

COMMENTARY:

Policy assessments to enhance EU scientific advice

Martin Kowarsch

The European Commission needs to amend its new Scientific Advice Mechanism. Highly integrated, participatory assessments of policy alternatives are required for multidimensional, value-laden policy issues such as the European Union's climate and energy policies.

After the much-disputed axing of Anne Glover's post of Chief Scientific Adviser^{1,2}, the European Commission is putting together the nuts and bolts of its new, more elaborate Scientific Advice Mechanism (SAM)³. By the end of October this year, a trio of scouts (Sir David King, Rianne Letschert and António Vitorino), known as the 'Identification Committee', is tasked with recommending seven eminent scholars as members of a High Level Group to advise the Commission³. The operational support unit assisting the Group will be well funded compared with Glover's former team. The new SAM wants the Group to cooperate with institutions such as the European scientific academies and the European Union's Joint Research Centre in a structured relationship. This new SAM is a compromise between different science-policy approaches in the EU member states⁴.

With the new SAM, the Commission is aiming for more independent, objective, interdisciplinary and transparent scientific advice than that provided by existing EU science-policy formats. The intention is to achieve better integration across policy fields, expert bodies and types of expertise in both member states and EU institutions. The SAM is expected to give sound advice to the European Commission both on short-term, urgent issues such as an Ebola outbreak, and on more complex public policy issues such as climate and energy policies, food and water security, and possibly the economic and financial crisis (see <http://ec.europa.eu/research/sam> for information about the SAM)³.

Addressing the complex policy issues

The EU's ambitions of strengthening its scientific policy advice and combining the forces of scientific institutions are certainly desirable. Given the Commission's role,

influence and focus on the new SAM, it may become Europe's key science/policy interface⁵. But open questions remain. How can the new SAM reasonably complement the multifaceted EU landscape of internal and external expert advice without duplication and counterproductive competition? This landscape includes, for instance, impact assessments, the Horizon 2020 programme, and 1,237 expert groups assisting the Commission in initiating and formulating new legislation⁶. Which EU policy processes (particularly along the ordinary legislative procedure) can this SAM feed into, and, more precisely, how can this be achieved? Furthermore, the SAM's legal basis, accountability and financial sources are still unclear. The Commission needs to provide the answers to all these issues. This Commentary will address the more fundamental question of how a new SAM could deliver the desired high-quality scientific expertise.

Although the Commission's proposal for a new SAM identifies the future key players at the EU science/policy interface, their more precise tasks remain unspecified, as do adequate formats and procedures of the scientific advice. The SAM proposed by the EU might be fully applicable to short-term issues, to specific 'technical' issues, or to reporting relevant new science. But the EU proposal is not yet fit for the purpose of responding to the complex regulatory policy issues already mentioned, which are often very fundamental, longer-term societal matters. They call for a more elaborate SAM proposal. I will focus on the examples of European climate and energy policies, which are current key EU policy fields and perfectly illustrate why an amendment to the existing SAM proposal is needed in the face of these and other complex policy issues.

In order to achieve ambitious emissions reductions in the EU, a future European energy mix might include a large proportion of bioenergy (<http://go.nature.com/CuSVsD>). This, however, could affect food prices, land use (including deforestation) and land rent dynamics within and beyond the EU⁷. Increasingly replacing coal with gas could perhaps make the EU too dependent on Russia. Implementing effective carbon pricing could have implications for economic efficiency and wealth distribution among and within EU member states⁸, and could generate health co-benefits through improved air quality⁷. As so much is at stake for so many lives worldwide and for most EU member states, European policymaking processes need to be better informed about the direct effects, obstacles, side effects and synergies of the available options. Only in light of the various practical implications can European decision-makers reasonably evaluate both the alternative policy goals and the potential policy instruments or measures to implement⁹. The tremendous complexity of climate and energy policies, however, highlights two important challenges for scientific advice on complex policy issues^{10,11}.

First, the implications of climate and energy policies are multidimensional, simultaneously affecting different and highly interdependent policy fields on several geographical scales⁷. Therefore, scientific advice has to ensure a high level of integration and policy-relevant synthesis of scientific knowledge across multiple clusters of publications. These clusters spring from different scientific disciplines and assumptions, addressing different policy aspects and governance levels. Standard research cannot deliver such integration. Among the many difficulties are the multiple competing paradigms in the social sciences

and the pervasive uncertainty; the social sciences and humanities are nonetheless key for understanding the policy solution space and its societally relevant implications¹².

