



## **Strengthening Evidence Based Policy Making through Scientific Advice**

***Reviewing existing practice and setting up a European Science  
Advice Mechanism***

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## 1. Executive summary

The European Commission (EC) is strengthening policy making at European level in the context of better regulation, breaking down silos, promoting cross-fertilisation between policy fields, strengthening transparency and accountability, and reinforcing the partnership with other Union institutions and Member States. Sound scientific evidence is a key element of the policy-making process, and therefore science advice should be embedded at all levels of the European policymaking process and coordinated across the Commission.

Recognising the eminent role of independent scientific advice as a key part of the policy-making process, Commission President Jean-Claude Juncker asked Carlos Moedas, the Commissioner for Research, Science and Innovation, to explore options for an independent system for scientific advice in the new Commission, based on the experiences in different Member States and worldwide, as well as previous experience within the Commission.

This paper has been written by European Commission staff to look at the different options available and to set the basis for a European **Science Advice Mechanism (SAM)** to policy-making to promote the dialogue between the highest levels of decision making in the Commission and the leading representatives of the scientific community.

The scope of the Mechanism will be to match the short, medium and long term demands of the EC for scientific evidence and advice, with the best available European scientific evidence, as well as offering pro-active or on-demand advice on emerging policy issues in need of scientific evidence, which is not offered by the existing in house advisory structures. It will operate taking into account the diversity of approaches across Member States, the specific nature of EU legislative processes and fully respect the principle of subsidiarity.

The way in which advice is provided to the Commission should be based on the principles of excellence, independence, accountability and efficiency. In its relations with the wider scientific community, the Mechanism should draw as much as possible on existing structures and organisations active at the European and global level, such as the European networks of academies, as well as those that are already working with the European Commission. Through these networks, links will be made into key advisory mechanisms active at Member State level. Inside the Commission, the mechanism should as far as possible be interlinked with and complementary to existing advisory structures and the work of the Joint Research Centre.

The Science Advice Mechanism will aim at getting the broadest possible scientific evidence on relevant policy initiatives and debates, and should at the same time provide a direct link with the scientific community to develop responses to emerging issues<sup>1</sup>. Working for the highest political decision making levels of the Commission, it should also contribute to a greater transparency of the policy-making process at European level by facilitating the exchange of ideas with the scientific community.

### 1. Introduction

Policy making in the twenty first century requires robust evidence, impact assessment and adequate monitoring and evaluation. Scientific advice needs to be independent of political or institutional interests, bring together evidence and insights from different disciplines and approaches, and ensure adequate transparency. High quality scientific advice, provided at the right time in the policy cycle, will improve the quality of EU legislation, and therefore contribute directly to the better regulation agenda.

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<sup>1</sup> Such emerging issues can be related to both short-term emergency situations and to long-term, emerging threats, brought to the attention of the SAM by EC and/or other forecasting services.

In his political guidelines for the new Commission, President Juncker stated that "*Europe is finding it is often ill-prepared for the global challenges ahead, be it with regard to the digital age, the race for innovation and skills, the scarcity of natural resources, the safety of our food, the cost of energy, the impact of climate change, the ageing of our population or the pain and poverty at Europe's external borders.*"<sup>2</sup> In his mission letter to Commissioner Moedas, President Juncker underlined the need for "establishing strong coordination across the Commission regarding research, science and innovation matters, to make sure that Commission proposals and activities are based on sound scientific evidence and contribute best to our jobs and growth agenda".<sup>3</sup>

The previous Commission had already recognised the growing importance of high-level scientific advice by appointing Prof. Anne Glover to the newly created position of Chief Scientific Advisor to the President. This note proposes to set up a broader and better interlinked European Scientific Advice Mechanism to policy making, consisting of a high-level group of independent scientific advisors that would systematise the input of evidence and scientific advice at the political level.

In accordance with the mandate given by President Juncker to Commissioner Moedas, the Mechanism is based on the experiences made so far in Member States and worldwide as well as on an analysis of the specific context in which the Commission is working, which requires truly interdisciplinary high level scientific advice.

The centerpiece of the new mechanism will therefore be a group of high-level independent scientists covering a broad scope of expertise, linking up the Commission with the leading voices of the scientific community. In this way, the Mechanism aims in particular at developing a structured approach to make use of the wealth and multidisciplinary of expertise of the European academies or other Member State scientific advisory bodies to provide scientific evidence in support to EU level policies.

Putting the Mechanism in place will not only signal to the scientific community that their input and guidance are actively solicited and highly valued but also demonstrate to the general public that the European Commission is more than ever committed to evidence-based decision-making.

The objective of this report is to present a state of the art of the scientific advisory systems in place and on that basis propose a model that is suitable for the EC. Chapter 2 of this note describes the existing structures in place within the European Commission to ensure the take up of scientific advice in its policymaking processes. Chapter 3 looks at the main models for scientific advice both in EU Member States and internationally, showing that while the various structures typically share a couple of key fundamental characteristics, they are also context-specific. Chapter 4 defines in more detail the criteria that any new advice mechanism needs to fulfill and Chapter 5 presents the key features of the proposed new mechanism.

The annex provides an overview of the sources that have been consulted to produce this proposal and gives background information on the European Academies and the different models for scientific advice that are in place.

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<sup>2</sup> [http://ec.europa.eu/priorities/docs/pg\\_en.pdf](http://ec.europa.eu/priorities/docs/pg_en.pdf)

<sup>3</sup> [http://ec.europa.eu/commission/sites/cwt/files/commissioner\\_mission\\_letters/moedas\\_en.pdf](http://ec.europa.eu/commission/sites/cwt/files/commissioner_mission_letters/moedas_en.pdf)

## **2. Scientific advice for policy-making in the EC: the present situation**

The various Commission services have developed an extensive and diverse advisory system to ensure that EU policies are underpinned by sound scientific evidence. This includes in-house expertise within the different Directorates General (DGs) and external expertise such as expert groups, standing advisory committees, commissioned studies, consultancy, and scientific committees. These sources of scientific evidence are usually highly specialized and are driven by the specific policy needs of the DG concerned. Some of these key advice structures will be presented in this chapter.

### **The Joint Research Center (JRC)**

The JRC is the Commission's in-house science service and its activities are highly targeted to fulfill its mission "*to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle*"<sup>4</sup>.

The JRC is a solid in-house source of scientific evidence in its specific areas of expertise. Its researchers are distributed across seven Institutes and have a broad range of expertise, including on health and environment, secure energy supply, sustainable mobility and consumer health and safety. As part of the European Commission, the scientific evidence generated by the JRC can be fed directly into the Commission's policy-making process. On the other hand, the JRC is a Directorate General of the Commission and is therefore not independent of the Commission's internal processes.

### **The European Political Strategy Centre (EPSC)<sup>5</sup>**

The new European Political Strategy Centre is the Commission's in-house think-tank providing specialised policy advice and forward-looking studies to the President and the College. The EPSC is the successor of Bureau of European Policy Advisors<sup>6</sup> and its creation was announced on 5 November 2014. The Centre is organised around six teams on economics, social affairs, sustainable development, foreign affairs, institutional issues and outreach and communication.

### **Dedicated expert groups reporting to the various Directorates-General**

To serve its needs for expert input into the policy making processes, the Directorates-General of the European Commission rely on a wide range of external inputs. The development of all major Commission proposals involves an extensive impact assessment to consider the potential policy options and bring together evidence about the likely impacts. This also includes open public consultations where stakeholders can submit views and supporting evidence.

The Commission services have also established a large number of expert groups (over 350 registered at present) which assist the Commission in the development of policies, the preparation of legislation or the implementation or evaluation of policies. These groups provide a wide variety of advice, ranging from scientific evidence to advice on more operational issues related to the implementation of policies<sup>7</sup>. For example, the 19 Advisory Groups of Horizon 2020 bring together independent experts from industry, public research

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<sup>4</sup> <https://ec.europa.eu/jrc/en/about>

<sup>5</sup> <http://ec.europa.eu/epsc/>

<sup>6</sup> [http://ec.europa.eu/archives/bepa/index\\_en.htm](http://ec.europa.eu/archives/bepa/index_en.htm)

<sup>7</sup> A complete list can be found at

<http://ec.europa.eu/transparency/regexpert/index.cfm?do=faq.faq&aide=2>

organisations and civil society, to advise the Commission on priorities for the development of the Horizon 2020 work programmes.

