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The impact of the Deep Decarbonization Pathways Project (DDPP) on domestic decision-making processes – Lessons from three countries

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The Deep Decarbonization Pathways Project (DDPP) is a collaborative global research initiative seeking to understand how individual countries can transition to a low-carbon economy consistent with ambitious climate targets. In its first phase (2014-2015), the DDPP covered 16 countries and developed there a policy-relevant research basis to support the adoption of ambitious domestic climate actions, consistent with national circumstances and the global 2C limit.¹

The DDPP adopts shared methodological principles (transparency and granularity of assumptions and results, long-term vision, multiple pathways to capture uncertainties), and gives a central role to the Country Research Teams, working independently of their governments and responsible for the design of their national low-carbon transformations to 2050. The country teams are indeed responsible for taking into account all specificities of the domestic context in their analysis (be they technical potentials, socio-economic conditions or policy aspects) and for undertaking engagement with domestic decisionmakers based on their conclusions.

This brief focuses on the engagement strategy developed by the DDPP teams to have an impact on the domestic processes. It takes the examples of three countries (Australia, Canada and France), reflecting a diversity of institutional circumstances, for which we present the context of domestic climate discussions and how the DDPP studies have been useful to affect policy debates.

1. Detailed results and conclusions can be found in DDPP's country reports (<http://deepdecarbonization.org/countries/>) and in synthesis report (<http://deepdecarbonization.org/ddpp-reports/>).

KEY MESSAGES

- In Australia, the DDPP has provided a clear and practical framework to enable the translation of the compelling evidence base for mitigation provided by the DDPP's agenda-setting research into tangible outcomes by government and business, by providing a transparent, structured and solutions-focused identification of actions towards low-carbon transformation.
- In Canada, the DDPP report brought the concept of near full decarbonization from hazy science-fiction to a public space where the technical, economic and policy means could be fairly debated. It was the first study developed by domestic experts that brought concrete insights able to inform the design of domestic policy packages compatible with ambitious climate goals like the one introduced by the Paris Agreement. It directly influenced an economy wide policy package undertaken by the province of Alberta, and elements of the DDPP policy package are emerging at the federal level (e.g. federal floor carbon price schedule, net zero emissions regulations for buildings).
- In France, the DDPP team developed a preliminary version of the dashboard and build on the DDPP study to bring to light the major uncertainties and trade-offs to be dealt-with in the decarbonization process. In particular, the critical dimensions of dynamic management of the transition appear in the accompanying documents to French legislative processes on the energy transition.

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1. TRANSLATING THE AUSTRALIAN DDPP INTO TANGIBLE OUTCOMES

ClimateWorks Australia and the Australian National University partnered on the delivery of the Australian DDPP, and its subsequent translation into tangible outcomes by government and business. The DDPP team took a holistic approach to research and communications, and a systematic and sustained effort to engage stakeholders that has resulted in tangible policy change and business action in a relatively short time. This approach is reflected in ClimateWorks’ “cycle of change”, designed to enable the translation of the compelling evidence base for mitigation provided by agenda-setting research into tangible outcomes by government and business (Figure 1).

The DDPP has proven to provide a clear and practical framework to support the different steps of this ‘cycle of change’ (Figure 1), by providing a transparent, structured and solutions-focused identification of actions towards low-carbon transformation. Notably, the ‘4 pillars’ approach proved efficient to communicate the research outputs with a range of audiences—including policymakers, business leaders, academics, community groups and sustainability professionals. This approach was adapted from the ‘3 pillars’ approach of energy transformation that frames the DDPP study in all countries, by adding a fourth pillar focused on sequestration given the importance of non-energy emissions in Australia.

