluation. Technology Future Analysis Methods Working Group: Technology futures analysis: Toward integration of the field and new methods. In: Technological Forecasting and Social Change. 2003.

[6] Among them are 15 scoping elements of foresight. European Foundation for the Improvement of Living and Working Conditions: handbook of knowledge society foresight. 2003.

[7] European Environmental Agency: Cloudy Crystal Balls. 2000

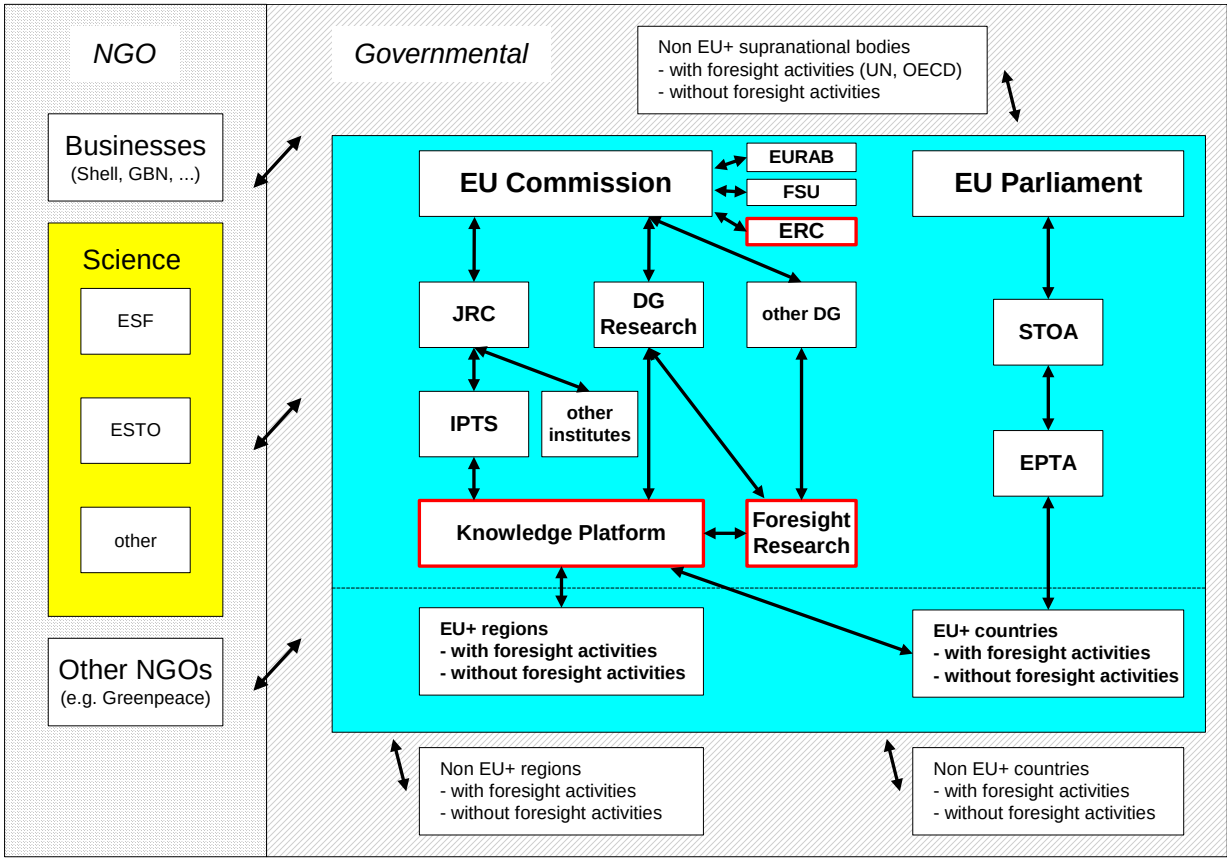
[8] high level: e.g. ISTAG Scenarios an Ambient Intelligence; type: e.g. parliamentary, within government, cross-ministerial working group, advisory board of independent experts, consultative institution to integrate public interests, cross-ministerial action programmes, consulting or research institute

[9] high: scenarios and models – low: extrapolation and Delphis; type e.g. cross-scaling concepts, balanced dimensions, vertical integration, etc.

