

Abstract

The ongoing transformation of the world's energy systems requires an international monitoring to evaluate the transformation processes and to identify transferable leading practice policies. For this purpose, an independent scientific expert commission should be established for the G20. By actively involving political decision-makers in the discussion of the final results a broad basis of support can be ensured.

Challenge

The commitments of the Paris Climate Agreement – which has so far been signed by 197 countries (February 2017) – cannot be met unless the energy systems around the world are fundamentally transformed.¹ The key challenge is to encourage immediate action and to ensure that leading practice policies are identified and implemented. In the G20 Energy Ministerial Meeting Beijing Communiqué, the G20 energy ministers “share a common understanding that the global energy architecture needs to continue to evolve to reflect better the changing realities of the global energy landscape”.²

Creating a global energy architecture of the future that is both just and sustainable is a challenge best met by resorting to scientific approaches. This paper proposes a vision of how the existing energy policy expertise can be implemented and institutionalised in a framework that takes both technological progress and aspects of economic development into account and is adjusted to the future needs of the international community in the global transition of the energy systems.

Table of contents

- Abstract1
- Challenge1
- Proposal3
- Implementation Overview8
- Existing Agreements.....8
- Existing Policies and Monitoring8
- References.....9
- Lead Authors11

Proposal

Establishing a scientific Expert Advisory Commission to report to the G20

Around the world, there are various different strategies of how the transformation of the energy systems might be approached. They would all benefit from a transparent international monitoring and evaluation process, taking account of the differences between countries, national and regional framework conditions and the heterogeneity in methods and metrics. To be sure, this would require a joint effort and commitment in order to establish a baseline level of information related to the transformation of energy systems. It would, however, allow for the identification of best-practice and leading examples in an international context. We recommend that the G20 mandate a group of independent scientists and policy experts to prepare the evidence base for such a process. This will enable the identification of robust policy options, i.e. options apt to achieve multiple policy objectives, including access to secure, affordable and sustainable energy.

We further recommend a complementary process, aiming at a cooperation between the commission and political decision-makers. This would give the results a wider notoriety and support basis. Once the scientific analyses are concluded, the process should consequently provide for a political discussion of the results, including the joint approval of an executive summary. Such a new forum for exchange would allow for iterative improvements. While respecting the core competencies of both spheres, this collaborative effort would constitute the foundation of a high-level partnership ensuring the relevance of the commission's work for practical policies.

The G20 are in a unique position to champion new ideas on an informal basis. They are also willing and prepared to take on cross-cutting issues of high complexity.³ In terms of relevance, the G20 assemble a variety of countries playing a key role in climate change and energy security matters.⁴ Since the G20 include countries with different levels of development, any cross-member state consensus on such issues is likely to have a strong signalling effect for the rest of the world.⁵

The proposed Expert Advisory Commission should be mandated to fulfil the following tasks:

1. Inform – gather and harmonize

Build a comprehensive, validated international database (taking into account technical, economic, environmental and social data) which accounts for differences in data availability and accessibility and which can be used both to monitor and evaluate G20 countries' energy transformation progress as well as to improve methodologies for future policy assessment.

2. Monitor – design indicators and track progress

Identify harmonized methodologies and develop indicators to provide policy makers with a neutral benchmark that is tailored to national circumstances in a way that checks national progress against national ambition based on the specific voluntary goals of the individual country.

3. Evaluate – analyse implementation and impact

Undertake a stock-take of relevant policy in (but not limited to) G20 countries, analyse the status of the implementation of policy measures and business models and their impact using ex-ante and ex-post impact evaluation methods.

4. Exchange – share experiences and knowledge

Assess the individual national success factors of impactful policies in order to determine their

The development of comparable indicators requires systematic preparation and in-depth discussions which will also have important consequences for the development of a comprehensive, validated international database. A careful calibration of indicators – harmonised, while nevertheless taking different national circumstances into account – offers several advantages: It would substantially improve the reliability of the interpretations of national developments, provide data for the scientific evaluation of policy impacts and extend the evidence base of policy-makers without restricting their political choices.