The second, closely related challenge is that of value-laden, disputed viewpoints in both policy debates and scientific studies. Value judgements are unavoidably incorporated in scientific policy analysis^{9,13}; scientific facts alone cannot determine the best policy option or measure. Examples include the evaluation of climate policy effects on food prices, wealth distribution, national sovereignty and levels of technological risks. This calls for legitimate processes at the EU's science/policy interface that are transparent, balanced and participatory^{9,13}.

Here lies the rub: we still do not know how the SAM scaffold could integrate all the elements of multidimensional scientific knowledge available on these complex issues. Can this be done by a small expert group? Probably not.

I accept that seven experts, if diverse, may perhaps be more legitimate than one, and that transparency is envisaged for the SAM. But it is still unclear how the High Level Group can ensure legitimacy and avoid severe bias given the divergent policy recommendations in the numerous scientific reports on climate and energy policies. The attack on Glover in terms of her allegedly biased stance on genetically modified crops² should be a warning sign for the new SAM.

Policy assessments as suitable tools

Consequently, the European Commission needs to amend the SAM by introducing larger-scale, integrated scientific policy assessments at the science/policy interface. This particular type of assessment seems the best choice for informing EU debates on climate and energy or other complex policy issues, because it was developed to respond to such multidimensional and highly disputed, value-laden policy problems affecting different stakeholders. Such assessments are sophisticated, formalized processes for synthesizing knowledge and ideally have the following characteristics (Fig. 1):

- Knowledge integration across different disciplines, assumptions and policy aspects should be relatively comprehensively done by a large number of scientific experts. They need to come from different disciplines and regions to mitigate bias¹⁴. High scientific quality of the assessments can be ensured through a focus on peer-reviewed policy analysis and a rigorous, multistage expert review of the assessment itself.

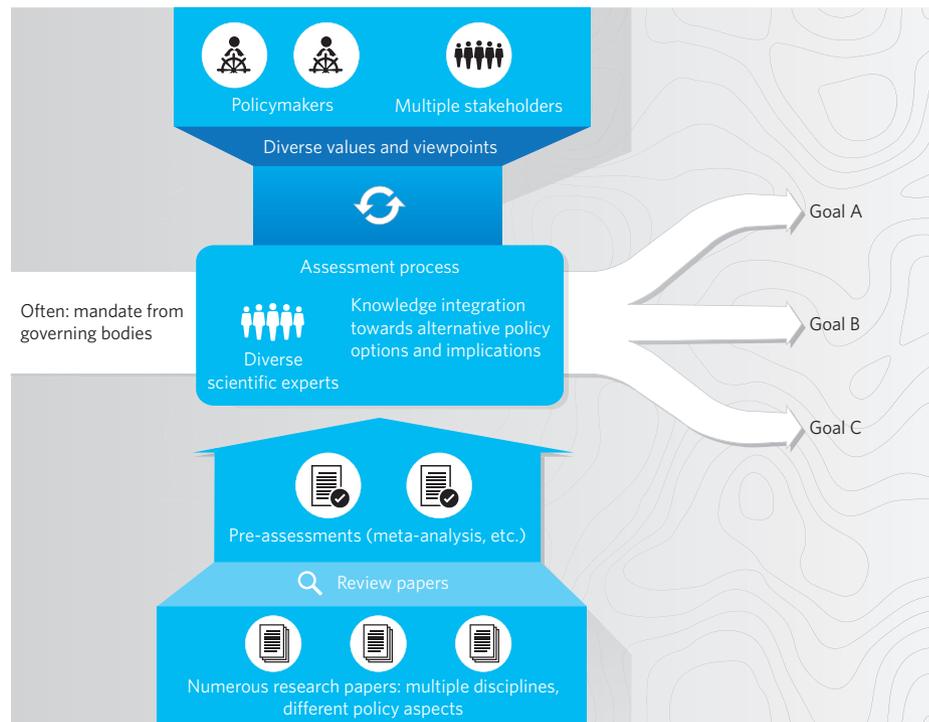


Figure 1 | Key characteristics of integrated policy assessments. These require integration of the available knowledge across multiple paper clusters and pre-assessments, together with transparent inclusion and exploration of divergent, value-laden viewpoints in an iterative process jointly with diverse policymakers and other stakeholders. The process aims at (usually mandated) maps of alternative policy options and their various implications, making controversies and uncertainty transparent.

