



Deep Decarbonization Pathways Project

Overview and Initial Results

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Promoting an Integrated Knowledge-Base System for
Scientific Low-Carbon Development Policymaking in Asia

Outline

- Objective, Organization & Approach
- Phase 1 DDPP Results
- Need for Global RDD&D
- Informing Near-term Planning

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
 - 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)**

Organization

- DDPP is convened under the auspices of the UN **Sustainable Development Solutions Network (SDSN)** and the **Institute for Sustainable Development and International Relations (IDDRI)**
- **15 Country Research Teams**
 - Leading independent researchers and research institutions
 - 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 US
- Several **Partner Organizations** contribute to the analysis and outreach of the DDPP, including:
 - German Development Institute (GDI)
 - International Energy Agency (IEA)
 - International Institute for Applied Systems Analysis (IIASA)
 - World Business Council on Sustainable Development (WBCSD)

Approach

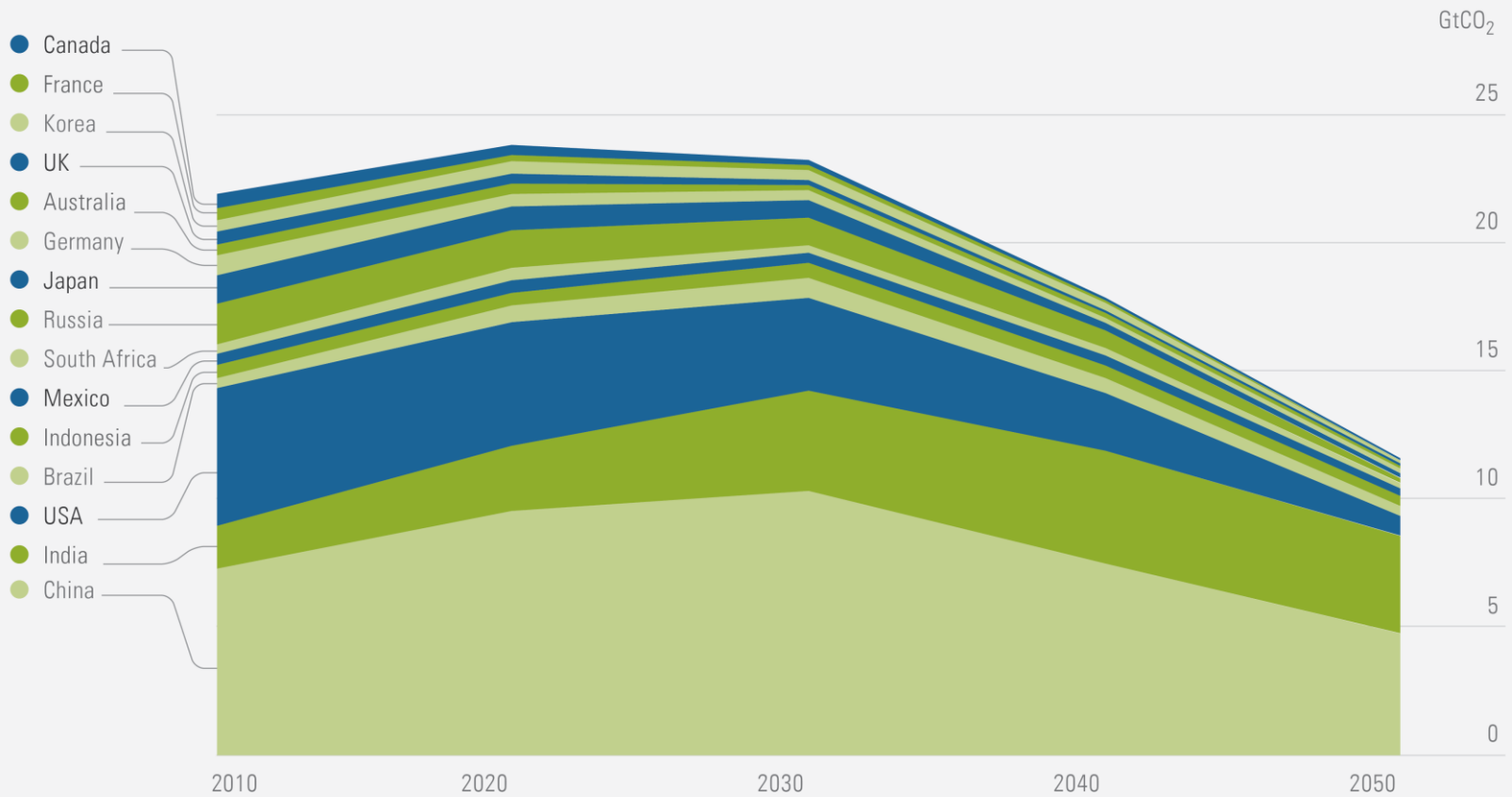
- Each Country Research Team develops a **national Deep Decarbonization Pathway (DDP) analysis to 2050**
 - Explore each country's possible transition to a low-carbon economy
 - Take into account national socio-economic conditions, development aspirations, infrastructure stocks, resource endowments, and other relevant factors
- The first phase of the DDPP focused on **the technical feasibility** of DDPs and a comprehensive report, *Pathways to Deep Decarbonization*, was published for the September 2014 UN Climate Summit