Based upon a harmonised methodology, the commission could provide policy-makers with a neutral benchmark tailored to individual national circumstances. By comparing national progress with the respective national aspirations (based on the goals the countries have chosen to set themselves), the search for leading practice policies could be facilitated. Furthermore, each country could be provided with an independent assessment of its progress which would highlight areas for improvement and identify its most successful policies. Following the example of the UNFCCC Measurement, Reporting and Verification (MRV) process, the commission would conduct its consultation and analysis in a manner that is non-intrusive, non-punitive and respectful of national sovereignty.⁹ There is a broad consensus – reflecting the spirit of the Paris Climate Agreement – that the plurality of efforts calls for a change in mindset.

3. Evaluate – analyse implementation and impact

In addition to the identification, harmonisation and monitoring of common indicators, the commission would provide added value to the ongoing discussions on energy transitions by analysing the implementation of policies and their impact. It would compile a foundation of reliable scientific evidence to be fed into the G20 policy preparations, business models and implementation processes via the T20 channel. The scientific Expert Advisory Commission would provide a platform for in-depth debates on evaluation methods and summarise and review scientific energy policy analyses. There is a clear need for a global stock-take of policy approaches to identify effective practices as well as areas worthy of improvement. The diversity of ongoing transformation processes offers a wide scope and countless opportunities for the exchange of experiences, information and good practices. At the same time, we fully acknowledge that different framework conditions impact energy transition processes differently and assure that the proposed monitoring and evaluation process would not interfere with political processes outside the scope of the initiative.

Sharing and understanding the different modelling approaches and key assumptions regarding ex-ante evaluations of impacts with quantitative simulation models of energy systems can contribute to a better understanding of the details crucial for designing a consistent benchmark. The ex-post impact evaluation of policies would be conducted on a case-by-case basis. A careful assessment of both the structural details of the policy as well as the specific conditions under which it is applied (e.g. technical, economic, infrastructural, legal, institutional, social, political), would ensure that the evidence is discussed in the appropriate context. In particular, the expert commission would identify leading practice policy options with measurable impacts and provide political decision-makers with easily accessible information.

Furthermore, the commission would specifically assess knowledge transfer processes between academia and the political communities. A standardised meta-format for results would constitute a valuable improvement both for researchers and policy experts as it would facilitate the transfer of knowledge into the political decision-making processes.¹⁰ Policy-makers, on the other hand, might draw upon these experiences to improve the functionality and reliability of impact assessments, ultimately contributing to improved decision-making. Further, the possibility of regionally differentiated approaches in policy design should be considered. This could, for instance, imply introducing a policy with a delay between different regions, which could dramatically improve the assessment of its impacts.¹¹

In addition, the commission would create substantial added value by proposing new standards for the

description, evaluation and identification of potential causal impacts of policies as well as for quantitative simulation models used in impact assessments. The commission would endeavour to develop a harmonised framework for impact evaluation adjustable to different contexts, thus increasing the accessibility and replicability of empirical analysis.

4. Exchange – share experiences and knowledge

The goal of the commission would be to provide policy-makers in different countries with the best tools and information, fully acknowledging that policies as well as performance benchmarks have to be tailored to national circumstances. The identification and exchange of best practices would be based on the evaluation of a variety of policies in different countries, a comparison of the identified impacts, and a thorough analysis of the transferability of a policy. Particular care would be taken regarding the external validity of results obtained under very special circumstances.¹² No one-size-fits-all solutions would be offered; rather, the commission would provide guidelines on how to adjust policies to different circumstances, pointing out those factors that should receive particular attention. In order to provide practical insights for policy-makers, special consideration would be given to the context under which a policy was implemented.

