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The Science-Policy Interface

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Abstract

The paper takes the case study on policy programmes of the European Forum on Integrated Environmental Assessment (EFIEA) as starting point for a more general reflection on science-policy interfaces in the context of European policymaking. First, the European Union is described as a challenging context in which scientific expertise is met with changing expectations by the public, the policymakers, and by scientists. Second, the paper analyses the challenges of science-policy interfaces and suggests criteria for evaluating organised attempts to create such interfaces. Finally, the experiences of the EFIEA policy programmes are analysed with the aim to suggest options to institutionalise Integrated Environmental Assessment as a tool for improved policymaking at the EU level.

Keywords: Expertise, Science Studies, Environmental Policy, Integrated Environmental Assessment, European Union

1 Introduction: On communication between scientists and policymakers

The Hollywood movie "The Day After Tomorrow" has at its core a fanciful depiction of the science-policy interface. Our rugged hero, a rational and brilliant scientist, uses scientific modelling to make a prediction (a sudden and catastrophic ice age) that is initially ignored by the policymaking community. Shortsighted, self-interested United States government officials pay him no heed. Only after our hero overcomes their resistance is he able to directly and personally communicate with the US President. Belatedly, the government follows his clear and simple advice: to evacuate the southern US. Sadly, it is too late to save those in the north—they are left to meet their fates in the ice and snow. The ensuing catastrophe is so massive that it has a cathartic effect: the corrupt policymakers see the error of their ways and find a humanity that had previously

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eluded them. The moral is clear: listen to scientists earlier, and for God's sake, follow their advice.

Real science-policy interfaces (SPIs) bear little resemblance to the Hollywood version. They are less catastrophic, less glamorous (but also less tragic), and rarely involve personal communication between scientists and high-ranking policymakers. Rather, the process involves writing reams of documents and endlessly sitting in committees of unknown effect. Communicating with policymakers is a time-consuming and often frustrating activity for scientists; moreover, it usually goes unrewarded within academia. Obviously, scientific expertise cannot replace policymaking; the crucial question is how to best conceptualise and organise SPIs in order to provide an environment in which rational policies can emerge.

The policy programmes of the European Forum on Integrated Environmental Assessment (EFIEA) are one example of an organised effort to improve the SPI. In the following sections I will describe the European Union as a challenging context in which scientific expertise is met with changing expectations by the public, by policymakers, and by scientists themselves. I will then suggest ways to understand the challenges of SPIs, and will suggest specific criteria that can be used to evaluate organised attempts to create new interfaces. Finally, I will analyse the experiences of the EFIEA policy programmes and will suggest several future options to institutionalise Integrated Environmental Assessment (IEA) as a tool for improved policymaking at the EU level.

2 Changing context for science-policy interfaces

Science is subject to an ongoing debate about its general role in society and about the justification for public funding of scientific research. The positive image formerly evoked by science and the firm belief in the legitimacy of public funding have given way to more public ambivalence. Some scholars argue that science is currently undergoing fundamental institutional changes, and that the public is acquiring new forms of control and influence over the production of scientific knowledge. In this perspective, academia has lost its monopoly on knowledge production, and a new mode of knowledge production has arisen (Gibbons et al., 1994; Nowotny et al., 2001). Others emphasize the need for science to emphasize public relations in order to regain trust and support, or the need for a new social contract that redefines the conditions for public investment in science (Rowland, 1993; Lubchenco, 1998). Yet another view suggests going beyond scientific self-regulation to collaborative models of knowledge production (Guston, 2000). Consequently, science and scientists are confronted with an array of new questions and expectations, such as a growing demand for participatory approaches and new forms of quality control.

The field of environmental science is particularly prone to changing public and political expectations, as a new understanding of environmental risk has begun to dominate policy debates. It is now widely recognised that many environmental risks involve hitherto unknown forms of uncertainty, including com-

plexities and interlinkages among ecosystems, the anthropogenic nature of some risks, and their potential irreversibility. These uncertainties and the high stakes in the policy process require "post-normal" science, in which traditional quality-control mechanisms are replaced by extended peer communities (Funtowicz and Ravetz, 1993; Ravetz and Funtowicz, 1999). Policymakers are increasingly aware that environmental policies require scientific expertise, but recognise uneasily that this expertise does not equal certainty. Instead, most environmental knowledge is inherently uncertain, forcing policymakers to look for ways of making decisions under conditions of uncertainty.