Phase 1 Results

- In aggregate, the initial DDPs developed by the Country Research Teams outlined in the report achieve deep absolute emissions reductions by 2050
- Total CO₂-energy emissions from the 15 preliminary DDPs already reach a level of 11.5 Gt by 2050, down from 21.8 Gt in 2010
 - 47% decrease of total CO₂-energy emissions
 - 56% reduction in emissions per capita
 - 88% reduction in the carbon intensity of GDP

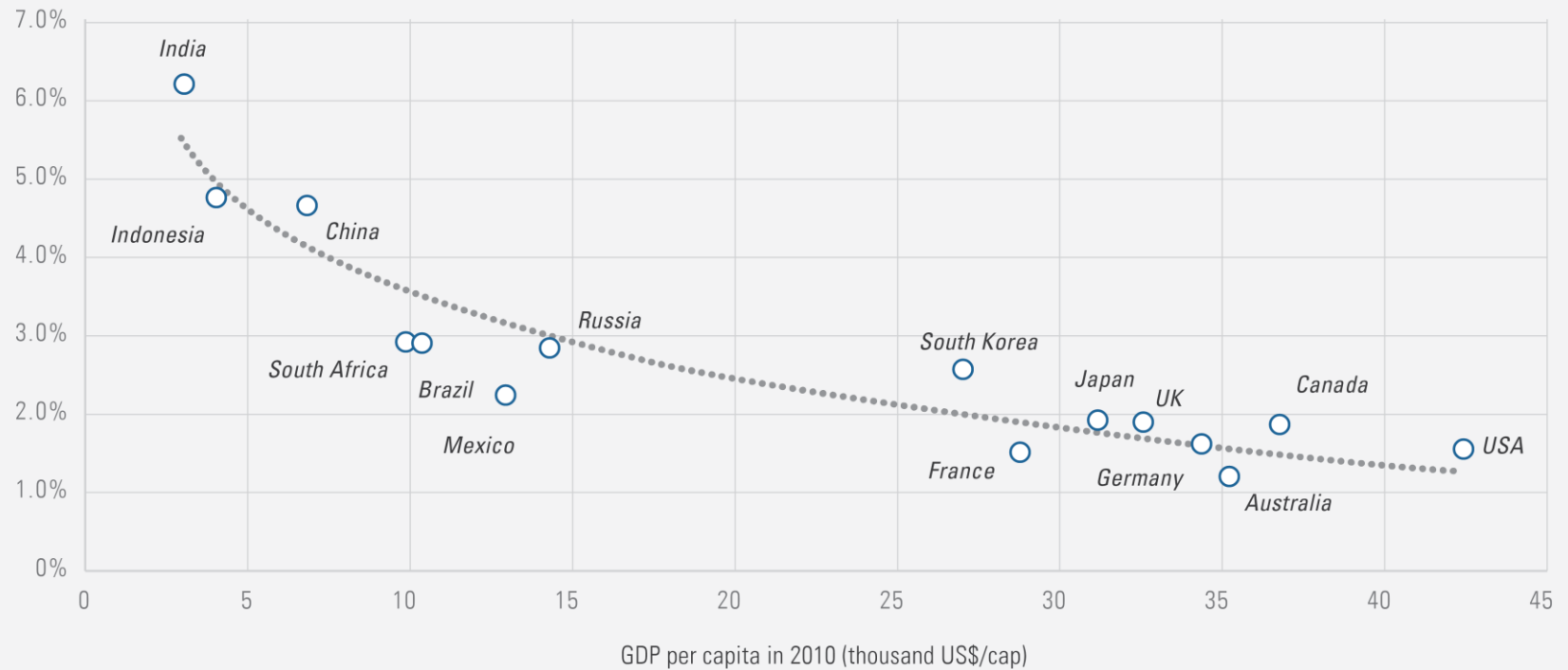
Emissions reductions to 2050 in the 15 DDPs

Figure 6.3. Energy-related CO₂ emissions reduction trajectories in the 15 DDPs



Based on Assumptions of Continued Economic Growth

Figure 6.1. Average annual growth rate of GDP per capita between 2010 and 2050



Phase 1 Results (cont'd)

- 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

Phase 1 Results (cont'd)

- The preliminary DDPs already provide key insights:
 - 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