Agenda-setting research

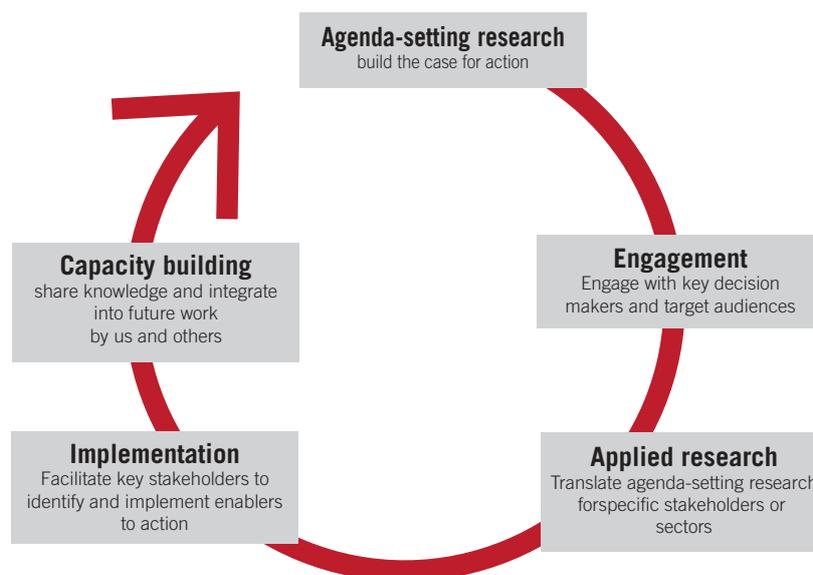
The Australian DDPP country report, ‘Pathways to Deep Decarbonization in 2050’, has been pivotal in redefining the Australian discourse on climate action. The need to get to net zero emissions by mid-21st century to stand a reasonable chance of not exceeding 2°C in global temperature rise was not widely understood prior to the report’s publication. Providing a robust and credible evidence base that shows that decarbonization of an emissions-intensive economy can be achieved alongside economic growth has been critical in building broader political engagement.

Engagement

Although illustrated as a unique phase in the cycle of change, stakeholder engagement is a key facet of all phases. In the research phase, the project team engaged in sense-checking to ensure buy-in from technical and industry experts. Once the research was complete, the team undertook a program of stakeholder engagement activities such as briefings, media interviews and presentations at academic and business conferences to ensure the research was understood and enacted upon by key decision-makers from both government and business, in recognition that strong action by each of these audiences influences the ambition and action of the other.

More than 50 DDPP briefings were conducted, including with high-level national and state policymakers such as the Federal Office of Prime Minister & Cabinet, the State offices of Premier &

Figure 1. The ‘cycle of change’



Source: ClimateWorks.

Cabinet and Environment Departments (in New South Wales, Victoria and South Australia), key corporates, business and industry associations, the financial sector and environmental advocacy groups.

Among the key outcomes of these briefings, the DDPP team was invited to participate in state-level policy processes with direct influence in:

- Victoria, where ClimateWorks' CEO Anna Skarbek was appointed to the Victorian Government's Climate Change Act Review Committee. DDPP results (along with further commissioned research) informed the Victorian Government's announcement of a net zero emissions by 2050 target.
- South Australia, where Anna Skarbek (ClimateWorks Australia) and Frank Jotzo (Australian National University) were appointed to the South Australian Government's Low Carbon Economy Expert Panel, which led to the South Australian Government's announcement of net zero emissions by 2050 target.
- Queensland, where the ClimateWorks team were invited to advise the Queensland Government on their decarbonization strategy.

Beyond this direct influence on policy processes, the stakeholder engagement has also contributed to several announcements including:

- Australian Labor Party's policy announcements of Net Zero Emissions by 2050 and 50% renewable energy by 2030, citing DDPP modelling.
- Newly appointed Australian Chief Scientist, Alan Finkel, publicly advocates 'net zero emissions by 2050' in appointment speech, alongside Australian Prime Minister Malcolm Turnbull.
- AGL's (Australia's largest and most emissions intensive energy supplier) public announcement in April 2015 to decarbonize its generation portfolio by 2050.
- The inclusion of an Energy Productivity target in the Australian Government's Energy White Paper.

This stakeholder engagement strategy was supported by targeted communication resources to enhance knowledge and understanding among target audiences, including a standalone project website, infographic to simply illustrate key research findings, an interactive 2050 pathways calculator, academic articles in *Climate Policy* and opinion pieces authored by the DDPP team and published media articles.