The political context of the EU is also responsible for changing expectations of SPIs. The EU has often been criticised for its fragile democratic legitimacy and for a lack of transparency in its decision-making procedures. The absence of centralised leadership, the rapid evolution of European institutions, and the enlargement of the Union to include a new set of heterogeneous member countries have led to calls for a scientific rationalisation. The relationship between science and governance is an actively debated topic in several EU institutions, and the debate partly guides the attempt to reform some of these institutions and their interrelations (Funtowicz et al., 2000). When there are conflicting national interests, scientific expertise is one of the few means available to harmonise these conflicts and to create a common interest (Theys, 1995). In the context of changing expectations for science, successful scientific assessments must simultaneously address questions of policy relevance, scientific quality, and legitimacy.

3 The challenge of organising science-policy interfaces

Organising SPIs involves setting goals and choosing appropriate means to achieve these goals. This is a non-trivial exercise. Empirical research demonstrates the difficulties inherent in the relation between science and policy. Most importantly, these studies show that SPIs cannot be characterized as simple knowledge transfer. The linear and technocratic model of scientific advice to governments has been rejected both from the perspective of science studies and from the perspective of policy analysis (van Eeten, 1999). Rather, there is a complex relation between two different institutional logics. As the boundaries between science and politics become increasingly blurred, recursive rather than unidirectional relationships dominate (Weingart, 1999, 2001).

Second, the legitimacy and power conferred by scientific knowledge have tremendous influence on the way this knowledge is treated in different institutional contexts. Scientific knowledge is commonly regarded as information that is useful for problem solving, but this is merely one of a multitude of roles. Many different uses of science are possible (Roqueplo, 1995). Science is a source of legitimacy in the policy process, not only for advancing new policies, but also for delaying or avoiding action and for justifying unpopular decisions

(Boehmer-Cristiansen, 1995).

Third, Hisschemöller, Dunn, Hoppe and Ravetz (2001) emphasize that in many cases scientific knowledge is unused or under-used in the policy process. If a particular piece of expertise is actually used, it is often unclear why it is used while other pieces are ignored. Scientific rationalization may have become an important factor in policymaking, but the decision to connect a policy decision to a given piece of scientific expertise (and the way in which this is done) depends on political, not academic, factors. Therefore, scientists who wish to organise successful SPIs require some understanding of how the policy process works, and how scientific expertise is typically treated in the policy process.

The use of science in the policy process depends on several factors: the type of policy problem, the phase in the policy cycle, and the national or international context. This section will deal with the first two aspects of the problem; the specific challenges of international contexts will be addressed in the next section.

Policy problems vary substantially in their degrees of complexity, in their potential for political conflicts, and in the availability of solutions or coping strategies. Many policy problems can easily be tackled within the boundaries of pre-established policy domains. However, a growing number of policy problems are of a cross-sectoral nature. This higher degree of complexity often implies a greater need for scientific input, scientific assessment, and scientific modelling. Moreover, policy problems vary in their capacity to set off political conflict. Many new policy problems affect the vital interests of conflicting parties more fundamentally than traditional ones. In these cases, scientific expertise and opposing sources of information are used by all parties to strengthen their positions. Finally, there is large variation in the availability of solutions to different policy problems. If solutions or coping strategies are unavailable or elusive, policy problems are likely to lapse into oblivion. However, scientific warnings can keep public attention alive for a while until new solutions are found. Moreover, science itself can be a source of new solutions and coping strategies.

These remarks suggest a systematic connection between certain types of policy problems and certain roles for science in policy. In a study on the role of environmental science in Dutch environmental policy development, Hisschemöller, Hoppe, Groenewegen and Midden (2001) identified four typical relations. According to the authors, problems vary in the degree to which they are perceived as structured. Relevant policymakers can perceive problems as well-structured, moderately structured, badly structured or unstructured. In a well-structured problem, a consensus exists on the kind of knowledge that is relevant and on the values that are involved in dealing with this problem. Scientific advice can thus focus on the classical task of problem solving. A moderately structured problem entails consensus on the values at stake, but uncertainty and conflict about the best way to achieve the agreed ends. Here, science can become involved in policy advocacy, and all conflicting parties will look for scientific expertise that supports their own positions in the conflict. A badly structured problem is characterised by a conflict about the values at stake; i.e., even the ultimate goal of the policy is contested, and therefore, the problem lacks a clear solution perspective. In this case, science can function as mediation in a long-term pro-

cess of policy learning. Finally, unstructured problems call for science as a tool for problem finding and problem structuring.