The high-level group of Research Innovation and Science Policy Experts (RISE) provides direct strategic support to the European Commissioner for Research, Innovation, and Science as well as to the European Commission more generally, on research and innovation policy issues<sup>8</sup>.

#### Specialised committees

The Commission has set up a number of Committees to provide sound scientific advice in specific policy areas and draw the Commission's attention to new and emerging issues. The future mechanism for scientific advice needs to be fully informed of the work of these committees and establish links with them to avoid duplication as to generate the maximum level of synergy between the relevant services of the Commission and their corresponding advisory structures.

Examples of specialised committees include:

- *The Scientific Committee on Consumer Safety (SCCS)*<sup>9</sup>

This Committee provides opinions on health and safety risks (chemical, biological, mechanical and other physical risks) of non-food consumer products (e.g. cosmetic products, toys, textiles, clothing, personal care and household products) and services (e.g. tattooing, artificial tanning).

- *The Scientific Committee on Health and Environmental Risks (SCHER)*<sup>10</sup>

This Committee provides opinions on health and environmental risks related to pollutants in the environment and other biological and physical factors that may have a negative impact on health and the environment (e.g. in relation to air quality, waters, waste and soils).

- *The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)*<sup>11</sup>

This Committee provides opinions on emerging or newly-identified health and environmental risks and on broad, complex or multidisciplinary issues requiring a comprehensive assessment of risks to consumer safety or public health and related issues not covered by other Community risk assessment bodies. Areas of activity include: antimicrobial resistance, new technologies (e.g. nanotechnologies) medical devices, fertility reduction, cancer of endocrine organs, etc.

- *The Standing Committee on Agricultural Research (SCAR)*<sup>12</sup>

This Committee was established in 1974 by a Council Regulation. It is chaired by the European Commission and includes representatives from 37 countries, including the 28 EU Member States, and observers from candidate and associated countries. Its original mandate to advise the Commission and the Member States on the coordination of agricultural research in Europe was renewed in 2005 for it to play a major role in the coordination of agricultural research efforts across the European Research Area.

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<sup>8</sup> [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=expert-groups](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=expert-groups)

<sup>9</sup> [http://ec.europa.eu/health/scientific\\_committees/consumer\\_safety/index\\_en.htm](http://ec.europa.eu/health/scientific_committees/consumer_safety/index_en.htm)

<sup>10</sup> [http://ec.europa.eu/health/scientific\\_committees/environmental\\_risks/index\\_en.htm](http://ec.europa.eu/health/scientific_committees/environmental_risks/index_en.htm)

<sup>11</sup> [http://ec.europa.eu/health/scientific\\_committees/emerging/index\\_en.htm](http://ec.europa.eu/health/scientific_committees/emerging/index_en.htm)

<sup>12</sup> [http://ec.europa.eu/research/agriculture/scar/index\\_en.html](http://ec.europa.eu/research/agriculture/scar/index_en.html)

▪ *The European Group of Ethics*<sup>13</sup>

The European Group on Ethics in Science and New Technologies (EGE) was established in 1998 as a neutral, independent, pluralist and multidisciplinary advisory body of originally twelve independent experts. Under the previous Commission the Bureau of European Policy Advisors (BEPA) provided the secretariat of the EGE. The EGE's main activity is to advise on ethical questions concerning sciences and new technologies, including sensitive issues, either at the request of the Commission or on its own initiative. The EGE often responds to requests from the President of the Commission.

#### **Horizon 2020**

The Framework programmes, as set out Treaty Article 179, finance longer term research projects needed to support EU policies and build up the evidence base that can be drawn upon for future policies. This objective has been taken up strongly in Horizon 2020 through its focus on cross-disciplinary research and innovation to tackle societal challenges. The results of projects funded under previous Framework Programmes provide a wealth of evidence and knowledge that is relevant to a wide range of EU policies.

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<sup>13</sup> [http://ec.europa.eu/archives/bepa/european-group-ethics/welcome/secretariat/index\\_en.htm](http://ec.europa.eu/archives/bepa/european-group-ethics/welcome/secretariat/index_en.htm). A new EGE website is currently under construction.

### 3. Scientific advice to policy making: existing models within the EU and internationally.

Both within the EU<sup>14</sup> and internationally, there are many different models and structures of scientific advice to national governments and international bodies<sup>15</sup>. Their differences reflect distinct political cultures and traditions of decision-making.<sup>16</sup> The degree to which these kinds of structures are formalised can differ substantially between countries.<sup>17</sup>

Most countries make use of Advisory Councils or Committees, National Academies of Science or a combination of the two. Another model, first instigated in the US and subsequently adopted in the UK, Australia and New Zealand is to appoint single persons as a Chief Scientific Advisors (CSA).

In practice, almost all countries make use of a combination of different bodies and approaches. For example, the UK does not rely solely on a single Chief Scientific Advisor and has a network of departmental CSAs work together under the leadership of the Government CSA to support each other and to address and advise on cross-cutting issues. Moreover, the UK Science Advice system also comprises a high level Advisory Committee on Science and Technology and receives advice from the Royal Society and other academies. In the case of Germany, there is no Chief Scientific Advisor and scientific advice is provided through a combination of advisory councils, advisory committees and the national academy.

Looking across all 28 Member States the common thread is the role of the national academies. Such academies exist in all Member States and typically play a particularly important role in providing scientific evidence in support of national policy making. Up until now, there has been no structured approach by the Commission to make use of the expertise of national academies or other Member State advisory bodies to provide advice on EU level policies.

Within this diversity, the following models are the most common, and are used both individually and in different combinations.<sup>18</sup>

#### Advisory Councils

Many countries have a high-level council or board for science (or science and innovation) policy. Advisory council members typically include senior scientists and representatives of industry, higher education and civil society. Members are generally appointed (for instance, by the relevant government ministry) rather than selected by another method such as open competition. Examples include Japan's Council for Science, Technology and Innovation (CSTI)<sup>19</sup>, the US President's Council of Advisors on Science and Technology (PCAST)<sup>20</sup>, and

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<sup>14</sup> In this note, we focus specifically on scientific advice to the European Commission. In addition, the European Parliament is seeking out expert, independent assessments of the various scientific or technological options through its Science and Technology Options Assessment unit (<http://www.europarl.europa.eu/stoa/cms/home/about>) and its Directorate-General for Parliamentary Research Services <http://www.europarl.europa.eu/aboutparliament/en/000f81b2e3/European-Parliamentary-Research-Service.html>.

<sup>15</sup> More details in annex 7.2.

<sup>16</sup> Peter Gluckman, The art of science advice to government, *Nature*, 13 March 2013.

<sup>17</sup> [http://ec.europa.eu/research/science-society/pdf/advice\\_final\\_report\\_en.pdf](http://ec.europa.eu/research/science-society/pdf/advice_final_report_en.pdf)

<sup>18</sup> Wilsdon, J., Allen, K. & Paulavets, K. (2014) Science Advice to Governments: Diverse Systems, Common Challenges - Briefing paper for the 'Science Advice to Governments' Conference, Auckland, New Zealand, August 2014. ICSU/Office of the NZ PM's Chief Science Advisor.

<sup>19</sup> <http://www8.cao.go.jp/cstp/english/index.html>

<sup>20</sup> <http://www.whitehouse.gov/administration/eop/ostp/pcast>

the United Nations' Scientific Advisory Board (SAB) that provides advice to the UN Secretary-General and the Executive Heads of UN organisations.

### Advisory committees

Many EU Member States (e.g. Finland, Denmark, Portugal and Greece) rely on a wide array of specialised scientific and expert committees, able to address detailed technical and regulatory issues in areas such as health, environment or food safety. The US, the UK and Japan also have many such committees and, as shown in the previous chapter, the Commission often uses this type of external expertise, depending on the policy area in question.