Applied research

The Engagement process typically brings to light a range of opportunities for collaboration with key stakeholders to apply the research methodology to

new audiences or sectors. The following work has been commissioned as a direct result of our DDPP stakeholder engagement work:

- Analysis for the Prime Minister and Cabinet Taskforce for Australia's post-2020 target for Paris COP21. This informed Australia's INDC of 26-28% for COP21 in Paris.
- Assessment for State-level climate policy, based on the DDPP 'four pillars' approach, in support to the above policy processes in Victoria, Queensland and New South Wales.
- Assessment of the risks and opportunities to the loan book of one of Australia's largest banks in a decarbonized world, based on DDPP.
- Assist one of Australia's largest property investors to develop a science-based target, based on the 'four pillars' approach.
- The 'Low Carbon, High Performance' report, commissioned by the Australian Sustainable Built Environment Council analyzing the potential for Australia's built environment to achieve net zero emissions, widely endorsed by key sector stakeholders.
- The report 'A prosperous net-zero pollution Australia starts today', commissioned by WWF Australia, which focuses on what needs to be done by 2030 in Australia, to achieve the long-term goal of deep decarbonization.

Implementation

The project team continues to work to understand where barriers to implementation exist, and to facilitate stakeholders to identify and implement the enablers to strong action. Barriers to change are often policy-based, but may also be driven by other factors such as supply chain issues, a lack of skills or knowledge, high costs or low financial returns.

In relation to DDPP, several workstreams are currently underway:

- *Electric vehicles*: coordinating a consortium of businesses from the vehicle manufacturing, energy and infrastructure sectors to identify and facilitate delivery of the enabling conditions required for rapid consumer uptake of electric vehicles.
- *Built environment*: working with academic, industry and government stakeholders to upgrade the energy efficiency requirements of the Australian National Construction Code, in line with the decarbonization pathway modelled for the sector.
- *Renewable energy and storage*: working with proponents of renewable energy and storage technologies to drive regulatory change to enable faster and less costly connection of their products to the electricity grid.

- A similar approach is planned in the land sector, to build momentum for the adjustments required to capture the significant sequestration potential available in Australia (while enhancing biodiversity outcomes).

Capacity building

The cycle of change is designed to embed continuous improvement, both in the project team and in others, through knowledge sharing to enable capacity building in others. Notably, DDPP provides the foundation for the design and delivery of a university Masters unit, focused on Climate change and carbon management strategies, and corporate education programs focused on building awareness and understanding of the business opportunities from decarbonization, and the risks of inaction.

2. THE EVOLVING CANADIAN CLIMATE POLICY DEBATE

Canada has gone from an international climate policy pariah, following its withdrawal from the Kyoto Protocol at Durban (2011), to darling as a champion of 1.5°C in Paris at COP21, aided by a dramatic change in federal government in October 2015. These catchy headlines obscure important complexities in the Canadian climate policy debate, complexities with lessons for the global debate.

For many reasons, Canada can be more accurately thought of as 10 separate “countries” with as many climate policy regimes, or lack thereof.² Canada is a geographically very large federation with distinct powers assigned to the federal and provincial levels of government, the latter representing significantly differing economies with wildly different GHG intensities (~70 tCO₂e/cap for Alberta and Saskatchewan, and ~10-12 for Ontario and Québec—the DDPP project goal was less than 2). Resource and energy policy is normally a provincial domain; the federal government becomes involved only when energy commodities cross provincial or international borders. The federal government is also responsible for signing international treaties, and has extraordinary powers of national interest based on “peace, order and good government”.

Within this framework, Ontario started a coal electricity phaseout in 2007 (now complete), British Columbia invoked North America’s first carbon

tax in 2007 (including recycling to labour and capital taxes, a world first), and Alberta started operation of a GHG performance standard based cap and trade system for large emitters in 2006. Every province has invoked controls on electricity GHGs of one sort or another (e.g. renewable performance standards or feed in tariffs), ranging from a cap in Nova Scotia to a focus on carbon capture and storage research in Saskatchewan (given its coal reserves). The federal government has invoked ambitious GHG intensity regulations for the transport sector, and effectively banned coal generation by mandating that any new generation be equal to or better than the best natural gas generation. More recently, Ontario and Québec have joined California in the WCI cap and trade system. The largest departure from business as usual is that Alberta has announced an economy wide carbon tax, a tighter cap and trade for large emitters, and an absolute cap on oil sands emissions.