These ideal-typical relations hint at the crucial importance of time and history in the development of any particular policy. First of all, political attention for issues can change dramatically within just a few years (Downs, 1972; Peters and Hogwood, 1985). Individual policies also emerge in several more or less distinct phases. After a problem is successfully established as an issue on the political agenda, regulations emerge, targets are defined and policies are formulated, and the implementation is monitored and evaluated. This policy process often requires multiple revisions of the initial problem definition and policy formulation. Some issues do not attract political attention at all, or they are blocked from entering the policy process for many years. In each stage of the policy cycle, policy advice can have a specific role. It can inform or legitimize the process of policy formulation, become an important factor in the implementation process or be used for ex post evaluations. Some even argue that predictive scientific assessments as a necessary precursor of decision making are inherently limited, and that "rigorous scientific assessments can be much more valuable in the role of ex post policy evaluation than they can in the context of ex ante policy formulation" (Herrick and Sarewitz, 2000, :310).

Understanding the type of policy problem and identifying the stage of the policy cycle may help in guiding the organisation of SPIs. The following list provides examples of possible functions for scientific expertise.

Scientific warning and awareness creation In the absence of public concern, long before an issue enters the policy cycle, scientific expertise can be used to bring a new risk to the attention of policymakers. Scientific warnings can steer public attention to issues that form threats to human well-being and that imply policy intervention. Such a process can be initialised by observation providing completely new sources of data, or can be generated by new interpretations of existing data. Uncertainty is often high, making the decision to issue a public warning risky. Scientific warnings have often been dismissed as prophecies of doom, and the very credibility of the scientific source can be called into question. However, many real environmental and health problems would have been left unaddressed without this important process of awareness creation through scientific expertise.

Problem definition Scientific expertise can also help to define or redefine policy problems. A clear problem definition includes claims about causal relations between sources and impacts; a description of threats that can follow from impacts; and a menu of strategies to avoid the source, mitigate the impact, or adapt to unavoidable changes. A problem definition usually also suggests what should be done, what can be done, by whom it can be done, and at what costs. This reveals the political core of the process of problem definition. The identification of "culprits" and the definition of responsibilities can be based on scientific assessments, but if problem solutions are difficult or costly, problem

definitions will be contested by the involved parties. Moreover, problems can become redefined several times during the policy cycle. If deadlocks emerge, or if solutions fail, problem definitions are often shifted to other areas where political action seems more promising or where political conflicts are not as obvious.

Ex ante impact assessment of policy options Even if a policy problem is well-defined, a choice among various policy instruments may remain. The choice of the best policy instrument can be based on projections that assess the likely impacts of policy options. Often this is done in the form of monetary cost-benefit analysis. Integrated impact assessment also seeks to broaden the scope of traditional cost-benefit analysis and to include non-monetary criteria as well. Governments vary greatly in the degree to which they are willing to base their own decision making on this kind of assessment, which can also be used to criticise ongoing policy developments or demonstrate the inappropriateness of alternatives.

Ex post evaluation of policy choices Scientific expertise can have a crucial role in rendering illegitimate existing policy choices by critically demonstrating their harmful effects, their comparative disadvantages, or their failure to achieve their goals. From a methodological point of view, this type of analysis is probably the least risky. However, as the justification of existing policies is involved, scientific expertise is rarely seen as neutral, and such an analysis inevitable involves taking sides. Typically, ex post evaluations gain importance when current governments are challenged by opposition parties or social movements.

Monitoring of implementation Many policies cannot be properly implemented or do not yield the intended outcome unless they are scientifically monitored on a regular basis. This type of scientific expertise usually involves routine procedures and methodologies. Once the methodologies are established, the task ceases posing a scientific challenge. Therefore, the process of monitoring often falls to the technical staff of government agencies. However, especially if the policy issue is still contested during implementation, and if the success of the regulation depends on stakeholders with divergent interests, an independent scientific source may be crucial for a credible monitoring process.

The IEA community has debated openly the circumstances under which various methodologies are most appropriate. IEA might not be equally appropriate for all of these goals of scientific expertise. It may be particularly useful for formulating goals and strategies and assessing policy responses, but not as useful for monitoring and other goals (*Challenges and opportunities for Integrated Environmental Assessment*, 1998, p. 2). However, once goals have been set, they can be met with a variety of SPI forms and designs. In principle, an SPI can be organised as a network, as an advisory body or think tank, or as a set of

policy workshops. Some of the relevant organisational features of these forms are listed below.