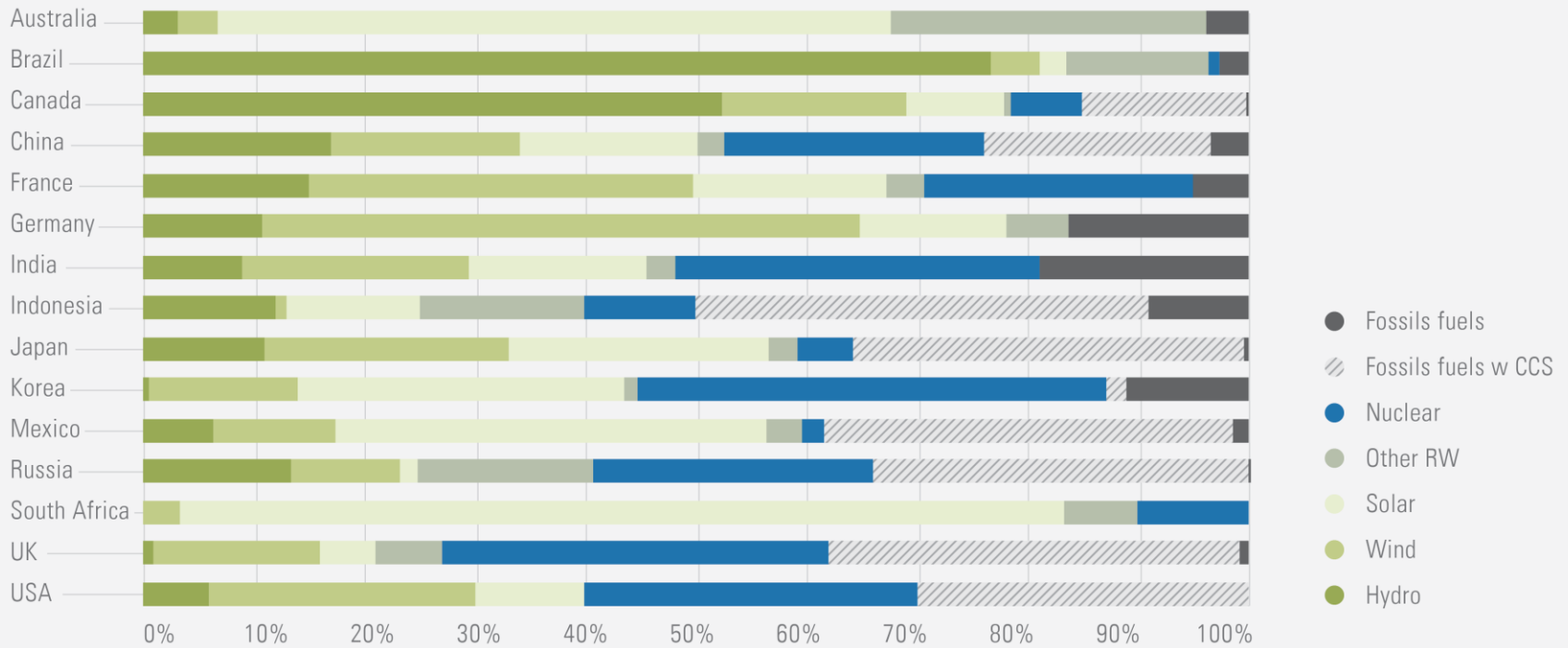
3 “Pillars”

Energy System Deep Decarbonization

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

Low Carbon Electricity

Figure 6.11. Electricity generation mix in 2050



Need for Global RDD&D

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

Need for Global RDD&D cont'd

- Some key technologies are either not yet technically mature or affordable:
 - Solar and wind electricity generation
 - Advanced energy storage and flexible load management to balance systems with high penetrations of variable renewable energy
 - Zero emissions vehicles with adequate range
 - Very high performance appliances, controls, and materials for buildings
- Some emerging technologies are key in a subset of DDPs:
 - New types of renewable energy technologies (e.g. advanced geothermal and deep offshore wind)
 - 2nd and 3rd generation sustainable biofuels or synthesized fuels
 - Carbon capture and storage (on fossil-fueled power plants and industries)
 - Advanced nuclear power technology that sustains public confidence and support

DDPP Informs Near-term Planning

- The DDPP has a **long-term** (2050) perspective.
- The **backcasting approach**, based on the long-term global goal of limiting the increase of mean surface temperature below 2°C, informs near-term emissions reduction/limitation goals
- Pathways to 2050 reveal the content of the **transformation** (with sectoral and technological details) to a low-carbon economy
- Helps to avoid **lock-in** to pathways that offer near-term emission reductions but do not enable long-term deep decarbonization

Considerations for International Negotiations

- 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
- Each DDP would be predicated on 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

Thank you

Report available online at:
www.deepdecarbonization.org