The advantage of using advisory committees and advisory councils is that it is possible to hear the views and opinions of many experts. The challenge is to ensure that all relevant stakeholders have a chance to contribute.

### National academies, learned societies and international networks

A growing number of national academies are active in science policy, and in countries including Canada, China, Germany<sup>21</sup>, Hungary, Austria, the Netherlands, South Africa, the US and the UK, academies are an important source of scientific advice. Networks of national academies, such as the International Council for Science<sup>22</sup>, with a membership of 121 national bodies, and the InterAcademy Panel<sup>23</sup>, a global network of science academies from over a hundred countries, are actively involved at the international level in science for policy-making.

There are a number of networks at European level that bring together national academies and learned societies. These include the European Academies' Science Advisory Council (EASAC), the European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE), the federation of All European Academies (ALLEA), the Federation of European Academies of Medicine (FEAM) and the Academia Europaea. Information about the activities of these networks is provided in the Annex.

### Chief scientific advisors

The first Presidential science advisor in the US<sup>24</sup> was appointed in 1957, followed in 1964 by the appointment of the first Government Chief Scientific Adviser (CSA) in the UK<sup>25</sup>. More recently the UK has developed a more extensive network of Chief Scientific Advisors across many Government departments, in the US the Presidential science advisor plays an important role but the system could be categorised as more decentralised with several sources of input. Chief Scientific Advisors have also been appointed in Australia, Cuba, Czech Republic, India, Ireland, Malaysia and New Zealand.

In order to strengthen and systematise scientific advisory processes, various sets of principles and guidelines have been produced by different national systems – from government directives to the codes of national academies. Well-known examples<sup>26</sup> include

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<sup>21</sup> In Germany, Chancellor Angela Merkel designated a science academy (the Leopoldina) to lead in science policy advice, along with several issue-specific advisory committees.

<sup>22</sup> <http://www.icsu.org/>

<sup>23</sup> <http://www.interacademies.net/Academies.aspx>

<sup>24</sup> <http://www.whitehouse.gov/administration/eop/ostp/about/leadershipstaff/director>

<sup>25</sup> Since 2002, additional scientific advisors have been added gradually in the UK, and there is now one in almost every government department.

<sup>26</sup> by Sir Peter Gluckman in *Nature*, op. cit.

the UK CSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making, first produced in 1997 and subsequently revised; and the Code of Conduct for Scientists published in 2013 by the Council for Science Technology and Innovation of Japan, which draws a clear distinction between brokerage and advocacy, and the list of 'ten principles' for effective scientific advice, published.

As the Chief Science Advisor to the New Zealand Prime Minister, Sir Peter Gluckman points out, the use of advisers, advisory councils or academies does not have to be mutually exclusive<sup>27</sup>, but can be combined to provide for a scientific advice system that is suitable for different purposes<sup>28</sup>. For example, in crises one-to-one relations between scientific advisers and senior members of government and based on mutual trust are essential. By contrast, for complex and chronic or long-term issues, advisory committees or academies have a crucial part to play.

Therefore, as can be seen in the following table<sup>29</sup>, many governments, in line with the political culture of their country, rely on **a combination of two or more of these models** to create a hybrid model of supply of expertise to assist policy-making.

*An overview of selected national science advisory systems*

	AU	CD	FI	F	D	JP	KO	NL	PL	PT	ES	S	UK	US	UN
<b>Advisory council(s)</b>	■	■			■	■	■	■	■	■	■	■		■	
<b>Advisory committee(s)</b>			■	■	■			■		■		■	■	■	■
<b>National academies</b>		■		■	■								■	■	
<b>Chief scientific advisor(s)</b>	■												■	■	

<sup>27</sup>

[http://www.nature.com/polopoly\\_fs/1.14838!/menu/main/topColumns/topLeftColumn/pdf/507163a.pdf](http://www.nature.com/polopoly_fs/1.14838!/menu/main/topColumns/topLeftColumn/pdf/507163a.pdf)

<sup>28</sup> Scientific advice to policy - depending on the context – usually includes different layers of advisory services, from advocating the need to back up policy initiatives with scientific evidence, to providing in-depth scientific analysis at a more technical level.

<sup>29</sup> For a more comprehensive analysis, refer to the annex. The information provided has been compiled from Wilsdon, J., Allen, K. & Paulavets, K. (2014), "Science Advice to Governments: Diverse Systems, Common Challenges" - Briefing paper for the 'Science Advice to Governments' Conference, Auckland, New Zealand, ICSU/Office of the NZ PM's Chief Science Advisor, August 2014, "Science Advisory Systems in International Governments 2013", (unpublished working paper by UK Govt Office for Science), as well as various other sources. The table and overview do only provide an impression of the different systems available, and are not exhaustive. Scientific advice to policy is complex and rapidly evolving and therefore the present document may in some cases not accurately reflect the latest status.

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Australia	Scientific advice is provided either through in-house capability (science expertise and agencies embedded within departments), commissioned research (science procured through grants or other contracts), advisory bodies (committees, expert groups, review panels and other bodies), or consultations, submissions and written reports (particular to the programme, policy and regulatory needs and expertise of each government department and agency).
Canada	Demands for scientific advice come mostly from science-based departments and agencies (SBDAs). Scientific experts, working within SBDAs and their research centres, provide advice to policy decision-makers. SBDAs also seek advice from external independent experts for reviewing science performance, funding programmes and policy.
Finland	The Research and Innovation Council, chaired by the Prime Minister, advises the Government and its Ministries in important matters concerning research, technology, innovation and their utilisation and evaluation. The Council is responsible for the strategic development and coordination of Finnish science and technology policy as well as of the national innovation system as a whole. Some ministries have set up temporary committees to bring in scientific knowledge. Institutional support is given by a number of state research institutes which function under the guidance and financing of ministries.
France	The Conseil stratégique de la recherche (CSR) defines the main lines of the strategic agenda, France Europe 2020, for research, transfer and innovation. The CSR includes French and international top-level scientists and experts as well as experts from the politics, society and the economy.
Germany	The Leopoldina – the German National Academy of Sciences – delivers scientific advice on social and political questions, using interdisciplinary groups of experts to publish policy-guiding statements on issues of current interest. It also releases joint statements with other German, European and international academies on a bilateral basis, with partner academies, or within various international academy committees.
Japan	The Council for Science Technology and Innovation (CSTI) provides advice on science, technology and innovation policy. Chaired by the Prime Minister, and composed of relevant ministers and executive members from academia and industry, the CSTI acts as 'headquarters' of STI policy. It has three main functions: the formulation of comprehensive STI policy, the formulation of resources allocation policy, and the evaluation of important R&D projects. As a decision-making body, the CSTI distinguishes itself from advisory councils and expert panels of relevant ministries, which usually have only an advisory role.
Netherlands	There are several government advisory bodies on science policy, including the Advisory council for science, technology and innovation (AWTI), the Royal Netherlands Academy of Arts and Sciences (KNAW) and departmental Knowledge Forums. The Advisory council for science, technology and innovation (AWTI) is an independent body that advises the government and

