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Scientific Advisory Bodies and Climate Governance in Europe

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In recent decades, scientific advisory bodies have assumed an increasingly prominent role in shaping, assessing, and legitimizing environmental and climate policies across Europe. The urgency surrounding climate issues has engendered a heightened demand for expert knowledge to inform public action, particularly within a post-normal context characterized by uncertainties and divergent values. These organizations operate at the intersection of science, politics, and society, facilitating the structuring of climate governance to reflect the institutional cultures and social dynamics prevalent in various European nations.

From the lens of Science and Technology Studies (STS), scientific advisory committees can be conceptualized as instruments of "co-production". They exist at the confluence of scientific knowledge and political decision-making, continuously negotiating their legitimacy, authority, and influence on collective choices. Functioning as "boundary organizations", these committees bridge the gap between technical expertise and societal representation, while also striving to balance independence with the imperative to impact policy effectively.

Their ability to do so depends on how they position themselves and answer public expectations about transparency, neutrality, and participation. In some countries, strong traditions of technocratic governance encourage reliance on expert bodies with minimal public consultation. In others, pluralistic political cultures support more deliberative and participatory forms of advice.

The historical evolution, typology, and functions of scientific advisory bodies concerning climate change in Europe reflect the gradual acknowledgment of global warming as a critical issue. Several pivotal phases can be discerned since the latter half of the 20th century, often catalyzed by discussions at international conferences. It is also important to note the shifting nature of the climate issue itself – from a scientific concern about carbon concentrations, to a broad societal problem involving energy systems, land use, equity, and intergenerational justice. This expansion of scope has necessitated new advisory arrangements that integrate diverse forms of expertise, including social sciences, economics, medicine, and law.

To fully comprehend the dynamics of these scientific committees, it is essential to analyze the specific areas of expertise required for their members. While many advisory councils prioritize natural sciences, others emphasize multidisciplinarity and aim to include economists, engineers, or civil society representatives. Furthermore, attention must be directed towards mixed bodies that incorporate political representatives or members from diverse societal and economic sectors. Finally, factors such as committee size and the inclusion of technical experts who support the members warrant examination. Closely related to committee composition are the criteria governing member selection, the mechanisms employed for their appointment, and the transparency of these processes. In countries with institutionalized participatory cultures, nomination procedures are often more open and democratic (Abraham-Dukuma *et al.* 2020).

The scope of action, or mandate, conferred upon these bodies by the legislative frameworks that establish them exhibits considerable variation. The capacity of these committees to exert influence on climate policies within their respective jurisdictions is inextricably linked to this mandate. Consequently, the roles of scientific committees can be classified into several broad domains. Some councils are explicitly charged with evaluating government action and issuing binding or semi-binding recommendations. Others serve in an advisory capacity with limited direct impact but may wield influence through reputation and media engagement.

Advisory bodies can be instrumental in the policy formulation phase, where they provide information, assess potential impacts, and offer opinions and recommendations to political decision-makers, including those within government and parliament. Additionally, they can monitor and evaluate the implementation of policies by governments, as well as the progress of countries in meeting emission reduction targets established at the supranational level. These monitoring roles have become particularly significant since the adoption of net-zero targets in many EU countries, requiring governments to track long-term carbon budgets. Institutions like the French Haut Conseil pour le Climat (HCC) or Irish Climate Change Advisory Council (CCAC) publish regular evaluations with policy-specific assessments, enabling parliamentary oversight.

Moreover, advisory bodies play a vital role in fostering aggregation and inclusivity among diverse actors, stakeholders, and citizens – an essential aspect connected to the legitimacy of policies. This should encompass not only the formal mandates of these bodies but also their actual practices. A critical factor in ensuring legitimacy is external visibility, which pertains to how public communication is managed through various channels, including publications and presence in both traditional and social media.

It is apparent that the establishment of climate change advisory committees necessitates a delicate balance among competing needs and interests. These committees, instituted by political authorities to provide guidance throughout different decision-making phases, must also uphold their autonomy, exercise control over political processes, and promote transparency to the public. This balancing act is dynamic and often contested. Councils must navigate tensions between relevance and independence, immediacy and credibility, expert authority and democratic accountability. The most effective ones have developed reputational capital that allows them to criticize government action while maintaining constructive influence.

