



# Building a bridge *from current action to “two degrees”*

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with contributions from Detlef van Vuuren &  
Heleen van Soest (PBL), Panagiotis Fragkos  
(E3Modelling)

Side event “Moving from commitment to action: combining mitigation and development objectives”

13 December 2019, UNFCCC COP25, Madrid



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## Partners



**Project leaders:** Detlef van Vuuren and Heleen van Soest

**Coordinator:** PBL Netherlands Environmental Assessment Agency

**URL:** <https://themasites.pbl.nl/commit/>

**Funding:** European Commission's Directorate-General for Climate Action (DG CLIMA)

# Main methodological approach



- Economic modelling
  - 11 countries of G20 (~90% of global CO2 emissions nowadays)
  - National teams closely working with policymakers

Country	National Team	Models	Model type
Australia	CSIRO	TIMES-AUS	Energy system
Brazil	COPPE	BLUES, COFFEE	Integrated Assessment
Canada	ECCC	GCAM-Canada, EC-MSMR	Energy system, Macro-economy
China	NCSC, ERI	PECE	Integrated energy system
EU-28	E3Modelling	PRIMES	Energy system
India	TERI	MARKAL	Energy system
Indonesia	BAU, CREP-ITB	ExSS, AFOLU Dashboard	Energy system, AFOLU, waste
Japan	NIES	AIM/Enduse [JPN]	Energy system
Russia	HSE	TIMES-RUS, ROBUL/ CBS-CFS3	Energy system, Forestry
South Korea	UOS	TIMES, AIM-Korea	Energy system
USA	PNNL	GCAM	Integrated Assessment

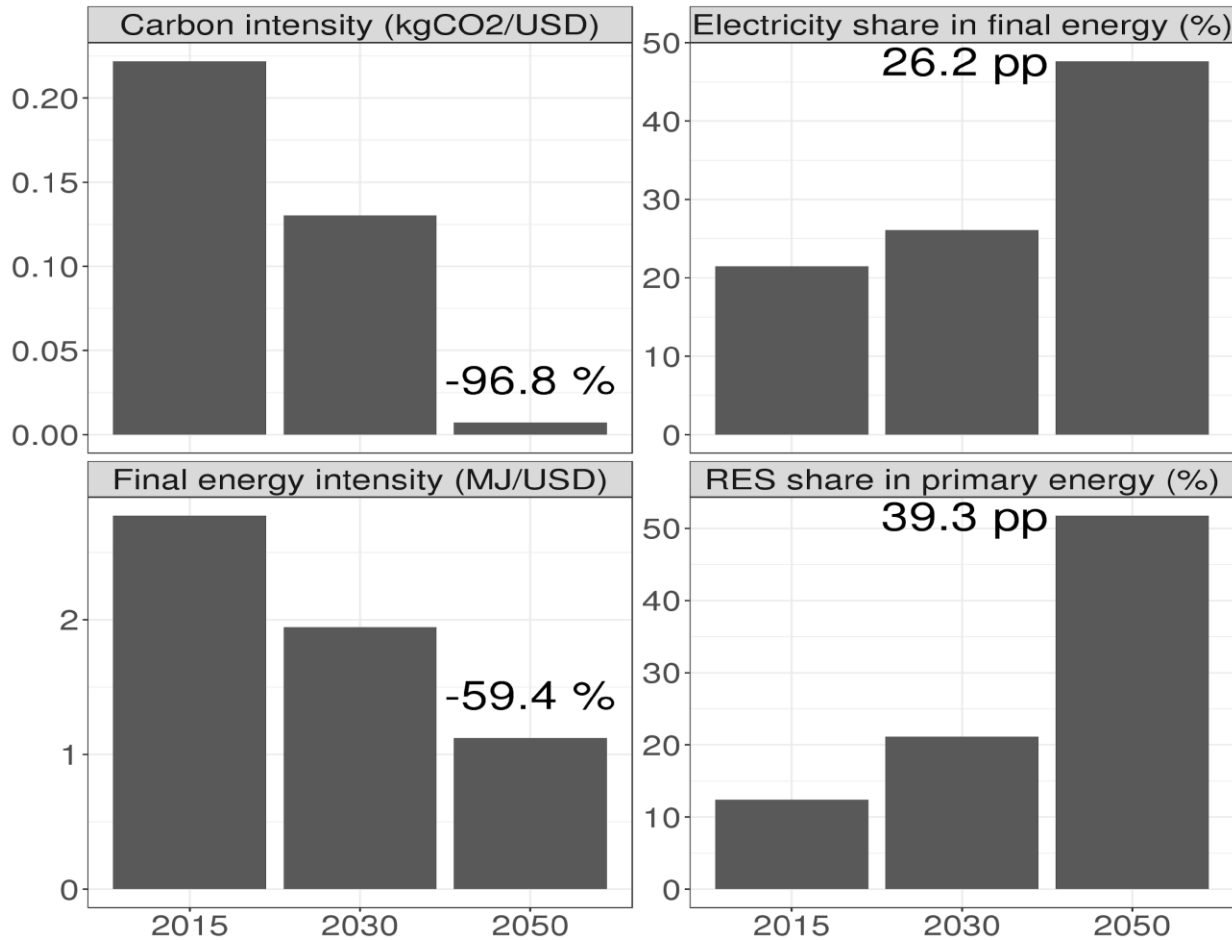
- Objective: Develop national low-carbon development strategies for major developing and developed G-20 economies
- Common indicators and figures:
  - Energy-economy indicators
  - GHG and CO2 emissions by major sectors
  - Energy system transformations
  - Other national relevant issues
- National fact sheets refer to the Talanoa dialogue questions:
  - Where are we? Where do we want to go? How do we get there?
  - + one specific key issue for each country
- **And bridging scenarios to link current policies and “<2°C” pathways**