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	<p>parliament on policy relating to scientific research, technology development and innovation. The Royal Netherlands Academy of Arts and Sciences has long performed a government advisory role. This statutory duty is laid down in the Higher Education and Research Act, which states that it is the duty of the Academy to advise the government, on request or on its own initiative, on matters relating to the pursuit of science.</p> <p>After some debate on the research and advisory role in government, several years ago almost all ministries established a Knowledge Forum, designed to strengthen interaction between senior civil servants and research institutions. Other institutions may advise on issues related to the knowledge-based economy, as part of their regular duties.</p>
Poland	Research and innovation policy is the political responsibility of the national government. The Prime Minister and the Council of Ministers have to set strategic priorities, define general policy goals and propose the distribution of the budget. In January 2005, a Science and Technology Development Council was organised to serve as a strategic advisory body for the Council of Ministers in matters of scientific and technological progress.
Portugal	The main advisory body for research policy is the National Council for Science and Technology, composed of representatives of the leading personalities of the research system and headed by the Prime Minister. The core of the Scientific Advice System in Portugal is a network of Governmental Laboratories (Laboratórios do Estado) and of the more recently created Associated Laboratories. This network of Laboratories covers practically all the sectorial areas. This is a consolidated system and these Laboratories have established a reputation of excellence (for example the National Laboratory of Civil Engineering established in 1946 and the National Institute of Health Ricardo Jorge established in 1899). National Academies (Academia das Ciências de Lisboa and Academia da Engenharia) and Professional Organisations (for example, Ordem dos Engenheiros) are often called to be part of the science advice system. Several Ministries have specialised advisory bodies.
Spain	Scientific advice is not included as such in any specific body within the governmental structures. Policies and other issues for which scientific advice may be relevant are informed in a flexible way on an ad-hoc basis through the national scientific competent bodies which include public research bodies embedded within the State Secretariat for Research, Development and Innovation. Depending on the specific need for scientific advice, the corresponding bodies are consulted including also regional bodies and other ministerial departments. Universities and academies are consulted also on the basis of their academic and research expertise or domain of specialization.
Sweden	The Swedish system gives quite wide opportunities to scientific advice, primarily through the committee system whose major function is to provide the policy formulation process with knowledge. Usually it is the minister, on behalf of the cabinet, who appoints a committee or a person (often a politician or a senior public servant) to investigate a certain issue. The committee can be composed of representatives of interest groups and political parties of the parliament, but also of experts from agencies or research organisations. Public agencies such as VINNOVA and the Swedish Agency for Growth Policy Analysis (Growth Analysis) are also important structures for scientific advice, but there are few permanent bodies that explicitly deal with scientific advice. The Swedish Research Council, whose remit lies in allocating funds, making links in academia, promoting interdisciplinary research and also provide information

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	and knowledge so that research is part of the solution to social challenges.
South Korea	The Presidential Advisory Council on Science & Technology (PACST) provides scientific expertise related to inquiries of the President regarding science and technology development strategies and principal policies, information and human resources as well as to encourage innovation. It also provides advice on institutional improvement in the field of S&T and on S&T policy issues.
United Kingdom	The Government Chief Scientific Adviser (GCSA) provides scientific advice to the UK Prime Minister and members of Cabinet, advice on aspects of policy on science, engineering and technology, and ensures that effective systems are in place within government for managing and using science. This often requires the GCSA to consult departmental Chief Scientific Advisers (CSAs) and other experts in relevant fields. Most government departments have a CSA which can provide advice to the relevant Minister and policy officials. Government departments draw on analysis and expertise from a wide range of sources, each involving a different level of prescription to ensure that the relevant evidence is available.
United States	Science advice in the United States is handled by a variety of different agencies, departments, and appointed bodies. The Director of the Office of Science and Technology Policy (OSTP) is assistant to the President for Science and Technology. He co-chairs the President's Council of Advisers on Science and Technology (PCAST), which advises the President and the Executive Office of the President directly, and is made up of the nation's leading scientists and engineers, making policy recommendations in the many areas where understanding of science, technology and innovation is required. A number of other relevant scientific coordinating and advisory bodies, including the National Science and Technology Council (NSTC), the National Science Board and the National Research Council, as well as a disaster response mechanism, complete the US science advisory system.
UN	The Scientific Advisory Board (SAB) provides advice to the UN Secretary-General and the Executive Heads of UN organisations, to influence and shape action by the international community to advance sustainable development and eradicate poverty. It is entrusted with ensuring that up-to-date and rigorous science is appropriately reflected in high-level policy discussions within the UN system, offering recommendations on priorities related to science for sustainable development that should be supported or encouraged; providing advice on up-to-date scientific issues relevant to sustainable development, identifying knowledge gaps that could be addressed outside the UN system by national or international research programmes, identifying specific needs that could be addressed by on-going assessments, and advising on issues related to the public visibility and understanding of science.

As the EU is a unique construction with a distinct political culture (taking into account its diversity, its complex governance system and the subsidiarity of its decision-making procedures), none of the aforementioned existing models can be fully adapted to the specific framework and political culture of the European Union and its institutions<sup>30</sup>. The EU model needs to address the challenges that all scientific advice faces in order to be successful but also to take into account the framework in which the EC operates. This will be further

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<sup>30</sup> The wide variety of existing national models within the EU also underline the usefulness and added value of an EU network and a European science advisory mechanism.

illustrated in the following chapter, where a mechanism for scientific advice to policymaking is proposed, which is adapted to the needs of the EU.

## 4. Requirement for scientific advice to policy making in the EC

### 4.1. General Requirements of Scientific Advice Systems

Based on the experiences of national models of scientific advice and the ongoing discussions on what such models should deliver, a number of general criteria for successful scientific advice are emerging<sup>31</sup>.

A fundamental requirement is the **independence and autonomy** of scientific advice, which must be developed and delivered independently of any political or economic influence. Scientific advice must be provided directly and uncensored to the head of the executive government or the head of the relevant department. At the same time, any scientific advisory system should acknowledge the gap between the provision and assessment of scientific evidence and the final policy decision on the course of action. While scientific advisers should have 'political acumen', they should not be 'political persons'. This also means that the governments should tap into scientific evidence from outside its departments.

Any scientific adviser should seek **objectivity** and act as an 'honest broker of knowledge'. According to this concept, as described by Roger Pielke<sup>32</sup>, the role of a scientific adviser should be to elucidate what is known and what is not known about a certain issue and to explain what the data and scientific findings say about the implications of various policy decisions. In performing this function any scientific advice system should reach out to the scientific community for the appropriate expertise, and help scientists to enact their social responsibility by making their knowledge accessible and understandable. The concept of the 'honest broker of knowledge' was further widened at the conference 'Science Advice to Governments' to include the acknowledgement that the production of evidence itself is not value-free and that inherent biases and limitations result from how we frame questions and seek knowledge in the first place<sup>31</sup>.

Another emerging criterion is the concept of **humility**, which acknowledges the inherent limits and biases of science and appropriately frames uncertainty. Scientific advisers should not pretend to be experts on everything. Instead they should be aware of what is currently discussed and put forward by the scientific community.

Any system to provide direct advice to decision-makers needs to be balanced with public **accountability and transparency** in its processes, which is essential for preserving trust in the scientific advice system. Both the advice sought by the policy-makers and the advice provided to them should be publicly available. The source or author of the advice provided as well as the extent to which it is taken into account should be made public. The **trust** of the public, the media, policy-makers, politicians and the science community is of key importance.

Engaging the acceptance of the final political decision will also be more likely when different stakeholders outside the scientific community have been involved in the discussions in an effective and sustained way. However, while scientific advisers should seek **discussion** with the scientific community and the general public on the evidence-based implications of different policy options, there should be a clear distinction between elucidating the scientific evidence and advocating any particular option.

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<sup>31</sup> The following overview, is largely based on the synthesis report of the first conference 'Science Advice to Governments', which took place on August 28-29, 2014 [http://www.pmcra.org.nz/wp-content/uploads/Synthesis-Report\\_Science-Advice-to-Governments\\_August-2014.pdf](http://www.pmcra.org.nz/wp-content/uploads/Synthesis-Report_Science-Advice-to-Governments_August-2014.pdf)

<sup>32</sup> R. Pielke Jr., 2009: *The Honest Broker – making Sense of Science in Policy and Politics*

The questions for which advice is most often sought tend to cut across different portfolios. As a consequence any scientific advice system should ensure **interdisciplinarity**.

As the UK Government Chief Scientific Adviser, Sir Mark Walport, has said that <sup>33</sup> “the need for scientists and policymakers to work together around the world has never been greater”. Issues with international impact such as climate change, energy, epidemics or natural disasters require evidence gathering, consensus building and action at international level. As our societies and economies and, consequently, our security, health and well-being become more and more globalised and interdependent, science advice also has to become an important component of diplomacy and international relations.

#### **4.2. The Specific Needs of a European science advice mechanism for policy-making**

Chapter 3 described the four main models of scientific advice in Europe and worldwide. They all have their specific strengths which make them particularly appropriate for different purposes.