One important question is the *frequency* with which SPIs ought to occur. In a few cases, one highly visible SPI event might be sufficient to yield the intended outcome, e.g., awareness creation, problem redefinition, or a policy change. The visibility and importance of an assessment can increase if it is backed by the majority of scientists in a field or by respected research institutions. However, in most cases stand-alone SPI events will not yield any effect at all. Instead, utilisation of scientific expertise often requires repetition and some form of institutionalised contact. Therefore, SPIs should be regarded as a continuous process rather than as isolated events. This is especially true in instances when trust is needed to enhance the credibility of scientific expertise.

A second important design question is the degree of *formalization* built into SPIs. They can range from highly formalized organisations to informal encounters. Often, governments rely on scientific expertise provided through official advisory bodies whose sole function it is to guarantee systematic input of scientific advice into the policy process. However, informal networking can also be a useful form of SPIs.

A third design question concerns the way in which *institutional boundaries between science and politics* are organised. SPIs can be organised in ways that emphasize either the sharpening or the blurring of boundaries. In the first case, the production and the use of knowledge occur in institutionally separate spheres. The SPI is then used to generate policy questions and to communicate scientific answers to these questions. Ideally, the scientific knowledge production as the core of the assessment is kept apart from the influences of interest groups and decision-makers in order to safeguard the integrity and credibility of scientific advice. In the second case, the research process is more open to the broader public and to various decision-makers and stakeholders. Different mechanisms of quality control (e.g., participatory science, extended peer review) are also used to increase the relevance and legitimacy of scientific advice.[1] The social preconditions for the validity of knowledge claims are taken into consideration. Interactions between science and policy occur in the early stages of the problem definition and throughout the assessment. SPIs are seen as a recursive relation between tightly coupled spheres that mutually inform and influence one another.

Current programmatic reflections on the relation of science and policy in the European context often depict the boundary-sharpening model as traditional, closely connected with an outdated positivist epistemology, and therefore in need of being supplanted. The boundary-blurring model is celebrated by many as the only appropriate way of thinking about science-policy relations. As a reaction to the growing complexity of environmental issues, to new forms of uncertainties, and to changing public expectations towards science, many researchers feel

[1] A variety of different forms of participatory and interactive science are discussed in the literature: focus groups (Dürrenberger et al., 1999), citizens panels (Hörning, 1999), electronic public consultation (Finney, 1999) and consensus conferences (Fixdal, 1997; Andersen and Jaeger, 1999).

the need to reorganise and reconceptualize science in fundamental ways (Funtowicz and Ravetz, 1993; Ravetz and Funtowicz, 1999). They feel that science should be problem-driven, context-sensitive, trans-disciplinary, interactive, and participatory. The institutional separation between the production and the use of knowledge is regarded as inappropriate in the face of these changing expectations. On the contrary, researchers feel that the research process should be open to the broader public. The rationale for this is two-fold. First, members of the public, (including stakeholders and decision-makers) often have local or insider knowledge that scientists usually lack. By including their viewpoints, the assessment becomes better informed, and its scientific quality improves. Second, policy assessments should incorporate the values and preferences of those who will be affected by the policies (Shrader-Frechette 1998). If they do, the assessment can gain more legitimacy, thus facilitating the policys implementation.[2]

4 Science-policy interfaces in international contexts

There are very few instances in which SPIs have been established at the international level and successfully framed and influenced the international policy process. The Intergovernmental Panel on Climate Change (IPCC) and the scientific assessments under the Convention on Long-Range Transboundary Air Pollution (LRTAP) are among the rare SPIs that have been crucial for progress in international negotiations.[3] SPIs in international contexts are even more challenging to organise than in national contexts. The first problem derives from national differences in the way scientific expertise is traditionally used in the policymaking process. Second, international SPIs must balance scientific quality with geographical representation; thus, political conflicts are easily carried into the assessment process.

Most institutionalised SPIs aim at policymaking at the level of national or lower-level governments. In many countries, the bulk of public research funding stems from domestic sources. Therefore, the institutional ties among national scientific communities, the leading research institutes in a country, and the countrys political system can become very close. Research has demonstrated enormous cross-national differences in policy styles, regulatory traditions, and administrative cultures (Knill, 1998, 1999; van Waarden, 1995). In the field of environmental policy, the US and the UK have been regarded as polar opposites in terms of rigidity, formality, and trust in the relation between regulators and the regulated. Environmental policy developed in an adversarial manner in the US, whereas the UK adopted an informal and unusually confidential approach (Vogel, 1986). Cross-national differences influence the ways in which scientific expertise is used (Renn, 1995) and the role that quantifications and models play.

[2]Examples of stakeholders in the field of global environmental management, ranging from Shell International to the Grameen Bank and the Friends of the Siberian Forest can be found in Welp (2001).

[3]For a comparison of the organisational design of these two cases see Siebenhüner (2003).