- translation of long-term policy recommendations to short-term policy agenda

From an institutional perspective the field of European Foresight activities covers the following main relationships:

Figure 0-1: Key foresight activities relevant for the RTD policy in the EU



source: own compilation by IZT

Legend: EPTA: European Parliamentary Technology Assessment, ERC: European Research Council, ESF: European Science Foundation, ETSO: European Science and Technology Observatory, EURAB: European Research Advisory Board, FSU: Forward Studies Unit, GBN: Global Business Network, IPTS: Institute for Prospective Technology Studies, JRC: Joint Research Center, STOA: Scientific and Technological Options Assessment

Foresight activities in the EU are carried out on different levels, especially by IPTS and national foresight bodies. New institutions on the European level are being set up. A European Research Council aims at strengthening basic research in the EU. EURAB is a high-level, independent, advisory committee created by the Commission to provide advice on the design and implementation of EU research policy. The European Science and Technology Foresight Platform is implemented by DG Research and the Joint Research Center of the European Commission and targeted to research and innovation

[10] system boundaries, methodologies, a priori assumptions, etc.

policy makers and managers. Currently it mainly consists of an online-platform, which has links to several EU and national foresight activities. An additional challenge will come from the EU-enlargement process and the task to integrate the experiences and traditions of their expert communities and vice versa.

The new organisation of European Foresight activities is based on three major building blocks:

5. Monitoring foresight developments in Europe and in major world-regions as well as disseminating the related information to practitioners, users and stakeholders by a network of country correspondents on a permanent basis
6. Active promotion of mutual learning between foresight practitioners, users and stakeholders in Europe
7. Specific studies on prospective key issues for EU research and innovation policy complementary to IPTS

These three building blocks are seen as key prerequisites to meet the goal, that foresight will become a high quality and efficient tool to inform RTD policy in the area of sustainable development.

4 Approaches to inform RTD policy in the area of sustainable development

Research policy in the European Union covers mainly the areas of Framework programmes, the European Research Area and international co-operation. Innovative approaches in the design of the 6th Framework programme include the ISTAG Scenarios on Ambient Intelligence,[11] as well as the conceptualisation of networks of excellence and integrated projects. The European Research Area stands for a vision, in which synergies of public research activities are unleashed throughout the EU. Key activities include benchmarking,[12] mapping of excellence and electronic networks for research.

In the STRATA projects (Strategic Analysis of Specific Political Issues) many challenges for RTD policy in the field of sustainable development have been identified. The European Commission has set sustainable development as the central objective of all sectors and policies[13] and issued *guidelines on impact assessment* of policies in the Commission.[14] The guidelines consist of three parts, an operational guide, a reference manual and technical annexes. The operational guide clarifies the role and identifies the

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[11] IST Advisory Group: Scenarios for Ambient Intelligence in 2010. 2001

[12] See also the IZT-study „Long-term and cross-section issues in European governments and parliaments – an analysis of institutions and procedures in selected countries“ (2002); www.izt.de

[13] “Sustainable development should become the central objective of all sectors and policies. This means that policy-makers must identify likely spillovers – good and bad- onto other policy areas and take them into account. Careful assessment of full effects of a policy proposal must include estimates of its economic, environmental and social impacts inside and outside the EU” (COM(2001)264 final).

[14] “Impact assessment is intended to integrate, reinforce, streamline and replace all existing separate impact assessment mechanisms for Commission proposals” (COM(2002)276 final).

deliverables expected from the policy units concerned and to define procedures and timetables. The reference manual contains technical instruments and methods available for impact assessment and the technical annexes are addressed to specialists. There are preliminary and extended assessments, as well as guiding principles, which are similar to many foresight requirements.[15]

Although the guidelines are also applicable to RTD policy they are too rough to provide a solid basis for informing RTD policy in the area of sustainable development. These guidelines are a useful starting point, but a broader view on the landscape of surveys in the area of RTD policy for sustainable development is necessary to gain deeper insights into the task. Two perspectives can be distinguished:

- Incremental changes in integrating sustainability principles and matters into current RTD policies
- Radical changes by reorganisation of the existing RTD policy

It is not so much the question of which concept to favour, but to make the right choice and balance. In fact it is hardly possible to link research in basic physical effects to societal needs.