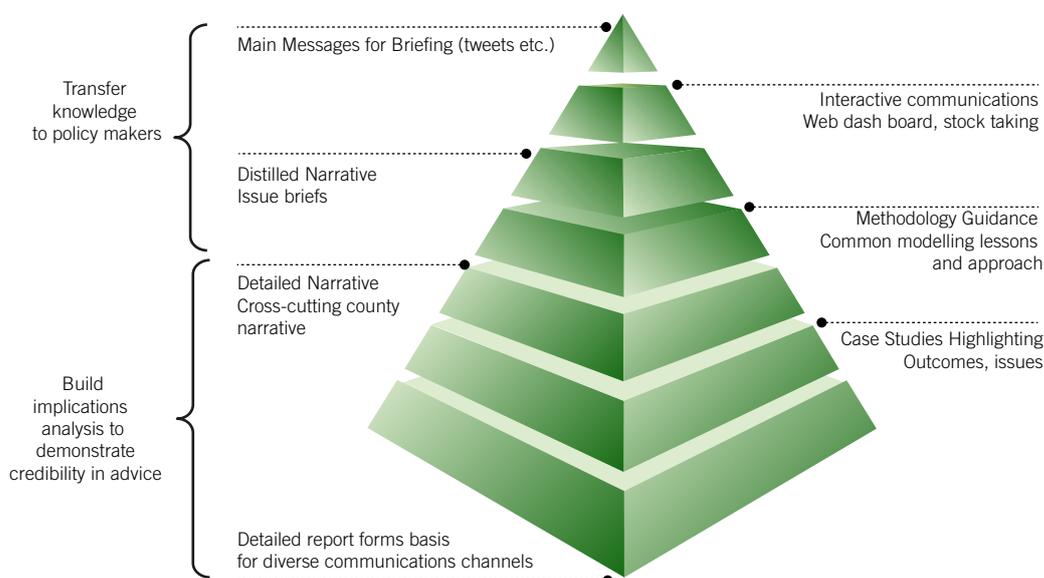
These measures, although going in the right direction regarding decarbonization, were lacking i) a vision of the economy-wide transformations to be considered, and ii) a normative vision of where the trajectory should lead to in the long term. The DDPP study was the first one developed by domestic experts that brought concrete insights able to inform the design of domestic policy packages compatible with ambitious climate goals like the one introduced by the Paris Agreement.

How the Canadian DDPP team engaged with the policy process

The September 2014 and especially 2015 Canadian DDPP reports (www.deepdecarbonization.org) were the foundation of the Canadian team’s engagements strategy with policymakers, stakeholders and the public. Using material from these reports and associated analyses, David Sawyer of the Canadian team wrote several op-eds for *The Globe and Mail*, a centrist national newspaper, while both Chris Bataille and David Sawyer spoke on the DDPP to a wide variety of audiences. In April 2016, corresponding to the Vancouver First Ministers conference on climate change and funded by a group of Canadian NGOs, they published a follow-up report (*Still Minding the Gap*) that summarized the effects of current and announced policies, and how they correspond to Canada’s INDC and eventual decarbonization. The report carefully described both where policy was on the right track (e.g. the electricity sector in all provinces, and the Ontario, Québec and Alberta climate policy packages) and where there were holes (e.g. general carbon pricing in Saskatchewan, Manitoba and the Atlantic provinces, and especially coverage of process and fugitive

2. <http://www.enviroeconomics.org/#!Still-Minding-the-Gap-An-Assessment-of-Canada%E2%80%99s-Greenhouse-Gas-Reduction-Obligations/cruze/571e86690cf269c350ef97f2>

Figure 2. The communications pyramid



Source: David Sawyer, Enviroeconomics.

emissions in British Columbia given the incipient Liquefied Natural Gas (LNG) industry). A second paper on alternative carbon pricing mechanisms funded by Clean Prosperity, *The Least Costly Path to Climate Action*, followed in August 2016 and compared a simple carbon tax to one combined with an intensity based cap and trade system for large emitters to ease the transition and allow international trading for compliance.³ A third report looking at what detailed policies INDC compliance may require is in production, and will be released in the late fall.