- Engagement of policymakers and other stakeholders is key to explore their diverse values, concerns, viewpoints and expertise transparently and iteratively¹⁵ at various stages of the assessment process, and to critically discuss the scientists' normative assumptions¹⁶. This would provide greater balance, policy-relevance and effectiveness than can be achieved in the new SAM as it stands, given the proposed marginal role of non-governmental stakeholders (<http://ec.europa.eu/research/sam>)^{17,18}. A strict demarcation between scientific expertise and the political realm is impossible and undesirable^{9,13}; stakeholder engagement is increasingly seen as indispensable^{9,19}.
- Maps of policy alternatives are the envisaged output. They should be publicly available and present different policy options or measures, together with their various implications⁹. This encourages learning among all stakeholders on both disputed policy objectives and means. It can also help to ensure legitimacy when the options and implications presented in the assessments reflect the major different national perspectives, controversial ethical values or group interests of those affected. Consensus is not necessarily required, nor is a focus on statements of high confidence¹². The experts act as cartographers of the solution space, its prospects and risks, rather than offering 'policy-based evidence' or being 'brokers' of policy options with the aim of political compromise behind closed doors. Armed with such maps of knowledge, EU decision-makers can perhaps make better policy decisions, as well-informed navigators⁹.
- Good connection to EU policy processes through an appropriate mandate — be it climate or energy policy initiatives envisaged by the Commission, the European Semester or another policy process²⁰ — would increase the impact and effectiveness of the assessments²¹. Assessments may inform the strategic, open discussions about policy alternatives within the Commission⁵ and perhaps other EU institutions (for example Parliament Committees or Council Committees) as well as broader debates by an expert public. The difficulty is that even narrow-scope assessments span at least 1–2 years. Assessments can, however, address longer-term issues; EU climate policy has been debated again and again since the early 1990s.

The recent work of the Intergovernmental Panel on Climate Change (IPCC)⁷ is an obvious example of a participatory, scientifically rigorous assessment process on a global scale that highlights the alternative climate and energy policy options and their (co-)effects. But the IPCC analyses (which also inform EU policies) have been slightly constrained; some governments do not want the IPCC to critically evaluate their policies and measures^{12,22}. The SAM therefore needs a clear mandate for critically assessing past and future policy options and measures, particularly in light of different national perspectives.

Despite the wealth of scientific research and governmental in-house expertise on EU climate and energy issues, their integrated assessment in the above sense is still lacking. The assessment format proposed above also transcends — but could integrate — the standard scientific reports and policy briefs on climate and energy issues. Such standard reports sometimes give clear-cut, yet divergent policy recommendations based on partial analyses and lacking scientific rigor. The proposed assessments also transcend the EU's crucial impact assessment procedure, such as that used for the EU Energy Roadmap 2050 (<http://go.nature.com/CuSVsD>). They do this by engaging stakeholders more seriously, exploring various quantitative and qualitative implications of a broad range of disputed policy options and measures, focusing on peer-reviewed publications, rigorously reviewing the assessment itself and drawing lessons from structured model comparisons²³.

Possible way forward

Building on, yet amending, the existing plans for the SAM, the Commission could introduce such assessments on climate and energy or other complex policy issues as follows:

- The High Level Group should consist of widely respected, well-connected senior scholars from different disciplines, including the social sciences, humanities and engineering, all with science-policy experience. In cooperation with, but largely independent from, the Commission, they could be given the task of initiating and leading the assessments, as well as selecting authors and relevant stakeholders for the processes.
- The Joint Research Centre — a sometimes undervalued resource — could be charged with coordinating and co-conducting the core assessment processes at an operational level, along with other existing specialist advisory bodies and many external assessment authors. The Centre could also produce peer-reviewed pre-assessments to aid the assessments.
- European scientific academies, by virtue of their scientific authority, could incentivize the research to feed into the assessments. This would fill the substantial research gaps concerning specific climate and energy policy issues, particularly those of integrated social-science policy analysis^{7,12}. They may also help develop integrated policy assessment methodology to ensure high scientific quality in light of the challenges discussed above. For these purposes, it would be beneficial for the academies to broaden their involvement of female experts, non-members and junior researchers. Through academic incentives, the scientific academies could make the onerous assessments (often based on voluntary, unpaid work)²⁴ into respectable and serious scientific tasks in their own right.

The provision of larger-scale, integrated and participatory assessments of EU policy alternatives and their implications would

add flesh and muscles to the skeleton of the existing proposal for the SAM. With it, the new SAM could become a remarkable step forward for the EU's science/policy interface. □

*Martin Kowarsch is at the Mercator Research Institute on Global Commons and Climate Change (MCC), Torgauer Strasse 12–15, 10829 Berlin, Germany. *e-mail: kowarsch@mcc-berlin.net*

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