What works in one or more countries may not necessarily be appropriate for the European Commission, with its Europe-wide scope. In the establishment of a scientific advisory model at European level national and cultural perspectives and traditions on governance and the provision of scientific advice will have to be openly considered, recognizing the **diversity** of providing scientific advice in European Member States and the principle of subsidiarity in EU policy making<sup>34</sup>. Science advice should be embedded at all levels of the European policymaking process and coordinated across the Commission. The appropriate mechanism for the EC should be able to bring together expertise available in all EU Member States reflecting and benefiting from the great diversity of scientific communities across Europe<sup>35</sup>. At the same time, the aspect of public trust in the advisory system requires that the advisers are recognized throughout Europe. In a Europe where public debates are still largely conducted at the national level, it is particularly difficult to identify any single person which would enjoy equal level of trust and public recognitions throughout the Union.

In this particular context, it seems more appropriate that scientific advice should come through a group of independent scientific advisers rather than any single person. In order to make sure the advice is as European in scope as possible, integrating science, technology, economy, sociology and governance, the advice mechanism should make use as much as possible of the federating organizations of European scientists, in this case the European-level networks of academies. These European federations of academies are playing an increasingly constructive role in interconnecting the debates taking place in different national contexts and the joint formulation of advice for policy making at European level. They should therefore be a key source of evidence to be fed into the European policy making system through a high-level group of scientific advisers in their role of “honest broker”. The academies, through their extended membership, are in turn in close contact with the scientific debates taking place at the level of other scientific organizations that are increasingly active at the European level.

The European mechanism for scientific advice should also rely on **independent** advice external to the Commission, and which should be separated from the Commission's in-house scientific capabilities. It should match the needs for advice in a timely and **efficient** manner. In order to ensure the policy relevance and uptake of the scientific evidence, the

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<sup>33</sup> The Guardian 27 Aug 2014, <http://www.theguardian.com/science/political-science/2014/aug/27/ambassadors-for-evidence-scientific-advice-science-policy>

<sup>34</sup> R. A. Pielke, Jr.: Pielke's Perspective: The Future of Science Advice in Europe; Bridges vol. 42, December 2014 <http://ostiaustria.org/bridges-magazine/item/8316-pielkes-perspective>

<sup>35</sup> The creation of a European network of National Science Advisors by Prof. Anne Glover, the EC Chief Scientific Advisor, in June 2014, is a first step in this direction.

advisory mechanism should act in full **transparency** close to the policy-makers at the highest level. This would allow on the one hand for the broader needs identified by the policy-makers to be directly addressed by the advice mechanism (top-down), and on the other hand for issues that are identified by the scientific world to be brought to the attention of the decision-takers (bottom-up).

The SAM should be flexible enough to react *ad hoc* to emerging issues insofar as they are not yet covered by the existing specific advisory mechanisms, which would also be facilitated by the closeness to the decision-makers. Moreover, the SAM should also enable the Commission to further develop and strengthen the scientific evidence base in support of evaluation and impact assessment reports related to its future initiatives with significant economic, social or environmental impacts.

As summarised by OECD in its latest report,<sup>36</sup> “scientific advice can play an invaluable role in short- and long-term risk assessment for unexpected crisis situations. It can also be essential in informing effective risk management strategies during such crises. When a rare crisis event occurs, which may have impact at regional or global scale, emergency response systems, science advisory structures and policy makers can be confronted with novel complex and rapidly changing challenges. The distinction between advisory and decision making functions can become blurred, as multiple responses and actions are required within very short time-scales. In such circumstances, existing advisory processes are usually neither entirely appropriate nor entirely adequate”. In such cases, SAM will coordinate its efforts with the existing mechanisms at EU level for crisis management, i.e. general rapid alert system ARGUS.<sup>37</sup>

For the sake of policy relevance ‘political acumen’ and a good knowledge of the policy-making and legislative procedures would be helpful. As the qualities of great scientists and great science advice practitioners are not the same, scientific merit is fundamental, but not sufficient.

The advice provided to the EC should be based on broad scientific expertise representative of the different schools of thought. Rather than replacing the existing system of advisory structures of the EC, the SAM should build on them and complement the usually very specialised (standing committees, expert groups, advisory groups – see chapter 2) or in house (Joint Research Centre, see chapter 2) expertise where necessary with cross-cutting and external advice. The SAM should also be able to activate the existing European-wide scientific knowledge base already in place by harnessing and integrating evidence from the European academies, as well as the larger scientific community.

To allow for the development of synergies among the various sources of scientific evidence across different domains, the SAM should be of **multidisciplinary** nature. The advisory function should therefore not be concentrated in one single person with specialised expertise but rather be performed by a committee structure with several independent top experts covering a broad area of expertise and making use of the knowledge present in the European scientific community at large.

Having (a group of) highly recognised independent scientific advisers would also increase the public visibility of the SAM. These scientific advisers could also act as the EU contact persons for the involvement of the SAM in a **global** network of science advice. As a consequence, the scope of the SAM will be to match the mid to long term demand of the EC for scientific advice and evidence with the best available European scientific evidence as well as offering pro-actively or on-demand advice on short term emerging policy issues in need of scientific evidence, not offered by the existing in house advisory structures.

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<sup>36</sup> [http://www.oecd-ilibrary.org/science-and-technology/scientific-advice-for-policy-making\\_5js33l1jcpwb-en](http://www.oecd-ilibrary.org/science-and-technology/scientific-advice-for-policy-making_5js33l1jcpwb-en)

<sup>37</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0662:FIN:EN:PDF>

## 5. The Science Advice Mechanism in European Commission policy making

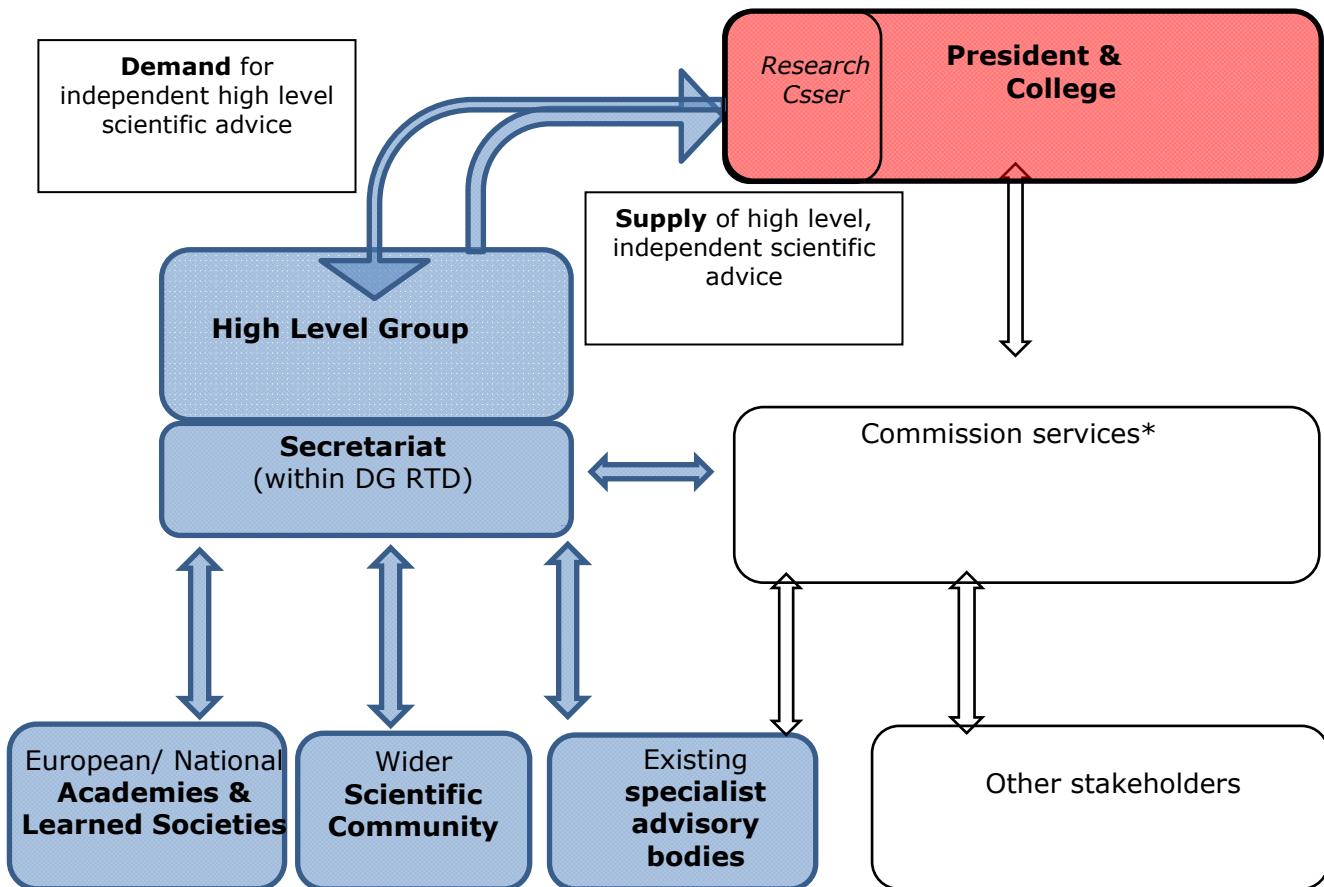
From the analysis of the different models of scientific advice around the world, and taking into account the specific conditions and also the new ways under which the European Commission works, it is proposed to set up a Science Advice Mechanism (SAM).

