



# Deep Decarbonization Pathways Project

## Interim results and lessons for the international negotiations

Emmanuel Guerin, Associate Director, UN SDSN

# Outline

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# Objective

- The Deep Decarbonization Pathways Project (DDPP) is a collaborative initiative to understand and show how **individual countries** can transition to a low-carbon economy and how the world can meet the internationally agreed target of limiting the increase in global mean surface temperature to less than **2 degrees Celsius (°C)**.
- Staying within the 2°C limit:
  - The commitment of the Parties to the UNFCCC since COP16 in Cancun, which COP21 in Paris needs to operationalize
  - The upper limit to maintain our ability to adapt to climate change

# Organization

- The Deep Decarbonization Pathways Project (DDPP) is convened under the auspices of the **Sustainable Development Solutions Network (SDSN)** and the **Institute for Sustainable Development and International Relations (IDDRI)**.
- Currently, the DDPP comprises **15 Country Research Teams** composed of leading researchers and research institutions from countries representing 70% of global GHG emissions and different stages of development: Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Japan, Mexico, Russia, South Africa, South Korea, the UK, and the USA.
- The Country Research Teams are acting independently of their national governments
- Several **Partner Organizations** contribute to the analysis and outreach of the DDPP, including the German Development Institute (GDI), the International Energy Agency (IEA), the International Institute for Applied Systems Analysis (IIASA), and the World Business Council on Sustainable Development (WBCSD)

# Approach

- Each Country Research Team develops a **national Deep Decarbonization Pathway (DDP) analysis to 2050**, consistent with the 2°C limit and their national circumstances.
- The objective of these DDPs is to explore each country's possible transition to a low-carbon economy, taking into account national socio-economic conditions, development aspirations, infrastructure stocks, resource endowments, and other relevant factors.
- The first phase of the DDPP focused on **the technical feasibility** of DDPs.
- The next phases will analyze in further detail how the **twin objectives of development and deep decarbonization** can be met through integrated approaches; quantify the **costs and benefits** of deep decarbonization; identify national and international **financial requirements**; and map out **policy framework** for implementation.

# Timeline

- The DDPP issued this interim 2014 report to the UN Secretary-General Ban Ki-moon in support of the Climate Leaders' Summit at the United Nations on September 23.
- The UN Secretary General Ban Ki-moon received the report on July 8. The report was also presented to the French Foreign Minister Laurent Fabius on July 10.
- In the first half of 2015, the DDPP will issue a more comprehensive report to the French Government, as host of COP21

# Interim results

- In aggregate, the initial DDPs developed by the Country Research Teams outlined in the report achieve deep absolute emissions reductions by 2050.
- Total CO<sub>2</sub>-energy emissions from the 15 preliminary DDPs already reach a level of 12.3 Gt by 2050, down from 22.3 Gt in 2010.
- This represents a 45% decrease of total CO<sub>2</sub>-energy emissions over the period, and a 56% and 88% reduction in emissions per capita and the carbon intensity of GDP, respectively.