Origins and Transformations: Environment, Sustainable Development, and Climate Change

As early as the 1960s and 1970s, international ecological consciousness began to ascend, significantly catalyzed by the publication of Rachel Carson's *Silent Spring*. This pivotal period witnessed the inception of dedicated institutions for environmental protection and the recognition of the necessity for stable knowledge support in numerous European nations. Consequently, the first ministries for the environment were established, beginning with France in 1971, followed by Italy and Germany in 1986. Concurrently, the inaugural scientific advisory committees were formed, charged with the responsibility of delivering expert opinions on matters such as pollution, natural resource management, environmental health, and spatial planning.

While these bodies often maintained connections with executive power, they functioned as intermediaries between emerging environmental science and regulatory demands. During this epoch, the conceptualization of "environment" transitioned from a primarily technical issue to a political concern, underscoring the imperative for expert knowledge to navigate increasingly complex public decisions.

In the United Kingdom, the Royal Commission on Environmental Pollution (RCEP) was established in 1970, producing influential reports on waste management, energy, agriculture, and climate change. In France, the Haut Comité de l'Environnement emerged as a parallel initiative, reflecting a burgeoning commitment to integrating scientific insights into environmental governance. Similarly, Germany established the Sachverständigenrat für Umweltfragen (SRU), which remains operational to this day.

This development was followed by a heightened emphasis on sustainable development, which resulted from the Rio Conference in 1992. Sustainable development is conceptualized as a strategy that seeks to harmonize environmental protection with human welfare and economic activities. To facilitate this endeavor, a new framework of committees – the National Councils for Sustainable Development (NCSDs) – was introduced. These councils serve as instrumental entities in implementing Agenda 21, aiming to cultivate dialogue among public, private, and civic stakeholders, promote the integration of environmental, economic, and social dimensions, and facilitate the localization of global commitments (NCSD Report 1999-2000).

Within Europe, the network of European Environment and Sustainable Development Advisory Councils (EEAC) has documented the diverse array of these councils. For instance, the Conseil Fédéral du Développement Durable (CFDD-FRDO) in Belgium is characterized by its diverse and pluralistic composition, whereas the Finnish Council adopts a more institutional framework. In contrast, the German Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU) is predominantly oriented towards the provision of scientific expertise.

The birth of the Intergovernmental Panel on Climate Change (IPCC) in the late 1980s significantly heightened awareness of climate change, with accumulating evidence of its impacts solidifying over the ensuing decades. Climate change has emerged as the paramount challenge of the new millennium, frequently overshadowing broader sustainable development concerns. This evolution signifies a new paradigm for delivering scientific advice to governmental entities.

In recent years, committees have been established inspired by the IPCC, particularly following the ratification of the Paris Agreement in 2015 and the adoption of the 2030 Agenda for Sustainable Development. These state-specific committees focus predominantly on climate-related issues and often possess a more technical mandate emphasizing scientific independence. Unlike the IPCC, these national councils lack an intergovernmental dimension, rendering them more prescriptive in directing government policy. Their critical role encompasses the evaluation of legislation and actions aimed at combating climate change, a pressing obligation increasingly confronting governments.

In 2021, the European Union inaugurated the Scientific Advisory Board on Climate Change, an independent entity charged with assessing EU climate policies and advising the Commission and member states. Composed of 15 experts selected for their scientific, economic, and social expertise, the Board epitomizes the model of independent committees, playing a vital role in ensuring coherence and ambition within the EU's climate strategy. Nonetheless, various models persist, often characterized by varying focal points for intervention.

Types of Advisory Bodies and National Differences

The classification of scientific advisory bodies can be grounded in various dimensions, such as their powers, the criteria governing their composition and expertise, the degree of independence they possess, their relationships with national governments or parliaments, and the scope of their focus on

climate change and related issues.
The diverse typologies of institutions often coexist within the same national context and are shaped by the legislative frameworks established by individual states. In nations that have implemented a climate framework law, the establishment of advisory committees is frequently mandated by statute. Additionally, the governmental structure plays a critical role; in federal systems, centralizing responsibilities pertaining to climate issues and forming an effective advisory body can prove challenging. The level of independence among these bodies varies, with some being more dependent on governmental structures than others. These structural differences shape the perceived legitimacy and influence of their recommendations.