The social acceptability and political credibility of scientific assessments also vary cross-nationally. What distinguishes policy advice from lobbying? Where is the line that separates scientific insights from partisan positions? This line is drawn differently in different countries (Bray, 1999). In small countries, personalised SPIs may predominate, whereas in larger countries, more formalised institutions may channel SPIs.

Therefore, SPIs in international contexts must deal with uncertainties about the appropriate form and style that will secure maximum political legitimacy and social acceptability. Replicating a model that is perceived as successful in one national context might meet fierce resistance in other institutional contexts, where different traditions dominate or where established traditions are lacking. The EU is a special case in this respect, as political harmonisation has been accompanied by a fresh emphasis on national (cultural) differences. A truly European identity is emerging along with a distinct European policy and governance style; thus, the "policy-side" is a moving target for scientific communities trying to organise contact and exchange.

The second problem is obvious in assessments dealing with global problems like ozone depletion, climate change, or desertification. Attempts to provide consensual knowledge about these global risks through international expert networks have often been criticised by developing countries as deriving from the wealthy, Western scientific mainstream and therefore biased. Biermann has discussed a number of cases in which the structural dominance of the North in the assessment process led to problem definitions, methodological choices, and ways of presenting results that disadvantaged or disregarded the interests of developing countries (Biermann, 2000). Geographical representation therefore seems more important when policy problems are influenced by or touch upon global inequality structures. This situation may apply in the EU, even though the member countries form a more homogeneous group than the United Nations, and inequalities between countries are not as sharp as at the global level. It would be very difficult to organise SPIs and completely ignore the question of political representation.

5 Experiences of the EFIEA policy programmes

From its inception, EFIEA aimed at improving scientific methodologies and improving and strengthening SPIs. As EFIEA is a European network, the special challenge was to organise SPIs that target European policy-making. Climate change was identified as a central field in which policy programmes could be useful and relevant. For one thing, climate change is one of the issues that cannot be addressed by individual states, but require international (EU) cooperation. Even though policy initiatives sometimes come indirectly from individual member states, the EU acts as a single negotiating party in the UN climate change negotiations. Therefore, it is of critical importance that assessments target the specific problems related to policy integration and harmonization in a supranational entity. Furthermore, most of the EFIEA member institutes have a core

First Policy Programme:

- "Integrating Climate Policies in the European Environment. Costs and Opportunities", Milan, March 4-6, 1999
- "From Kyoto to The Hague European Perspectives on Making the Kyoto Protocol Work", Amsterdam, April 18-19, 2000
- "The Integrated Environmental Assessment of the Transeuropean Networks-Transport (TEN-T)", London, September 7-8, 2000
- "Integrated Management of Water Resources", Paris, October 25-27, 2000

Second Policy Programme:

- "Towards a long-term European strategy on climate change policy." Workshop I, The Hague, August 30-31, 2004
- "Towards a long-term European strategy on climate change policy." Workshop II, Norwich, November 1-2, 2004-12-07

Figure 1: EFIEA policy programmes 1999-2004

expertise in climate change research and modelling. In the course of the first policy programme, two events were organised to examine SPIs in the fields of European transport and water policies, but the main effort was concentrated on various aspects of climate change, climate impacts, and mitigation and adaptation policies (see Figure 1).

Climate change: what type of policy problem? Much has been said in the literature about the complexities of climate change. Legions of scientists in multiple disciplines have attempted for decades to assess the causal relations between human and non-human factors and changes in the earths climate. The concepts of uncertainty and risk are crucial to understanding the nature of climate change as a policy problem. The attempts to reduce the uncertainties of climate models have contributed to a new understanding of uncertainty in policy-making. Policy-making under uncertainty must take into account a range of uncertainty that is an inherent feature of modelling. Meanwhile, wide-reaching and potentially catastrophic consequences of climate change for human populations imply a high risk for policymaking in this field.

Climate change as a policy problem is also tightly linked to international negotiations with almost global participation. Therefore, the definition of the problem and the acceptability of solutions strongly depend on consensus or compromise among openly conflicting parties, often between North and South, but most times across more complex divides. Even though much agreement has been achieved in more than ten years of negotiations, conflicts still emerge—not only on technical issues, but also on fundamental questions of goals and val-

ues. Finding ways to achieve a worldwide reduction of greenhouse gas emissions touches upon the vital interests of entities as diverse as oil corporations, car manufacturers, small island states, oil exporting countries, and the renewable energy sector. Conflicts among different political approaches have become increasingly visible between the EU and the US, and also between developing and developed countries. Complex causal relations, uncertainties and risk, conflicts about ends and means, and an extremely heterogeneous conglomerate of interests and viewpoints are crucial elements of climate change as a policy problem.