# Average per capita emissions and carbon intensity of GDP in the 15 DDPs

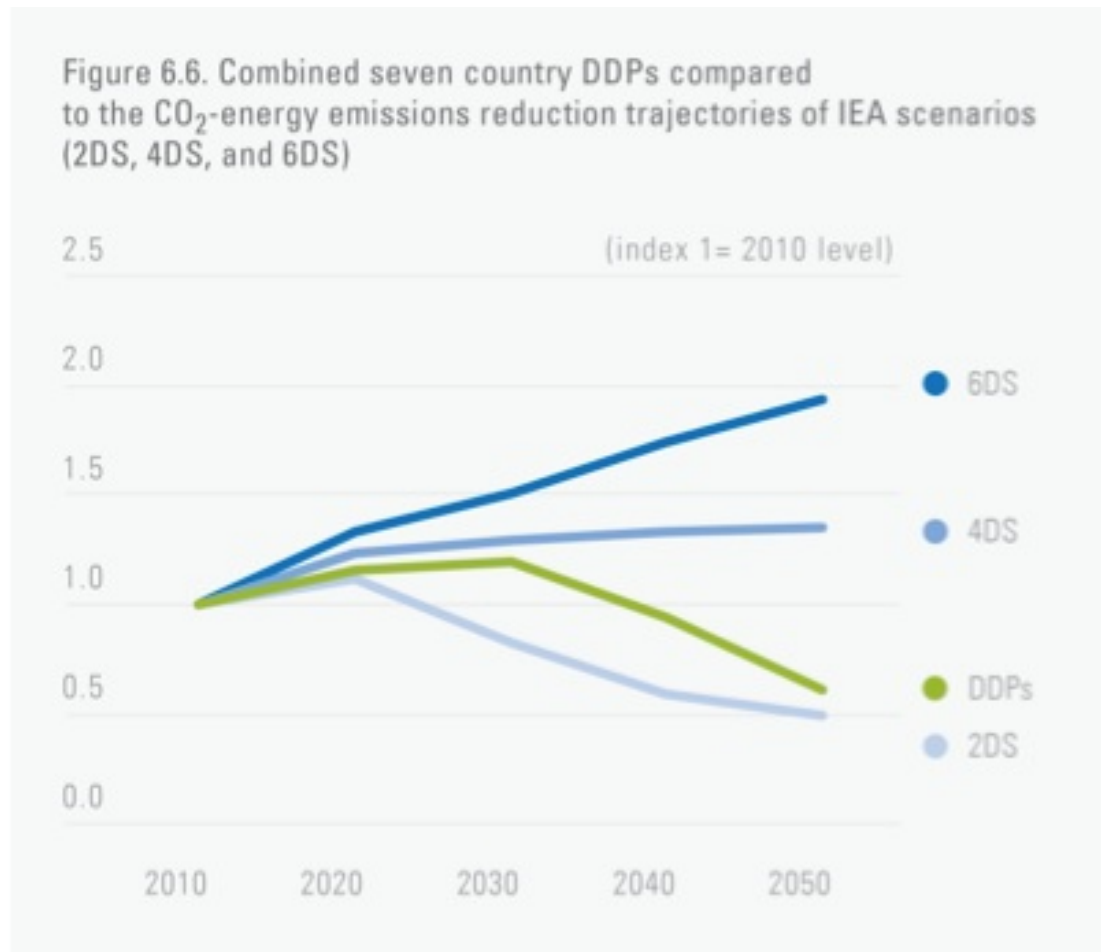
Figure 6.4. Average energy-related CO<sub>2</sub> emissions per capita, historical and DDPs for 15 countries



Figure 6.5. Average energy-related CO<sub>2</sub> intensity of GDP, historical and DDPs for 15 countries



# Comparison with the IEA scenarios (selection of 7 countries)



# Interim results

- The interim DDPs do not yet achieve the full decarbonization needed to make staying below the 2°C limit “likely,” defined as a higher than two-thirds probability of success.
- The Country Research Teams have identified additional opportunities for deep decarbonization that will be incorporated in the next version of the DDPs to be published in 2015.
- Nonetheless, the aggregate decarbonization pathway is already very substantial and well on its way to becoming consistent with the 2° limit.

# Interim results

- The preliminary DDPs already provide key insights. These include:
  - Key components of nationally appropriate strategies and the most promising country-specific technology options for deep decarbonization
  - Principal challenges going forward and enabling conditions (nationally and globally, technically and from a policy perspective) for successful deep decarbonization
  - Lessons from the DDPP process and interim results for the international negotiations