As an initiative of the G20, the expert commission would work complementary to the MRV process already established by the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP).¹³ The evaluation of actions taken at the national, regional and international levels in the field of energy systems transformation would be facilitated. Furthermore, the commission could recommend a toolkit of leading practice policy options and appropriate metrics and indicators to facilitate the consistent monitoring and evaluation of progress at the international level. This would especially include instruments resulting from the synergy of science and technology that have the power to foster innovation processes of global momentum. The exchange of scientific methods for data collection, impact evaluation and modelling would generate added value since it would lead to the adoption of common standards. At the same time, it would present the participating countries with continuous opportunities to broaden their knowledge and understanding. Finally, the discussion on energy and climate justice would benefit from the thorough analysis of national circumstances as well as from any shared information, mutual communication and collaboration structures.

Organisational setup

The commission, backed by a robust mandate to work independently, would add value to the current landscape of institutions by focusing on the specific needs of national policy-makers in the energy transition processes. This implies that in terms of output, the commission would seek to prepare information in easily accessible formats and take the political dimension of recommendations into account.

Moreover, the commission of academic experts may use information from expert agencies like the IEA for a broad range of topics. For certain aspects of energy transitions, more specialised agencies can be resorted to, e.g. IRENA in the case of renewable energies and energy efficiency¹⁴, or the IPCC and the MRV process in the case of climate change mitigation¹⁵. The commission would hence build upon the expertise and comprehensive knowledge already existing in the scientific and policy expert communities (such as the World Energy Council's Energy Trilemma Index¹⁶). However, the primary aims of the Expert Advisory Commission would be to pool and condense the current evidence base on energy transformations¹⁷ and to deliver comprehensive analyses which would benefit from the exchange of different perspectives.

The commission would also encourage the business community to engage in a dialogue process in order to identify scalable business models and provide insights into successful public-private partnerships (PPP).

Most importantly, the commission would investigate systemic issues that arise from the dynamic nature of disruptive technological change and from the interconnection between different subsystems (environmental, social, technical, and economic). Finall

Implementation Overview

An **independent** Expert Advisory Commission should be established for the G20. The proposed expert commission should be mandated to fulfil the following tasks:

1. Inform: Build a comprehensive, validated international database which recognises differences between countries, serves as a basis for monitoring and evaluation, and can be utilised for policy advice.
2. Monitor: Identify harmonized methodologies and develop indicators to provide policy-makers with a neutral benchmark tailored to national circumstances.
3. Evaluate: Undertake a stock-take of relevant policy approaches, analyse the status of the implementation of policy measures and evaluate their impact.
4. Exchange: Assess the individual national success factors of impactful policies and create a toolkit for policy-makers consisting of leading practice policy options.

Existing Agreements

1. The Paris Climate Agreement
2. G20 Energy Ministerial Meeting Beijing Communiqué
3. G20 Voluntary Action Plan on Renewable Energy
4. 2014 G20 Principles on Energy Collaboration

Existing Policies and Monitoring

1. Committee of Experts for Energy Transition, France
2. Committee on Climate Change, United Kingdom
3. Monitoring process "Energy of the future", Germany
4. National Energy and Environment Strategy for Technological Innovation towards 2050 (NESTI 2050), Japan
5. Partnership on Transparency in the Paris Agreement
6. The UN Secretary General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development

