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Methodological insights for building scenarios in the post-Paris context

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Country-specific deep decarbonization pathways are meant to inform how nations could carry out the reduction of their GHG emissions, while being consistent with their development priorities and with the overarching 2°C target agreed on in the Paris Agreement. Such pathways have been produced within the Deep Decarbonization Pathways Project since 2014. Climate Policy's special issue published in June 2016 reflects upon this policy-driven research, its objectives and some of its results, and this blogpost discusses key takeaways from these analyses, with a focus on methodological insights.

Constraining global average temperatures to “well below 2°C” above pre-industrial levels will require global energy system emissions to be halved by 2050 and complete decarbonization by 2100. In the nationally orientated climate policy framework codified under the Paris Agreement, each nation must decide the scale and method of their emissions reduction contribution while remaining consistent with the global carbon budget. This policy process will require engagement amongst a wide range of stakeholders who have very different visions for the physical implementation of deep decarbonization. The [Deep Decarbonization Pathways Project \(DDPP\)](#) has developed a methodology to structure and inform these debates. These principles have been operationalized in the creation of deep decarbonization pathways (DDPs) by in-country teams in 16 major emitting countries, which are discussed extensively in the [2015 synthesis report](#) and [country reports](#).

This special issue of the journal *Climate Policy* [...] take[s] stock of the progress made under the DDPP to develop scientific inputs suited to inform the policy process in the post-Paris context, and identify the priorities for further research.

In addition to these policy-oriented reports, the DDPP published on Friday, June 17, “[The Deep Decarbonization Pathways Project: Insights and Emerging Issues](#)”. This special issue of the journal *Climate Policy* gathers seven peer-reviewed journal articles discussing the scientific contributions of the DDPP. In a reflective analysis of the DDPP scenario building process, these articles take stock of the progress made under the DDPP to develop scientific inputs suited to inform the policy process in the post-Paris context, and identify the priorities for further research (see the editorial and synthesis articles of this special issue for an overarching view).

Country-scale analysis is required to capture key physical, economic and political circumstances to maximize policy relevance

Mitigation studies must build from national modelling analyses that allow assessment of policy questions directly pertinent to individual countries’ national development and low-emissions transition challenges. [The modelling analysis](#) shows that a variety of models have been used both during the DDPP and for other deep reduction analyses, and that the choice between different model paradigms must be made according to their capacity to inform core domestic questions. Comparison of modelling frameworks used in the DDPP studies for China, India, South Africa and Brazil, respectively, provides a practical example of this principle (see section 2.3.2 of the [synthesis article](#)). The South African and Japanese papers, with a focus on unemployment, poverty alleviation and inequality in the former case and energy security in the latter, illustrate how this approach allows consideration of the question of how to accommodate mitigation and country-specific socio-economic issues.

Detailed sectoral analysis with transparent representation of emissions drivers through a common accounting framework

The post-Paris Agreement agenda requires a transparent and detailed understanding of national sectoral low-carbon transformations to inform the design of a wide ranging set of sector-specific policies and their application (e.g. energy supply policy, trade policy, housing policy, etc.). To inform this, a harmonized reporting template, comparable across countries, with a sufficient level of granularity in social, technological and economic systems, is key to internal and external policy legitimacy. The DDPP has made a first step in this direction by using a sophisticated and common accounting “dashboard” to reveal policy-relevant variables. Directly mapped to the UNFCCC inventories, covering all emissions, mapped to development indicators, and based on the Kaya identity for structure, building this dashboard

is part of the research agenda. As a method for framing and displaying modelling results, the dashboard allows any type of quantitative modelling tool to inform it, encouraging the use of sector-appropriate tools at the right scale in order to capture the policy-relevant dimensions of a given country (see point above).

A long-term perspective to harmonize short-term decisions with long-term objectives

Burden sharing approaches which allocate national carbon budgets *ex-ante* are not consistent with the “nationally determined framing of the post-Paris bottom-up context”. To achieve the long temperature goal, however, clear guidance is required to allow for additively consistent scenarios at the national and global scales, including necessary technological development and investment mechanisms. In the DDPP, common benchmarks in the form of long run “multi-scale downward attractors” were used by analysts using different modelling tools as guidance on key technical, emissions and development directions (e.g. tonnes of GHGs per capita, GHG intensity of electricity production, technical benchmarks for industrial sectors). The dashboard mentioned above is the instrument by which the downward attractors are operationalized, since it reveals key dialogue generating variables against which the benchmarks can be compared.

A multi-scenario approach to support sequential decision making in a context of strong uncertainties

The increase of collective ambition through the 5-year NDC revision cycles introduces a dynamic of sequential decision making (“adaptive management”) necessary to build upon learning in a context of strong uncertainty. The crucial question is to identify policies that trigger ambitious emission reductions in the near term while inducing innovation and preserving options for accelerated action in the longer term. The DDPP informs this question by substituting normative visions of an optimal pathway with multi-scenario approaches that are all consistent with long-term objectives but acknowledge short term horizons and myopia. This is illustrated in a [comparative study of the French and German cases](#).

Building the global picture from a composite of national system transformations

The bottom-up process grounded on national transformation raises the issue of global consistency of the respective visions. This is why global-scale approaches can provide critical insights that complement the more detailed national analyses and should play a stronger role in informing DDPPs. However, use of global models also calls for improved representation of country specifics in global models, which can oversimplify national economic and political realities. Using both model scales provides important insights that are complementary but that can challenge the other's orthodoxy. This general question is discussed in *Climate Policy's* special issue using the example of [energy commodities](#) and [energy-intensive industrial goods](#) (cement, steel). Other attempts to engage the conversation between global-scale and national-scale approaches while preserving the specifics of each are already on-going, notably in the [Modelling and Informing Low Emission Strategies \(MILES\) project](#). Well-designed national scenario analyses developed by the scientific community are crucially needed to frame and inform the next two crucial milestones of climate talks, i.e. the facilitative dialogue in 2018 and the revision of Nationally Determined Contributions in 2020. The above methodological elements provide framing principles and define the research priorities to be further investigated in order to ensure that these scientific assessments meet the needs of the domestic and international policy processes, i.e. provide relevant information about domestic implementation, levers for increased ambition and opportunities for scale-up of international cooperation. >> See on the [DDPP website](#)

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