Three key categories of scientific committees can be delineated:

Independent Scientific Councils

Independent scientific climate councils are predominantly (or exclusively) constituted of experts selected for their scientific acumen and independence. These councils provide analyses, scenarios, and recommendations aimed at informing policy decisions grounded in objective criteria. A prominent example is the UK Climate Change Committee (CCC), which was established in 2008 under the Climate Change Act. The inception of the CCC represents a significant paradigm shift in the approach to climate advisory mechanisms, with various countries adopting or in the process of developing committees inspired by its structure and functions.
The CCC is a legally mandated entity with distinct responsibilities delineated by law. Its members are appointed through a transparent selection process designed to ensure independence, scientific authority, and a diversity of disciplines. The CCC proactively recommends emission reduction targets to Parliament, advises the government, monitors progress on climate-related issues, and produces annual reports to Parliament, for which the government holds accountability.

The CCC's model has influenced the design of similar institutions across Europe, playing three different functions: watchdogs of climate policies, advisors to governments, and convenors of various stakeholders (Ewans, Duwe 2021). This kind of independent institution includes the French Haut Conseil pour le Climat (HCC), the German Expertenrat für Klimafragen, the Irish Climate Change Advisory Council, the Finnish Climate Change Panel, the Dutch Wetenschappelijke Klimaatraad, and many others. Additionally, the EU Scientific Advisory Board on Climate Change, launched in 2021, mirrors this structure at the supranational level and aims to ensure consistency across member states' climate trajectories.

Multi-Stakeholder Councils

Multi-stakeholder councils are predicated on the pluralistic model of National Councils for Sustainable Development (NCSDs) and comprise representatives from various sectors, including non-governmental organizations (NGOs), the business community, trade unions, local authorities, and academic institutions. Their structural design is intended to foster consensus by facilitating dialogue among the diverse interests they represent. Notable examples of such councils include the Conseil Fédéral du Développement Durable (CFDD-FRDO) in Belgium and the National Economic and Social Council in Ireland.

While these bodies may not provide technical expertise in climate modeling, their participatory structure enhances their ability to detect social and political risks associated with climate policies. This makes them valuable in countries where climate action depends on coalition-building or public acceptance is fragile.

Institutional or Mixed Councils

In certain jurisdictions, climate advisory functions are assimilated into existing public entities or mixed councils. These councils integrate technical expertise with institutional representation and frequently assume planning, regulation, and public communication roles. Illustrative examples include the Raad voor de Leefomgeving en Infrastructuur (RLI) in the Netherlands and the Rat für Nachhaltige Entwicklung (RNE) in Germany.

These councils may enjoy strong ties to government, enabling integrated cross-sectoral analysis, but may also face limitations in autonomy or political space. In some cases, they act more as facilitators of policy coherence than as critical watchdogs.

Conclusion

From the standpoint of Science and Technology Studies (STS), these advisory bodies function as institutional laboratories that scrutinize the interplay between scientific inquiry and policymaking, as well as the mechanisms through which policy translates and transforms scientific knowledge. The credibility of these councils hinges upon their capacity to sustain a balanced position between empirical scientific data and prevailing public narratives, as well as between societal relevance and political viability.

Their institutional design is therefore a matter not only of technical configuration but of democratic theory. They raise essential questions about who gets to speak for the future, how scientific authority is earned and exercised, and what forms of participation are compatible with credible climate governance.

A technocratic risk emerges when their advisory output becomes self-referential or overly disconnected from societal contexts, potentially leading to diminished efficacy. Conversely, an undue proximity to political authority may engender perceptions of these councils as mere instruments of legitimization rather than authentic sources of guidance. The independent scientific council model aspires to mitigate these risks by striving for a dynamic equilibrium that incorporates procedural independence, a clearly defined and focused mandate, communicative accessibility, transparency, and collaborative engagement with political decision-makers.

In this light, the future of climate advisory institutions will depend on their ability to evolve adaptively – embedding reflexivity into their methods, expanding interdisciplinary collaboration, and maintaining legitimacy amid rapid political and technological change. Their role is not static; it must grow in parallel with the transformations they are tasked with guiding.

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