The Canadian DDPP report can be fairly said to have transformed the Canadian climate policy debate, in that it connected the global carbon budget discussion to the national debate in an understandable way and brought the concept of near full decarbonization from hazy science-fiction to a public space where the technical, economic and policy means could be fairly debated.

A key principle the Canadian team followed in promoting the DDPP was the use of the following communications pyramid, the principle of which is applying the appropriate level of information to a given audience (Figure 2). The full technical report forms the base of the pyramid and is available for experts. A summarized version of the technical report is meant for the policymaker and stakeholder public, and sits on the technical report. Policy briefs and media articles are prepared from the

full and summarized technical reports, and publicly available products are advertised on Twitter or other appropriate social media.

The Alberta Climate Leadership Plan

A key concrete policy debate on which DDPP had a direct influence was the ambitious economy wide policy package undertaken by Alberta, home of the oil sands. In the spring of 2015 a newly elected provincial government ordered a review of the province’s climate policies. The review was set up as a three month stakeholder engagement process, based on written submissions, internet engagement, and community open houses. 25,000 online responses and 535 formal submissions were received, including the Canadian Deep Decarbonization Pathways Report, submitted by Carbon Management Canada.

On November 20th 2015 the outcome of the review was announced. The report and recommended policies focused on preparing Alberta for a global low carbon economy, with a focus on economic diversification, decoupling energy use from economic growth and reducing the carbon intensity of energy. As recommended in the Canadian DDPP report, from which the recommended policy package was quoted prominently, Alberta will be implementing a general carbon tax rising to \$30 in 2018, a cap-and-trade system for large emitters like the oil sands, electricity decarbonization regulations, an aggressive methane control program, and energy efficiency policies. The policy package

3. <http://www.cleanprosperity.ca/eia>

is designed for coordination with trading partners and eventual increased ambition. The core elements of the policy package were passed as law by the Alberta legislature June 7 2016.

This policy package puts in place all the main tools to eventually decarbonize the Albertan economy, and is a model of its kind for an energy exporter. Even more significant is the broad political consensus behind the policies, including households through environmental NGOs to oil sands firms, established using a first class stakeholder engagement process. Many observers from all sides of the political spectrum have commented that key to the successful completion and adoption of the Alberta Climate Leadership Plan process was the engagement process.

The national discussion, and broader lessons

At the national level the new federal government (both Dave Sawyer and Chris Bataille have repeated and extended contact with the Environment Ministry based on the DDPP, with results forthcoming in the fall) has communicated that it will invoke a minimum national carbon price starting at \$10/t CO₂e in 2018, and rising \$10/t yearly to 2022, but that it will not override the provinces with equivalent existing policy. Saskatchewan in particular is strongly resisting a mandatory national carbon price. Some broader lessons can be taken from both the Alberta and more general Canadian experience.

Climate policy is not one size fits all. The Canadian provinces all have very different economic structures, and even the most ambitious have chosen very different policy regimes. What fits for Alberta's currently hydrocarbon extraction based economy is very different from the "post-industrial" economies of Ontario and Québec. Also key is that the provinces have very different access to hydroelectricity (Québec, Manitoba and BC have almost all of it, and control it exclusively), which is key to near term switching to decarbonized electricity.

Carbon pricing is necessary but not sufficient component. Every jurisdiction has invoked non-price regulations on electricity, building and transport.

Every grouping of jurisdictions has laggards. These cannot be ignored because of perceived fairness issues for front runners, and must be dealt with firmly and fairly. The laggards likely wouldn't be laggards if they didn't have reasons to be, i.e. that they have higher mitigation costs, and these must be dealt with directly. This argument

can be expanded to sectors. There will always be lagging sectors, probably with high costs, low profit margins, and high competitiveness concerns. They cannot be allowed to stall the process, but their concerns must legitimately met.

Communication to all parties is key. The Alberta experience in particular outlines the importance of broad based consultation and communication. If and when the largest current polluters get on the stage to promote a policy, then the policy is far more likely to survive the political process.