The mechanism will be independent and ensure scientific integrity; it should be interdisciplinary in order to better address the diversity and complexity of issues faced in the policy making process of the European Commission. It is proposed as the optimal model to ensure that the demand of scientific advice and the supply of such advice are efficient, effective, independent and transparent.

The SAM will be composed of:

- a **high-level group of independent scientists**, convened regularly in agreement with the Commissioner for Research, Science and Innovation,
- a permanent **secretariat**, provided by DG RTD, that ensures a structured and effective liaison between demand and supply of scientific advice, and
- a **strengthened relationship** with existing advisory bodies at EU and national level, and with the wider scientific community.

The mechanism is illustrated in the following graphic.



\* Including the Joint Research Centre which provides in-house scientific support

## 5.1. Identification of issues and provision of advice

The SAM will complement the existing processes of Commission policy making (stakeholder consultations, impact assessments, etc) and the existing sources of scientific advice (in-house, outsourced, specialist advisory bodies). The added value will be to focus on policy issues where there are important scientific questions at stake, where there may be divergences of scientific opinion, or where scientific evidence from across a range of different disciplines needs to be brought together.

The identification of issues can come from the College of Commissioners, relayed through the Commissioner for Research, Science and Innovation, as well as from the High Level Group. The SAM should be able to provide advice on short, medium and long term issues, e.g.:

- Short term in order to advise on urgent issues that arise in the course of the policy making process.

- Medium term in order to advise on issues foreseen on the Commission work programme/ agenda planning.
- Long term in order to advise on new or emerging issues that may require future policy attention.

The SAM should seek out relevant scientific advice, evidence and opinions that already exist on the issues it is addressing, including the European and national academies and learned societies, the existing specialised advisory bodies and the wider scientific community. Where relevant advice has not been developed within the academies, learned societies or specialised advisory bodies, the SAM would work with these bodies and the wider scientific community in order to develop advice based on the best available scientific evidence. The Commission would support the European academies to organise a collaborative effort among national academies and learned societies for this purpose, while respecting their autonomy. Where needed, the SAM should be able to draw directly on individual scientists for their opinions.

The SAM provides advice directly to the Commissioner for Research, Science and Innovation, who, as a member of the College, shares the political responsibility to ensure that the best available relevant evidence and advice from the scientific community is brought into the policy making process of the Commission.

## **5.2. The High-Level Group of independent scientists**

The high-level group (HLG) will ensure the independence and scientific integrity of the advice provided to the Commission, supported by a secretariat. The panel should be of limited size with high level expertise covering different fields. Members would not be full time and they would not be employed by the Commission. Rather, they would maintain their positions as independent scientists and be reimbursed for a set number of days per year for regular meetings in Brussels and for remote work. The members of the HLG will be expected to serve in their personal capacity and not as representatives of their respective countries or institutions. They are therefore expected to offer their advice on a strictly independent basis.

The HLG will meet several times a year to provide advice on the issues identified and to help identify new issues. The HLG can also be convened to provide specific scientific advice on any emerging issue that it considers should be brought to the attention of the Commission, and provide views on specific scientific questions where urgent advice is needed. The HLG will rely on the support of the secretariat to prepare their meetings and ensure the follow-up of their deliberations.

The HLG will operate in a collegial way, seeking consensus among its members. SAM opinions and advice will be transmitted directly to the Commissioner for Research, Science and Innovation. Members retain their individual liberty to speak but will make a clear distinction between the opinion of the SAM and any opinion expressed in their personal capacity. In their function as SAM HLG members will refrain from advocating any particular political action or agenda.

The HLG will not try to centralise or supersede the work of the large number of well-functioning advisory committees or the activities of the Joint Research Centre that provide specialised advice to individual Commission needs. Instead, the HLG will aim to get a synthetic overview of the main items of advice formulated by these committees and identify areas where the debate should possibly be widened to take into account input from a wider part of the scientific community.

Whenever the college of Commissioners sees the need for a more in-depth advice in a particular policy field, SAM could offer advice on how to best activate the scientific community or the relevant advisory committees around these questions.

### **5.3. The Secretariat**

The secretariat will be housed within DG Research and Innovation of the European Commission. Its role will be to support the meetings of the HLG, to ensure the follow-up of its decisions, and to ensure the flow of information between the HLG and Commission services, including the Joint Research Centre, other internal advisory boards, the European academies, and other specific and relevant organisations in the scientific world. The Secretariat will help the HLG in identifying at a sufficiently early stage of the policy making process the demands and needs in terms of scientific advice across Commissioners portfolios and Commission services, taking into account the Commission Work Programme.

The Secretariat will support the HLG in reaching out to other scientific organisations that should be involved in the debate, allowing them to prepare and submit relevant evidence and formulate advice in a timely fashion. The Secretariat will also support the HLG in the scrutiny of the main debates taking place in the academic community, in particular at the level of academies or other scientific organisations, in order to identify issues that have implications for policy making at the European level. It will also keep in close contact with the European academies' networks in order to coordinate the delivery of advice from the academies.

The secretariat will ensure a close collaboration with other parts of DG Research and Innovation, the Joint Research Centre, the European Political Strategy Centre and other DGs of the Commission in charge of the various thematic policy dossiers and of the respective existing specialist scientific advisory bodies.

Where appropriate, the Secretariat will participate in the organisation of studies, workshops, conferences and other activities that fall within the remit of the SAM.

### **5.4. The Academies and Learned Societies, existing advisory bodies, and the wider scientific community**

The European and National Academies and Learned Societies will enable the Commission to benefit from the wealth of expertise that exists within Member States. Not only would this avoid duplication of effort, but it would also help build legitimacy of the advice provided to the Commission. Moreover, this approach set up new structures and instead will tap into the richness of the European science eco-system, via the EU wide networks of academies (EASAC, Euro-CASE, ALLEA, FEAM, Academia Europaea – see annex for a description).

These networks are already well developed and therefore a natural partner to animate the debates and synthesise the advice of the wider scientific community. The SAM would become a strategic partner of the academies, helping them to be informed at an early stage about the advice that the European Commission needs in support of future policy initiatives. In the opposite direction, the SAM will also take up the advice or issues to be advised on, the academies can forward at any time they judge useful. In doing so, a bottom up and fully independent system is put in place. The SAM will in this way benefit from the increasingly active role played by the European networks of academies in organising the European-wide debate within the scientific community.

A European network of National Science Advisors was initiated in June 2014 by the then Chief Scientific Advisors to the European Commission President, and this network should be taken forward in the new setting.