The first string can be represented by the *SASKIA* RTD Road Map for Information Society's Contribution to Sustainable Development.[16] It enriches two already existing RTD fields and identifies three new fields, which have been generated by the demand for social innovations. Cross-sectoral issues were addressed only for mature RTD sectors. Specific action is enumerated for each theme, an outline timetable as well as the need for involving different actors. Inherent is the identification of new actors and to avoid the consolidation of existing networks. There might also be a need for new mechanisms and financial regulations.

The radical changes perspective has been applied in the *AIRP-SD Project*.[17] It is based on the assumption, that sustainable development requires paradigmatic changes at the systems level.[18] A key issue is to introduce the irreducible uncertainty and risks into problem solving and decision making. Each development problem has to be re-conceptualised, in order to include all necessary elements and actors. The project provides a methodology for the evaluation of SD-oriented RTD programmes (Research outcomes, Research Design and Process and Research Context) as well as recommendations for the design of future SD-oriented Research programmes. The policy recommendations include the effective co-ordination and coherence, both internal and to the policy environment, plurality and diversity of options, iterative mutual learning processes as well as integrated and knowledge assessment

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[15] "Get things in proportion, think outside the box, consult interested parties and relevant experts, be transparent, use existing knowledge and expertise, compare negative and positive impacts, use your judgement"

[16] Barco et al: Strategic Action for a Sustainable Knowledge & Information Age. 2003

[17] Bleischwitz, R. et al: Adaptive integration of research and policy for Sustainable Development. 2003

[18] "Research for sustainable development is action oriented research that seeks to envision and explore different socio-economic and environmental futures."

methodologies as a core part of sustainability research, including transparency and openness. The practical design should consider the creation of partnerships and shared platforms of communication. For the assessment of RTD programs a broad set of indicators and new tools are required. The effects are often less tangible and process related. The AIRP-SD check-list of interim process-related objectives and a set of measurable evidence-based qualities might be important sources to inform RTD policy in the area of sustainable development.

Having reviewed the changing science/policy/public relationship, foresight activities in the EU and the information of RTD policies in the area of sustainable development main challenges can be defined, which influence the project-design to a high degree.

5 Key challenges for foresight to inform RTD policy on Sustainable Development

Taking into account the specific situation of Foresight in the EU four key challenges have to be addressed in order to find ways how to use foresight as a an efficient high quality tool to inform RTD policy in the area of sustainable development:

1. Increasing the impact of Foresight on RTD policy

Foresight activities lost credit in the policy making process, as deterministic forecasting and one-dimensional presentation of results in the past didn't comply with developments. Foresight activities mainly relied on separated expert opinions, which is inappropriate to reflect firstly the complex interactions among driving factors and impacts, and secondly the knowledge of different stakeholders (e.g. politicians and civil society). Therefore foresight activities have had limited impact on RTD policies. Although many problems have been tackled, today's RTD in the areas of foresight are still characterised by isolated research on improving methods, selection of methods, integration of analysis and stakeholder engagement.[19]

An **in-depth analysis of the impact of foresight activities on RTD framework programs** can serve as a starting point to address the main barriers and potentials. An important topic of interest is the reception of foresight studies in DG and some of the main users. The possible outcomes of foresight studies have to be confronted with the expectations to understand causal relationships and identify decision points. Bridging the communication gaps between users and suppliers of foresight and between citizens and decision-makers provide a more consensus-based foresight, a higher acceptance and could therefore unroll a higher political weight in RTD policy making processes.

[19] Technology Future Analysis Methods Working Group: Technology futures analysis: Toward integration of the field and new methods. In: Technological Forecasting and Social Change. 2003.

2. From technology bias to serving the over-arching goal of sustainable development (demand-side)

Many traditional Science and Technology Foresights focus too much on technological developments, instead of on societal trends and issues. Among the multiple reasons for this bias is the organisation of research policy in ministries and other institutes, whose staff is dominated by natural scientists and engineers. Another consequence is the mostly disciplinary approach. The practical involvement of institutions of the European Union is more than a management task as it implies cultural changes in policy making. The vast amount of EU entities, esp. DGs, can benefit from Foresight activities and they have their own foresight activities. Currently they have to integrate the concept of sustainable development into their sectoral policies, which might be the door-opener for foresight as well.