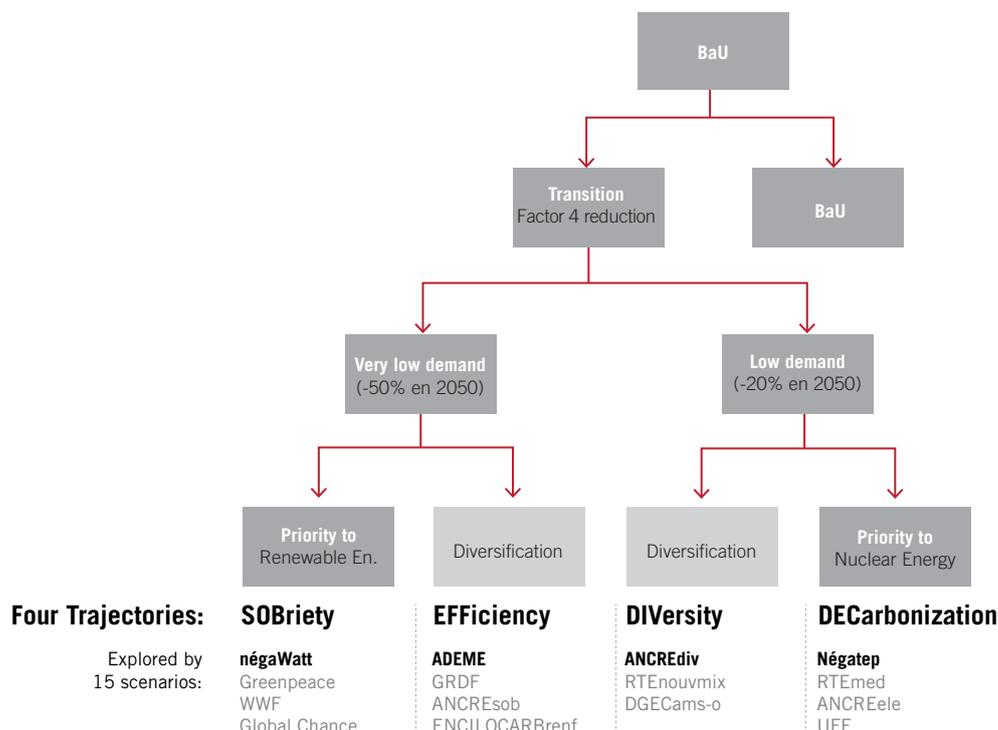
3. DEEP DECARBONIZATION PATHWAYS AND ENERGY TRANSITION IN FRANCE

The work performed in 2013 during the so-called National Debate on Energy Transition in France has anticipated the spirit, methods and analyses that later were shared and elaborated in the Deep Decarbonization Pathways Project. At the time, members of the DDPP French team got closely involved as independent lead experts in the debate. Three years later and in a feedback process, many conclusions of the DDPP study for France can help analyse the content of the Law on Energy Transition for Green Growth, voted by the parliament in 2015 and can contribute to support its concrete implementation.

Deep decarbonization has been on the agenda of French environmental and energy policy since 2003, when the concept of Factor 4, i.e. the target of reducing French total GHG emissions by 75% in 2050 compared to 1990 level, was first introduced. This target is a domestic translation of the requirements for deep decarbonization since it corresponds to 1.5 tCO₂/cap, which is below the DDPP focal point of 1.7 tCO₂/cap and represents a deep reduction of emission intensities given the initial level of 6 tCO₂/cap, already one of the lowest values among industrialized countries. Since then, the Factor 4 has been introduced in 2005 in the law setting Energy Policy Guidelines (called the POPE law in French, for "Programmation et Orientation de la Politique Énergétique") and clearly provided a consensual landmark for all national stakeholders in energy policy.

Combined with this overarching target, a noticeable transformation in energy policymaking process took place after the presidential election of 2007, with the organization of a deliberative process on environmental policies involving representatives of five stakeholders groups (NGOs, trade unions, business community, local authorities and the central administration) along 6 thematic groups, among which one on energy. This approach was deepened after 2012 for energy policy with the launching of the National Debate on

Figure 3. Four pathways for the French energy transition



Source: Patrick Criqui, CNRS PACTE-EDDEN.

Energy Transition, a deliberative process structured around a council of 112 members from 7 stakeholders groups (consumer associations and members of parliament joining the above five groups), with monthly plenary meetings chaired by the minister of environment and energy.