Most of the challenges that Europe is facing cannot be dealt with in isolation. The global dimension of science is growing mainly because many of these challenges can only be addressed by a concerted effort among all the regions of the world. Climate change, pollution, diseases or natural resources depletion are just a few examples of the need to find

global solutions. Both the European scientific community and the European Commission play key roles in these international efforts.

In close collaboration with the respective Commission services, the SAM will develop the adequate channels to make sure that the scientific evidence produced through the relevant international efforts will inform EU policy-making. Examples of international efforts would include: the OECD Global Science Forum, the Intergovernmental Panel on Climate Change (IPCC); the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA), World Health Organisation activities, and the Future Earth platform.

### **5.5. Implementation of the SAM**

A key step in the implementation of the SAM will be the appointment of the members of the High Level Group. The HLG members will be appointed on the basis of their scientific excellence. Furthermore, the members should have a strong familiarity and experience in providing scientific advice for policy making processes at national or EU level and previous expertise. The composition of the HLG will respect gender balance.

The identification process would be expected to include consultation with the main representative organisations of the various sectors of the research community at European level<sup>38</sup> as well as allowing suggestions from other representative organisations. Self-nominations will not be considered. The use of external expertise, building on the experience in establishing the ERC Scientific Council, will be considered. The members of the HLG would be formally appointed for a limited term.

The secretariat will be set up and managed within DG Research and Innovation. It would have a staff with expertise across different areas and for the organisation and support of the meetings of the HLG and for commissioning any additional dedicated studies, workshops or conferences. Further resources would also be made available through the Horizon2020 programme to European-level networks of academies and other key organizations to help them expand their activities as a strategic partner of SAM.

The Science Advice Mechanism should be operational by Autumn 2015. An indicative timetable for the establishment of the High Level Group is:

- May 2015 : identification process starts
- September 2015 : appointment of high level group members
- September 2015: financial provisions to support the mechanism (Horizon 2020 work programme)
- October 2015 : first meeting of high level group

### **5.6. Conclusion**

The Science Advice Mechanism will be independent, and act as an interdisciplinary body to address the diversity and complexity of issues faced in the policy making process of the European Commission. It is designed to be the optimal model to ensure that the demand of scientific advice and the supply of such advice are efficient, effective, independent and transparent.

The SAM will complement existing processes of Commission policy making and the already available sources of scientific advice. It will focus on policy issues where important scientific

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<sup>38</sup> SCIENCE EUROPE, Euro-CASE, ESF, EUA, EASAC, ALLEA, FEAM, Academia Europaea, EARTO and EIRMA.

questions are at stake, where there may be divergent scientific opinions, or where scientific evidence from across a range of different disciplines needs to be brought together.

In close collaboration with the Commission services, the SAM will develop adequate channels to make sure that scientific evidence produced through relevant international efforts will inform EU policy-making. As such, the SAM will aim at getting the broadest possible scientific evidence on planned policy initiatives, and should at the same time provide a direct link with the scientific community to develop responses to emerging issues.

Working for the highest political decision making levels of the Commission, it should contribute to a greater transparency of the policy-making process at European level and facilitate the exchange of ideas with the scientific community.

## **Annexes**

### **A. References - Selected sources**

#### **Articles**

Gluckman Peter, The art of science advice to government, *Nature*, 13 March 2014

The use of advisers, advisory councils or academies need not be mutually exclusive. Different approaches suit different purposes and are the product of a country's culture, history, political and social structures and approaches to civic reason. Achieving the culture change that encourages the better use of scientifically derived evidence in government relies on a level of trust that may be best achieved by one-to-one relationships with senior members of the executive government. In crises, such relationships are essential. By contrast, for complex and chronic issues, advisory committees or academies have a crucial part to play.

<http://www.nature.com/news/policy-the-art-of-science-advice-to-government-1.14838>

Hirakawa Hideyuki, Paradigm Shift in Scientific Advice, *Japan Policy Forum*, February 2014

'Scientific advice' which provides the government, corporations and individuals with useful technical information, knowledge and judgments on the policy issues related to science and technology, such as 'risk' issues in food safety, emerging infectious diseases, climate change, earthquakes, nuclear power and cyber security, and as promotion of science, technology and innovation, is expected to play an increasingly vital role in contemporary society.

<http://www.japanpolicyforum.jp/en/backnumber/no23/pt20141218134854.html>

Omi Koji, Constructing a Global Science Forum, *Science & Diplomacy*, December 2014

The rapid progress of science and technology in the twentieth century delivered economic growth and enriched our quality of life. However, it has also created unforeseen problems, such as environmental, bioethical, and security concerns. These are the "lights" and "shadows" of science and technology. The 21<sup>st</sup> century is the first time in history when the world, through digital technology, has become truly interconnected. More than ever, science and technology issues are social issues as well. They cannot be solved by scientists alone, or by any single country. Science and technology presents global challenges and opportunities that need to be addressed by stakeholders across disciplines and national borders.

<http://www.sciencediplomacy.org/letter-field/2014/constructing-global-science-forum>

Pielke Roger, The Future of Science Advice in Europe, *Bridges*, December 2014

Leadership should come from professional scientific societies, including national science academies. By organizing a high-profile discussion of architectures for the future of science advice in Europe, such bodies might assume the role of an "honest broker" helping to clarify or even expand alternative ways forward. They can also help to play a role that they mostly ignored over the past three years. The termination of the Commission's CSA represents an important opportunity for the scientific community.

<http://blogs.lse.ac.uk/impactofsocialsciences/files/2015/01/esa.jpg>

Sato Yasushi, Koi Hirokazu and Arimoto Tateo, Building the Foundations for Scientific Advice in the International Context, *Science & Diplomacy*, September 2014

Because the contemporary world is facing a variety of issues—climate change, energy crises, food security, epidemics—in which science, technology, and society are tightly intertwined, today's global society has an unprecedented need for proper and reliable scientific advice. To address these issues, appropriate mechanisms that bridge science and policy making must be established. At the same time, the globalization of the political economy has changed the modality of national borders in every aspect. As a result of these changes, scientific enterprise, socioeconomic activities and public policies may have consequences on all parts of the world. Scientific advisory systems today need to effectively function not only within individual countries but also in the international context.

<http://www.sciencediplomacy.org/article/2014/building-the-foundations-for-scientific-advice-in-the-international-context>

Walport Mark, Ambassadors for Evidence, The Guardian, 27 August 2014

The need for scientists and policymakers to work together around the world has never been greater. Important issues requiring policy decisions are not constrained by national boundaries. However, the science advisory systems that help policymakers are predominantly national, matching the basic structure of democratic mandates. As our economies, our societies, our health and wellbeing become increasingly globalised, science advice needs to become much more international in its outlook.

<http://www.theguardian.com/science/political-science/2014/aug/27/ambassadors-for-evidence-scientific-advice-science-policy>

Wilsdon James, The Past, Present and Future of the Chief Scientific Advisor, EJRR, 03/2014

The author explores the evolution of the CSA role, from its origins in the US and UK, to its increasing popularity in other national and international contexts. It distils some of the lessons learned in recent years about the strengths and limitations of the CSA model, and it reflects on what the recent argument over a European Commission CSA reveals about the politics and prospects for scientific advice.

<http://sro.sussex.ac.uk/51655/>

### **Reports**

Future Directions for Scientific Advice in Europe, Edited by James Wilsdon and Robert Doubleday, this collection published in April 2014 brings together essays by policymakers, practitioners, scientists and scholars from across Europe. Their contributions outline various challenges but also constructive ways forward for scientific advice in Europe.

<http://www.csap.cam.ac.uk/projects/future-directions-scientific-advice-europe/>

Embedding up-to-date and rigorous science in high-level policy discussions within the UN system, Background paper for the inaugural conference of the Scientific Advisory Board of the UN, January 2014

This paper analyses the need to revise what the UN system does in terms of linking science to high-level policy discussions on sustainable development, given also the criticism from sectors of the scientific community. According to these critics, scientific knowledge is not adequately utilized by the UN system, both in practical detail and in conceptualizing the very process of development, non-holistic approaches to development dominating programme design and implementation, using science as a tool only, and not using science as an integrative factor that shapes the very conception of development programmes.