References

1. In the preamble of the Paris Agreement, the Conference of the Parties “recognizes that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions”. (United Nations / Framework Convention on Climate Change (2015) *Adoption of the Paris Agreement*, 21st Conference of the Parties, Paris: United Nations. UN Document Code: FCCC/CP/2015/10/Add.1. Accessed 03/08/2017.)
2. G20 (2016). *G20 Energy Ministerial Meeting Beijing Communiqué*, Final draft 4am 29th June 2016, p. 7. Accessed 03/08/2017.
3. Previous summits span a wide range of topics and discussions, with implementation rates changing by subject and country. Detailed assessments of previous G20 summits are provided by the University of Toronto’s G20 Research Group. Accessed 03/08/2017.
4. According to the International Energy Agency (IEA), G20 members account for 85% of the global economy, 75% of world trade and two-thirds of the global population. Furthermore, the G20 represents 75% of global energy demand and 80% of energy-related carbon emissions. (IEA G20 website, accessed 03/08/2017.)
5. The capacity of G20 decisions to alter global realities became most visible after the 2008 financial crisis, when the 2008 G20 Washington Summit on Financial Markets and the World Economy marked a cornerstone for global crisis management.
6. Preliminary guidelines for Assessing Impacts of Climate Change have been provided by the IPCC as early as 1992. (IPCC website, accessed 03/08/2017.)
7. The Secretary-General’s Independent Expert Advisory Group on a Data Revolution for Sustainable Development (IEAG) concludes in its culmination report *A World That Counts: Mobilising a Data Revolution for Sustainable Development* that “without high-quality data providing the right information on the right things at the right time; designing, monitoring and evaluating effective policies becomes almost impossible. (United Nations (2014), Independent Expert Advisory Group on a Data Revolution for Sustainable Development (IEAG), *A World That Counts: Mobilising a Data Revolution for Sustainable Development*. UN Data Revolution Group website, accessed 03/08/2017.)
8. *About the Independent Expert Advisory Group*, UN Data Revolution Group website, accessed 03/08/2017.
9. UNFCCC (2014). *Handbook on Measurement, Reporting and Verification for developing country Parties*, p- 41, accessed 03/08/2017. Further details on the MRV process are provided on the UNFCCC’s dedicated website. Accessed 03/08/2017.
10. One example for such a format has been suggested for the case of energy scenarios. Following general guidelines could significantly improve the quality and create added value for policy-makers. (acatech/Leopoldina/Akademienunion (Eds.): *Consulting with energy scenarios* (Series on Science-Based Policy Advice), 2016. ISBN: 978-3-8047-33550-7. Accessed 03/08/2017.)
11. Numerous possibilities exist to create control groups for evaluation, and even small alterations can help a policy to succeed while simultaneously explaining the reasons for it. This interaction between social

scientists and policy-makers on a very detailed level has recently gained increased attention. (Duflo, Esther, *The Economist as Plumber* (January 23, 2017). MIT Department of Economics Working Paper No. 17-03. Available at SSRN: <https://ssrn.com/abstract=2927153>. Accessed 03/08/2017.)

12. External validity refers to the extent to which the results of a study can be generalized to other situations and to other people. (Aronson, E., Wilson, T. D., Akert, R. M., & Fehr, B. (2007). *Social psychology*. (4 ed.). Toronto, ON: Pearson Education.)

13. The UNFCCC provides further details on the MRV process on its website. Additional international initiatives, such as the Partnership on Transparency in the Paris Agreement, also have to be taken into account. (Both accessed 03/08/2017.)

14. The Statute of IRENA explicitly focuses the attention of the Agency on Renewable Energy and Energy Efficiency Measures. (IRENA (2009), *Statute of the International Renewable Energy Agency* (IRENA), Conference on the Establishment of the International Renewable Energy Agency, IRENA/FC/Statute, 26 January 2009, Bonn. Accessed 03/08/2017.)

15. Originally established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988, the IPCC is the leading international body for the assessment of climate change. (IPCC website, accessed 03/08/2017.)

16. World Energy Council (2016). *Energy Trilemma Index*. Accessed 03/08/2017.

17. Special consideration would be given to advanced approaches such as the UNFCCC's Technical Examination Process. For example, the identified policy options could be evaluated systematically. (UNFCCC Technical Examination Process Website. Accessed 03/08/2017.)

18. UN press release ENV/DEV/1770 as of 3 January 2017. United Nations website, accessed 03/08/2017.

19. German Government's monitoring process "Energy of the Future" (Federal Ministry for Economic Affairs and Energy website, accessed 03/10/2017.)

Lead Authors

Prof. Andreas Löschel

Supporting Institutions

acatech – National Academy of Science and Engineering, Germany

Australian Academy of Technology and Engineering, Australia

Chinese Academy of Engineering, (CAE), China

Expert Commission on the monitoring process “Energy of the future”, Germany

LCS, Japan Science and Technology Agency, Japan

World Energy Council, United Kingdom