A number of stakeholders from different origin (academics, industry, NGO) had anticipated the debate by developing quite substantial pieces of analytical work, aimed at supporting their approach to the energy transition. Quite heterogeneous in their methodologies (bottom-up vs top down) and scope (sector-focused on power generation to building vs. economy-wide), they provided nevertheless a promising input to the debate. But the discussion got rapidly stuck on confronting demands and emblematic disputes around nuclear, shale gas or the impact of the energy transition on growth. In this context, an expert panel was invited to conduct a study on energy scenarios which, instead of the usual centralized approach to decision-making, proceeded from the gathering and treatment the variety of pre-existing scenarios produced by the stakeholders. To unlock the discussion and make full use of the expertise of the stakeholder group, Patrick Criqui and Michel Colombier then developed a first version of the dashboard that would then be adapted to the needs of a multi-country exercise to become a central tool

in the DDPP exercise. Stakeholders were invited to report their scenarios according to this framework, allowing for a less conflictual and better informed discussion. In particular, this approach revealed the diversity of underlying assumptions embedded in these alternative visions (on costs, availability of technologies, impact of public policies, risk appraisal...). But it also made it possible for the expert group to extract the main features of each exercise and come back to the plenary discussions with a synthesized, tractable set of 4 possible pathways for the French energy transition (Figure 3). Also, three main blocks of policy options that needed to be combined in the transition were identified: end use efficiency, switch to decarbonized energy carriers (electricity, zero gas, heat) and decarbonization of the primary energy mix. This is what gave birth later on to the ‘3 pillars of decarbonization’, used to frame the DDPP analysis in all countries.

Based on this participatory process, the **Efficiency** trajectory was identified—both by NGOs and by the Ministry of Ecology—as a first best policy option in the preparation of the Law on Energy Transition for Green Growth, finally adopted by the parliament in July 2015. This law explicitly mentions six structuring quantitative targets consistent with this scenario, (on all GHG emissions, final energy consumption, all fossil fuel consumption,

share of nuclear in power generation, final energy consumption, electricity generation from renewable energy and total landfill wastes).

The illustrative scenario investigated in the first phase of Deep Decarbonization Pathways⁴ for France reflected the assumptions of the **Efficiency** trajectory. The main added value of the DDPP study is to identify the core challenges to be overcome in order to meet the targets set by the Law: the level of energy demand reduction implies a deep energy retrofiting of almost all existing building before 2050; the reduction in fossil fuel consumption implies a massive deployment of electric vehicles as soon as 2030; the increase in the share of renewable in electricity generation also involves an accelerated deployment of wind and solar so as the capability to ensure network stability in that conditions. In all these areas, success is wished... but not guaranteed.

This is why the second French DDPP report of 2015 also explores a second-best trajectory, closer to the Diversification profile, with less energy demand reduction and a larger supply of non-fossil energy, through nuclear and biomass energy. This second pathway presents alternative options for maintaining a deep decarbonization transformation in case of constraints imposed by the above challenges of the Efficiency trajectory. This second pathway in turn poses many challenges related notably to the capability of the nuclear

industry to produce safe and cost-effective solutions or to the availability of significant biomass resources either for liquid fuels, gaseous fuels or heat in district heating systems.

In this sense, the DDPP study provides the frame for informing the management of the transition and associated trade-offs in a context of strong uncertainties. This study has served as direct contribution to the legislative process and to associated strategic policy documents such as the National Low Carbon Strategy and the Multiannual Programming for Energy, which discusses the concrete actions to be taken in the coming 2 decades in order to reach the objectives set by Law. Members of the DDPP French team are now core contributors to this process and were able to bring into these official documents the key insights derived from in-depth analysis conducted in the DDPP, notably regarding the major uncertainties and trade-offs to be dealt-with in the energy transition process. In particular, the dimensions of dynamic management of the transition, with the need to consider alternative pathways towards the Factor 4 objective and regular revision of implementation according to the actual achievements, appear in the accompanying documents to the National Low Carbon Strategy and the Pluriennial Programming for Energy.⁵

4. The term “pathways” is very similar to the concept of “trajectory” used in the French National Debate.

5. <http://www.developpement-durable.gouv.fr/Programmation-pluriannuelle-de-1,48569.html>