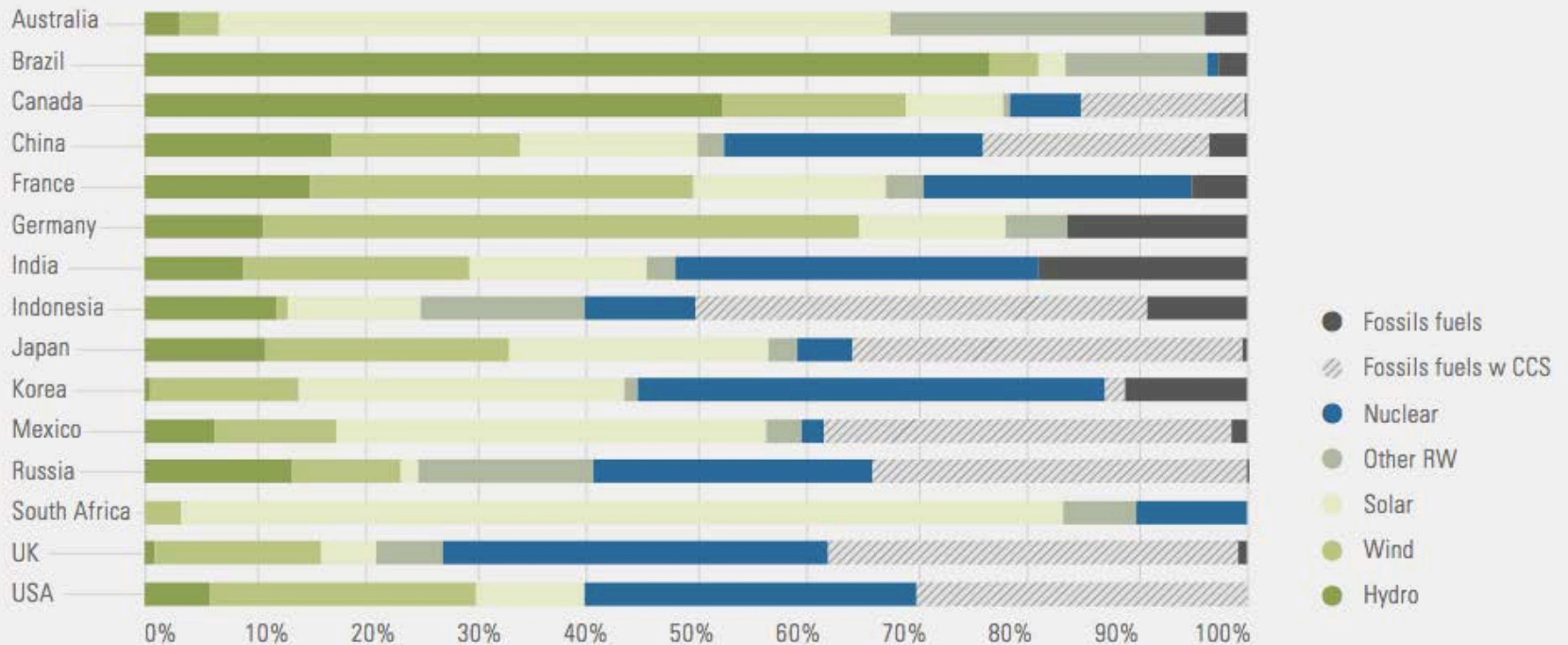
# 3 “pillars” of deep decarbonization of energy systems

- Energy efficiency
- Low carbon electricity
- Fuel switching
  
- Within the three pillars that are common to all countries, individual DDPs show a wide variety of different approaches based on national circumstances.

Each scenario details the ways in which GHG emissions can be reduced.

Example: the power sector.

Figure 6.11. Electricity generation mix in 2050



# The need for a global RDD&D push on some low-carbon technologies

- Deep Decarbonization rests on the large-scale deployment of some technologies that are not yet commercially available or affordable
- The timely deployment of these technologies depends on “directed technological change” — that is technological change that is propelled through an organized, sustained, and funded effort engaging government, academia, and business with targeted technological outcomes in mind.

# The need for a global RDD&D push on some low-carbon technologies

- Some key technologies, which are critical for deep decarbonization in all DDPs, are not yet technically mature or economically affordable. They include:
  - Advanced energy storage, flexible load management, and integrated portfolio design for balancing power systems with high penetrations of variable renewable energy (e.g. wind and solar)
  - Very high performance appliances, controls, and materials for buildings
  - Zero emissions vehicles with adequate range, notably battery electric or fuel cell light-duty vehicles
  - Sustainable biofuels or synthesized fuels for air and marine transport
- Some emerging low-carbon technologies are key in a subset of the 15 DDPs. They include:
  - New types of renewable energy technologies (e.g. advanced geothermal, deep offshore wind, and tidal energy)
  - Carbon-capture and sequestration (on fossil-fueled power plants and industries)
  - Advanced nuclear power technology that sustains public confidence and support



# Lessons for the international negotiations

- The preliminary results and the approach of the DDPP itself reveal the critical importance of preparing country-level DDPs to 2050.
- These pathways, and the discussion of their results and input assumptions, are essential tools for learning and problem solving.
- This process is crucial to developing a long-term vision for deep decarbonization and shaping the expectations of countries, businesses, and investors about future development opportunities.

# Lessons for the international negotiations

- It highlights the need to introduce long-term backcasting into the scope of the international negotiations.
- Food for thought:
  - Parties could develop and make publicly available a non-binding DDP to 2050 that is consistent with the 2°C limit and their national circumstances.
  - They would be predicated on a shared commitment to the 2°C limit and to all aspects of global cooperation needed to achieve it, including technology cooperation, financial support, and policy coordination.
  - There should also be a massive and sustained global public-private effort to develop, demonstrate, and diffuse various low-carbon technologies that are not yet technically mature or competitive and are key to the success of deep decarbonization.

# Thank you

Report available online at:  
[www.deepdecarbonization.org](http://www.deepdecarbonization.org)