<http://en.unesco.org/system/files/Background%20Paper%202.pdf>

## Strengthening Evidence Based Policy Making through Scientific Advice

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Science Advice to Governments: Diverse systems, common challenges, Briefing paper for the first international conference of practitioners and scholars on Science Advice to Governments, August 2014

A brief introduction to the topics discussed at the Auckland conference, "Science Advice to Governments: Diverse systems, common challenges", held in August 2014. The first section outlines some recent developments and debates over the provision of scientific advice. The second section surveys a number of recent sources to suggest some tentative principles for scientific advice that could form the basis for further discussion at the meeting. The third section provides a reading list of key material to assist in further learning and reflection, while an annex contains draft overviews of a range of different scientific advisory systems from economies and international organisations across the globe.

[http://www.globalscienceadvice.org/wp-content/uploads/2014/08/Science\\_Advice\\_to\\_Governments\\_Briefing\\_Paper\\_25-August.pdf](http://www.globalscienceadvice.org/wp-content/uploads/2014/08/Science_Advice_to_Governments_Briefing_Paper_25-August.pdf)

Science Advice to Governments: Diverse systems, common challenges, Synthesis report for the first international conference of practitioners and scholars on Science Advice to Governments, August 2014

More governments are recognising the need for establishing science advice mechanisms, but there is little by way of shared lessons about how best to do this. The Auckland conference responds to the need for a discussion and sharing platform drawing simultaneously from practical experience and from scholarly analysis of the field, thus encouraging input into processes that have traditionally been limited to a select group of government advisers. It also highlights the commitment to building a regionally and professionally inclusive network, bringing evidence of the rapidly changing relationship between science and society, as well as the between the public and their elected officials, as mediated by science.

[http://www.pmcса.org.nz/wp-content/uploads/Synthesis-Report\\_Science-Advice-to-Governments\\_August-2014.pdf](http://www.pmcса.org.nz/wp-content/uploads/Synthesis-Report_Science-Advice-to-Governments_August-2014.pdf)

Towards a strengthened science-policy linkage, Background paper for the inaugural conference of the Scientific Advisory Board of the UN, January 2014

While the need for enhanced science-policy linkages to advance sustainable development worldwide is widely recognized, there are debates, at both the policy level and within the scientific and socio-political communities at large, about how this should be accomplished and what norms should govern such linkages. There seems to be broad agreement that the linkages should be 'stronger'. However, in practical terms, it is not well defined what exactly a 'stronger linkage' would entail: for example would it mean more involvement of science - or different involvement - or different mechanisms and modalities? In the first place, a stronger linkage necessitates a dialogue between science and policy as well as a mutual involvement while respecting the necessary autonomy of both communities. This paper focuses on practical challenges and possible avenues to strengthen the linkages between the science and policy-making communities.

[http://en.unesco.org/system/files/Background%20Paper%201\\_0.pdf](http://en.unesco.org/system/files/Background%20Paper%201_0.pdf)

UN system priorities related to science for sustainable development, Background paper for the inaugural conference of the Scientific Advisory Board of the UN, January 2014

This paper focuses on two perspectives for setting priorities related to science for sustainable development: framework conditions (are science, technology and innovation globally/nationally, adequately prepared to tackle issues of SD effectively, and if not, what could the UN system do as a priority to support or encourage change), and topics (which SD

topics should science increasingly focus on and what can the UN system do as a priority to support or encourage change).

<http://en.unesco.org/system/files/Background%20Paper%203.pdf>

Scientific Advice for Policymaking: the Role and Responsibility of Scientists, Organisation for Economic Co-operation and Development Global Science Forum Workshop, October 2013

Although science is an international enterprise, collaboration between countries (i.e. governments or advisory structures) on scientific advice has not yet been developed to its full potential. Good examples of collaboration through international science assessment structures, but there is a lack of effective coordination in many areas. Any form of institutional collaboration in an international context is always contingent on the vicissitudes of national interests, which can affect the framing of questions, the selection of experts or the provision of funding. The complexities of international bureaucracy can also hinder swift reaction in crisis situations. This changing national and international landscape provides the context for this background paper.

<http://www3.grips.ac.jp/~gist/en/events/ws20131022.html>

## B. Background information on European networks of academies

**EASAC**<sup>39</sup> - the European Academies' Science Advisory Council - is formed by the national science academies of the EU Member States to enable them to collaborate with each other in providing independent science advice to European policy-makers. It was founded in 2001 and focusses mostly on Energy, Biosciences, and Environment.

President: Jos van der Meer<sup>40</sup>

**Euro-CASE**<sup>41</sup> - The European Council of Academies of Applied Sciences, Technologies and Engineering is an independent non-profit organisation of national academies of Engineering, Applied Sciences and Technology from 22 European countries, founded in 1992. Euro-CASE acts as a permanent forum for exchange and consultation between European Institutions, Industry and Research.

Through its Member academies, Euro-CASE has access to top expertise (around 6,000 experts) and provides impartial, independent and balanced advice on technological issues with a clear European dimension to European Institutions, national Governments, companies and organisations.

The mission of Euro-CASE is to pursue, encourage and maintain excellence in the fields of engineering, applied sciences and technology, and promote their science, art and practice for the benefit of the citizens of Europe.

Chairman: Reinhard Hüttl<sup>42</sup>

**ALLEA**<sup>43</sup>, the federation of All European Academies, was founded in 1994 and currently brings together 58 Academies in more than 40 countries from the Council of Europe region. Member Academies operate as learned societies, think tanks and research performing organisations. They are self-governing communities of leaders of scholarly enquiry across all fields of the natural sciences, the social sciences and the humanities.

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<sup>39</sup> <http://www.easac.eu/>

<sup>40</sup> <http://www.easac.eu/about-easac/easac-bureau.html>

<sup>41</sup> <http://www.euro-case.org>

<sup>42</sup> <http://www.euro-case.org/index.php/about-eurocase/executive-committee.html>

<sup>43</sup> <http://www.allea.org>

Independent from political, commercial and ideological interests, ALLEA's policy work seeks to contribute to improving the framework conditions under which science and scholarship can excel. Jointly with its Member Academies, ALLEA is in a position to address the full range of structural and policy issues facing Europe in science, research and innovation. In doing so, it is guided by a common understanding of Europe bound together by historical, social and political factors as well as for scientific and economic reasons.

President: Günter Stock<sup>44</sup>

**FEAM**<sup>45</sup> – the Federation of European Academies of Medicine – its mission is to promote cooperation between national Academies of Medicine and Medical Sections of Academies of Sciences in Europe; to provide them with a platform to formulate their collective voice on matters concerning human and animal medicine, biomedical research, education, and health with a European dimension; and to extend to the European authorities the advisory role that they exercise in their own countries on those matters. FEAM was founded in 1993 and is made up of 18 national member Academies with a membership of over 5000 high level scientists from the whole biomedical spectrum

President: Dermot Kelleher<sup>46</sup>

**Academia Europaea**<sup>47</sup> - is a functioning European Academy of Humanities, Letters and Sciences, composed of individual members. Membership is by invitation on the basis of eminence of the individual in their chosen field. Members are drawn from across the whole European continent, not only western Europe. Members also include European scholars who are resident in other regions of the world. Current membership stands at around 2,800. Amongst them are fifty-two Nobel Laureates, several of whom were elected to the Academia before they received the prize.

President: Sierd Cloetingh<sup>48</sup>

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<sup>44</sup> <http://www.allea.org/Pages/ALL/4/780.bGFuZz1FTkc.html>

<sup>45</sup> <http://www.feam-site.eu/cms/>

<sup>46</sup> <http://www.feam-site.eu/cms/index.php/governance>

<sup>47</sup> <http://www.ae-info.org/>

<sup>48</sup> [http://www.ae-info.org/ae/Acad\\_Main/About\\_us/Council/Composition](http://www.ae-info.org/ae/Acad_Main/About_us/Council/Composition)