Science and Technology Policy as a whole has to be linked closer to societal goals, such as the sustainability strategy of the EU. The quality of Science and Technology Foresights could be improved significantly by alliances with competent societal communities in the process of shaping RTD policies. A re-conceptualisation of RTD policy requires institutional innovations. The concept of sustainable development asks for a **new positioning of units** within DG Research and the JRC, as well as a new **definition of tasks** of recently established or planned institutions, such as EURAB and the Foresight knowledge Sharing platform.

3. Developing adequate methodologies

The complex interplay of trends and impacts poses severe methodological problems to foresight activities.[20] There is an increasing demand in the EU for both, upscaling of foresight activities to the global level and downscaling to the regional level. Furthermore scientific insights and public opinions are subject to change. From the bulk of foresight methodologies some are more suitable to inform RTD policy in the area of sustainable development than others.

Futures research has to deal with many uncertainties and therefore increasingly focuses on instruments, which are suitable to integrate knowledge of different disciplines, several possible futures and strategies. Sustainable development as a cross-cutting and long-term concept requires methods of **integrated assessment**, such as scenarios and models. For practical reasons more simple tools, such as the Impact Assessment Guidelines in the European Commission have to be considered. The situation of the European Union, sandwiched between the global and national/regional level, the altering relationship of governmental and non-governmental institutions and changing often non-consensual scientific insights as well as differing public opinions over time underpin the necessity of developing flexible instruments. It must be evaluated, whether a common framework for foresight methods can be developed (e.g. baselines for scenario development: GDP, population, ...). Other questions include a sharing of lists/views of major **drivers of change** and the diffusion of **sustainability principles**.

[20] European Environmental Agency: Cloudy Crystal Balls. 2000.

Another alternative way would be the creation of a typology of Foresight methodologies in practice, and the definition of requirements for new methods and research principles.

4. Practical conduct of foresight activities

The current foresight system faces severe difficulties in making practical use of the vast amounts of knowledge. The involvement and co-ordination of many different stakeholders with limited resources in terms of time, money and personnel is a difficult task.

To ensure highly efficient and high qualitative foresight activities much can be learnt from modern management practices.

- Taking into account the enlargement of the European Union and the many parallel foresight activities on national and regional levels a **policy benchmarking** might unleash efficiency potentials and synergies.[21] Both the dimensions of performance & structural data and analysis of activities & processes should be covered. The latter is hardly addressed by current EU activities. The role of the foresight knowledge platform might be rather **moderative and mediative**, to catalyse self-organisation processes (bottom-up instead of top down). First experiences with synergies between GB and D foresight processes exist. The comparibility might depend on **cultural differences**, as indicated in the EURENDEL project.[22]
- The second string to explore, is to better involve NGOs and businesses in the foresight activities. There are hardly any non profit NGOs which are explicitly preoccupied in Science and Technology policies. However, their practical involvement especially in the case of subject- or problem-driven foresight activities is essential to meet social demands. The integration of businesses in the Foresight process must include a well developed communication strategy, which clarifies their benefits: a key success factor of the **Roadmap** for Sustainable ICT project.[23] The **adequate representation of NGOs and businesses** has to be explored in order to meet the demands of a changing science/policy/public relationship. Participation of those groups would clarify whether there is interest, willingness and commitment for concerted action. Special emphasis has to be attributed to **electronic consultation processes**.
- A vast amount of ongoing foresight activities asks for **synergies with this project**. Especially the Monitoring foresight developments in Europe project and specific foresight issues, also covered by the recent calls for tender, should be seen as relevant activities which might also benefit from mutual exchange.

Time frames and cycles, preparation, moderation and communication processes are key success factors for each foresight activity. To avoid collision of interests there should be an independent and moderating body, which identifies white spots, hot spots, diverging opinions and which is able to organise consensus.

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[21] VDI Technologie Zentrum: Monitoring Forecasting Activities in Europe. 2002

[22] IZT: European Energy Delphi 2030. 2004; www.eurendel.net

[23] IZT: Roadmap for sustainable ICT. Focal Group Displays. 2004; www.roadmap-it.de

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