Where in the policy cycle? The issue of climate change has already undergone several phases in the policy cycle. It has been widely accepted as a problem that requires political regulation. International negotiations have led to broad definitions of goals, and a wide variety of policy responses have been developed. Many policy responses are already in the process of implementation. However, the failure of these policy responses to deliver sufficient emission reductions led to the development of new policy responses, e.g., emissions trading and new technical solutions like carbon storage. The UN Framework Convention on Climate Change from 1992 includes a stabilization goal for greenhouse gas concentrations in the atmosphere. This translates into an emission reduction goal for the EU, which decided to pursue this goal by creating the so-called EU "bubble" and defining a formula for burden sharing among the member states. In the meantime, a highly elaborate set of policy tools is available, including the now-mandatory EU Emission Allowance Trading Scheme (EU EATS).

Goals of the SPIs: The two policy programmes of EFIEA covered the period from 1999–2004, in which major policy developments and policy response implementation took place. The first policy programme was not very explicit about the goals of the SPIs, at least not in the sense discussed above. The IEA community was only beginning to think strategically about what role IEA could play in the process of European policymaking. The programme operated as a framework for a network of research institutes in search of a client for IEA. The IPCC had already built a well-established SPI; its reports provided authoritative assessments that influenced the process of international negotiations at multiple points. The task was therefore to find a niche for additional SPIs that would avoid redundancy.

In this phase of fuzzy goals, the term (policy) relevance was often used to conceptualise the objective of the science-policy interface. For example, the declared goal of one workshop was "to bring together state-of-the-art scientific information from European (Integrated Assessment) research that is relevant for the EU and its member states in preparing for the 6th Conference of the Parties (CoP-6)" (Engels, 2002, , p. 11). In a similar way, some of the workshops tried to formulate policy lessons that could be generated from the scientific presentations during the workshops. Both concepts remained rather vague, which often served to hide fundamental disagreements among participants of the workshops about the concrete meaning of these terms. In hindsight, it seems that the

most important functions of these SPI workshops were problem definition and a very general ex-ante impact assessment of policy options. For example, the first workshop examined how climate policies can be integrated into EU environmental policymaking at large, and discussed possible costs and opportunities. The specific focus of IEA allowed participants to ask how social, economic, and environmental criteria can be used together to create an integrated problem definition (see also EFIEA, 1999).

The second policy programme was more explicit and strategic about the goals of SPIs. The organisers linked the programme more closely to the international negotiations, and aimed at contributing to a long-term European strategy on climate change policy. Here, the goal was both problem (re-)definition and ex-ante impact assessment of policy options. The policy problem was redefined such that technology policies became part of the potential solution, and adaptation policies emerged as necessary both in developing countries and in the EU itself (*Conference Proceedings Workshop 1*, 2004; *Conference Proceedings Workshop 2*, 2004).

Design and organisational form: Both policy programmes chose the organisational form of policy workshops to establish SPIs. The workshops were meant to bring together scientists and policymakers, where scientists would present results of their scientific assessments and engage in a critical dialogue with policymakers and stakeholders. This reflects an organisational form that is regularly used in academia to communicate scientific results. During the course of the two programmes, the organisers developed workshop designs which were less academic and more of an informal discourse between scientists and policymakers. However, the policy programmes did not have the resources to experiment with radically different organisational forms.

Frequency: In the first programme, disconnected workshops were organised that did not build on one another; each SPI was organised as a single event without repetition. Therefore, we cannot speak of frequency in any meaningful way. However, the second policy programme built on the assumption that some form of repetition is needed, and that a process can achieve better outcomes than isolated events. Thus, two interconnected workshops were organised two months apart, with a significant overlap of participants and with tightly connected topics.

Formalization: The workshop format generated primarily informal exchange and network activities between scientists and policymakers, which most participants viewed as valuable. Formalizing exchange in the context of workshops is difficult. Even though EFIEA was the formal framework for the policy programmes, most of the participants regarded only the individual workshops to be relevant. However, in later stages of the policy programmes, the organisers tried to formalize the outcome of the workshops in the form of workshop reports and policy documents, and they tried to link the results systematically to the nego-

tiation process. The workshop format thus seriously limits the formalization of SPIs, but it can create very useful informal network opportunities.

Institutional boundaries between science and politics: The policy programmes started with a clear distinction between science and politics, but slowly became more open to an overlap between spheres. Policymakers and stakeholders became increasingly involved in identifying critical questions and topics for the workshops. The format of the workshops became more focused on policy-relevant questions; dialogue and exchange focused on a small, manageable number of input papers. In all phases of the policy programmes, industry stakeholders and NGO representatives were invited to attend the workshops. Over time, their role became more active. Workshops included plenty of time for structured discussion of relevant questions in small breakout groups. This enabled a more systematic inclusion of industry and NGO views than plenary debates alone. This type of policy workshop provides a useful SPI because it creates a separate space where participants from different communities can meet. However, it does not alter the process of generating knowledge; workshops in themselves do not blur the institutional boundaries between science and politics. Moreover, the decision to organise separate methodology and policy programmes within the framework of EFIEA reinforces these institutional boundaries.

The two policy programmes so far have attempted to move towards a stronger policy orientation. The organisers of later workshops became more conscious of formulating goals and tried to focus on more specific policy aspects than in the first workshops. The workshops became more open to the needs of policymakers and stakeholders, and they were linked more directly to concrete climate change policy developments and negotiations. However, it also became obvious that a policy workshop requires much more organisational effort than a routine scientific conference. In purely academic settings, much can be left to the discretion of the authors and other participants. In policy workshops, however, authors of scientific input papers need much more guidance on the questions they are expected to raise and, if possible, answer. Throughout a workshop, the organisers must provide input, structure the debate, and formulate summaries or conclusions. Because so many policymakers and stakeholders cancel their participation before the workshop begins, organisers must invest much time and effort in the preparatory phase to ensure acceptable attendance. The effectiveness of policy workshops also strongly depends on the communication strategy for workshop results. If the goal is to support long-term policy development in a UN negotiation framework, for example, it can be useful to present workshop outcomes during the annual Conferences of the Parties. Likewise, relevant workshop conclusions should be systematically provided to policymakers and decision-making bodies.

However, the aim of establishing SPIs that target European policymaking has proven to be inherently difficult. Geographical representation of participants is an immediate concern, especially if the organisational format of the

SPI is a workshop. The two policy programmes attempted to create a European perspective that transcends to some degree the particularistic views of individual member states. Ideally, this would involve the equal representation of all member states in the workshop. Alternatively, all European sub-regions or country groupings should be represented. The effectiveness of European policy workshops might depend on the participation of at least some accession countries, on representation of both northern and southern European countries, or on inclusion of views from both the Mediterranean and the Baltic Sea. These requirements imply huge organisational efforts, as it is of crucial importance to ensure the participation of people who are actually working in areas related to the issues covered by the workshop. As a consequence, organisers may incur high search costs. Exchanges and dialogue during the workshop are also more challenging owing to the national differences among 25 member states. Moreover, if several issues are addressed in the same workshop, equal representation of all European regions inflates the size of the workshop. The experience of the second policy programme in particular led to the conclusion that roughly 40 participants is the maximum number that allows for dense personal exchanges.

Another problem emerged as central for European SPIs. Throughout the policy programmes, it remained unclear who the actual client of these workshops is or should be. A few policymakers from EU levels of decision-making repeatedly indicated that there was little demand for the IEA provided in these workshops, except from policymakers at the member state level. In most policy fields relevant for IEA, the European Commission is the central decision-making body, as it has the right of initiative to put forward policy proposals. Many participants of the workshops viewed the EC as unwilling to engage with new SPIs, even if they are funded by the EU. The question of how to institutionalize future SPIs that actually reach the European level has emerged as a crucial one from the two policy programmes. Several possible answers are discussed below:

Policy orientation at the level of individual projects: A strong policy orientation is considered to be an important aspect of IEAs. As such, it seems appropriate to routinely incorporate some form of policy orientation in every research project. Within the context of EFIEA, many projects have experimented with participatory modelling, extended peer review, and other policy components. The recently created International Society for Integrated Assessment might be a space in which these experiences can be exchanged and standard components can be developed.

Policy outreach at the level of individual institutes: Policy interfaces can be generated at the level of individual institutes throughout the EU. Creating or strengthening policy interfaces can be included in the strategic operations of these institutes; e.g., a staff member could be appointed as an outreach or contact person with two responsibilities: to search for policy-relevant research questions and for available sources of funding, and to feed research results into the ongoing policy process. This would be the basis of a more continuous inter-

face than through individual workshop events. Some large research institutes already have established this type of outreach activity at the level of member state policy processes. However, simply transferring this type of activity from the member state to the European policy level would incur problems. Most research centres are perceived as nationally-based research centres. They are not necessarily well-known throughout the entire European policy community, despite strong reputations in their home countries. They might also be regarded as competitors to other research institutes based in the home countries of those politicians whom they would like to reach. This could in part be avoided through the pooling of expertise in a self-organised policy network among several research centres from different European member states.

Self-organised policy networks among research centres: An easy way of institutionalising the policy interface would be to create small self-organised networks. Institutes that are already close partners could try to extend their collaboration over time with the explicit aim of becoming a source of expertise for policymakers and stakeholders. A small and operational (policy) network can be easily maintained by institutes that are already used to close (academic) collaboration with each other. They could also pool their resources to employ a coordinator who oversees the network outreach component at the European level, i.e., someone who can frequently travel to Brussels, make the network visible to the policy world there, and establish closer contacts.

Standardised workshop programmes: Part of the activities of such a network (but also of individual research institutes) could be the development of a standardised workshop programme. This is an extension of the workshop idea and would allow standardised, small-scale, repeated workshop events to be routinely offered and organised on demand. For example, this could be based on the expertise of research institutes in specific cross-sectoral issues (e.g., transport and energy) and provide an entire programme of workshops on the linkages between these two policy fields, repeatedly held at different levels of administrative rank or policy. Through repetition with different audiences, the amount of work needed for each workshop could be minimised, and the effect optimised.

Formalised networks centred around European institutions: Leading research institutes could also aim directly at formalising network ties with the Commission, DGs, the European Parliament, or the European Environmental Agency. This would probably require that the voluntary supply of European expertise meets more demand than has thus far been forthcoming. Moreover, European Topic Centres and the Joint Research Centre in the Commission for Science and Research already perform similar roles, so the added value of the new structure would have to be clarified.

Creation of a European Advisory Board on Climate Change: This would entail the establishment of a fixed and specialised advisory body at the

European level to which top-level experts would be appointed, either by Parliament or by member states. Most member states have some kind of advisory body of experts installed, so this Advisory Board could be modelled after one of them. However, this would require significant resources and might be difficult if equal geographical representation is seen as a more important criterion than scientific excellence. It would probably also establish an unwanted precedent for several other specialised advisory bodies.

Formation of a European think tank: The example of the United States tells us that think tanks can become an extremely influential way to filter scientific expertise and debates into otherwise closed policy circles. Some examples have become well-known, especially in the field of climate change. However, this type of model is probably not (yet?) suitable for the EU as a political entity. Even though European policymaking has been described as an emerging transnational field of governance (Albert and Kopp-Malek, 2004; Kohler-Koch and Eising, 1999), political integration is still in its infancy, and important steps in the process of decision-making still take place in the context of member states. Furthermore, Europe does not have a tradition of think tanks, nor of private foundations which are usually necessary to supply funding.

Some of the arguments above raise the question: Is there a need for European expertise in the first place? If expertise was just about knowledge in the cognitive-instrumental sense, then the answer would clearly be "no." There are many research institutes distributed all over Europe that could in principle give advice to anyone, or engage in a policy dialogue with anyone. However, although knowledge may move freely, expertise may not; expertise usually comes from a specific source and has a specific addressee, and both form a social relationship where trust and credibility is very important. Often, scientific expertise for European policymaking is provided through the established contacts between policy and research in the context of member states. In other words, policymakers ask "their" national scientific networks or research institutes for advice (generally on a very ad hoc and short notice basis) because they are considered more trustworthy than others; once they have received this advice from their own sources, they go back to the European level. Therefore, different national styles of institutionalised SPIs come into play, as do different national traditions for assessing policy options. On the other hand, the "U-turn" in the EU position on emissions trading in the late 1990s is an example where expertise was not readily available from member state communities. Through the involvement of experts (both practitioners and academics) who had gained experience with emissions trading in the US, members of the Commission and Members of Parliament came to a more realistic understanding of the instrument. This understanding allowed them to go beyond the polemics that dominated negotiations in Kyoto (Christiansen and Wettestad, 2003).

This example indicates a need for building up specific expertise at the European level and for conceptualising SPIs accordingly. However, a deliberate

decision to focus on the national policy process in each member state can be a viable strategy in the short term, if aiming at the EU level excessively burdens the resources of an emerging scientific community. After all, the political and legal process of Europeanisation is a long and cumbersome process. There is no need for scientific communities to pursue overly ambitious goals of building influential SPIs at the EU level in just a few years time. As long as the models do not tell us we will experience a catastrophic climate event the day after tomorrow, there will remain time to build sound structures in the mid- to long-term future. Policy programmes like the ones carried out through EFIEA are a valuable step in that direction.

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