# Fact sheet: EU-28 by 2050

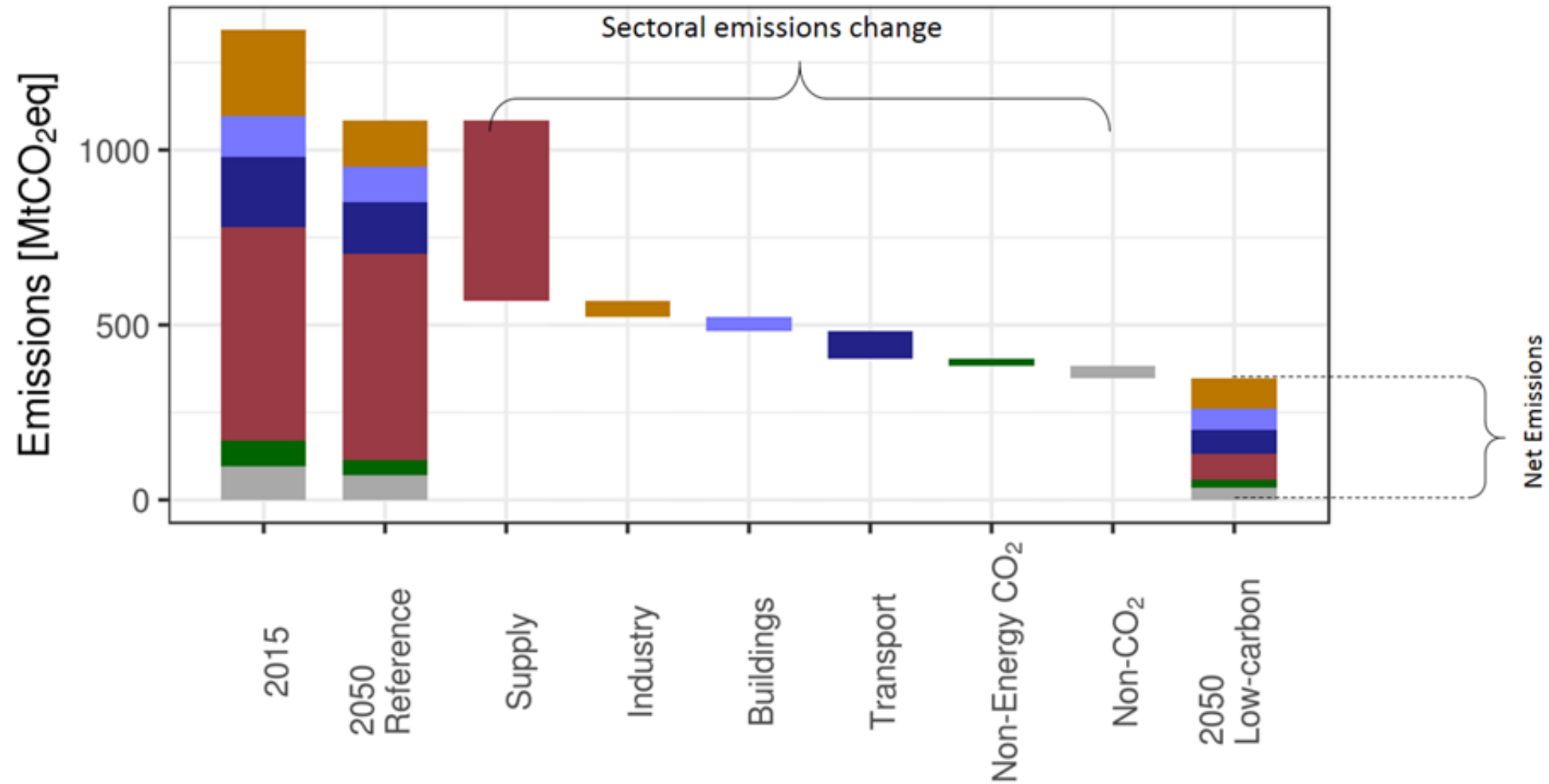


EU-28



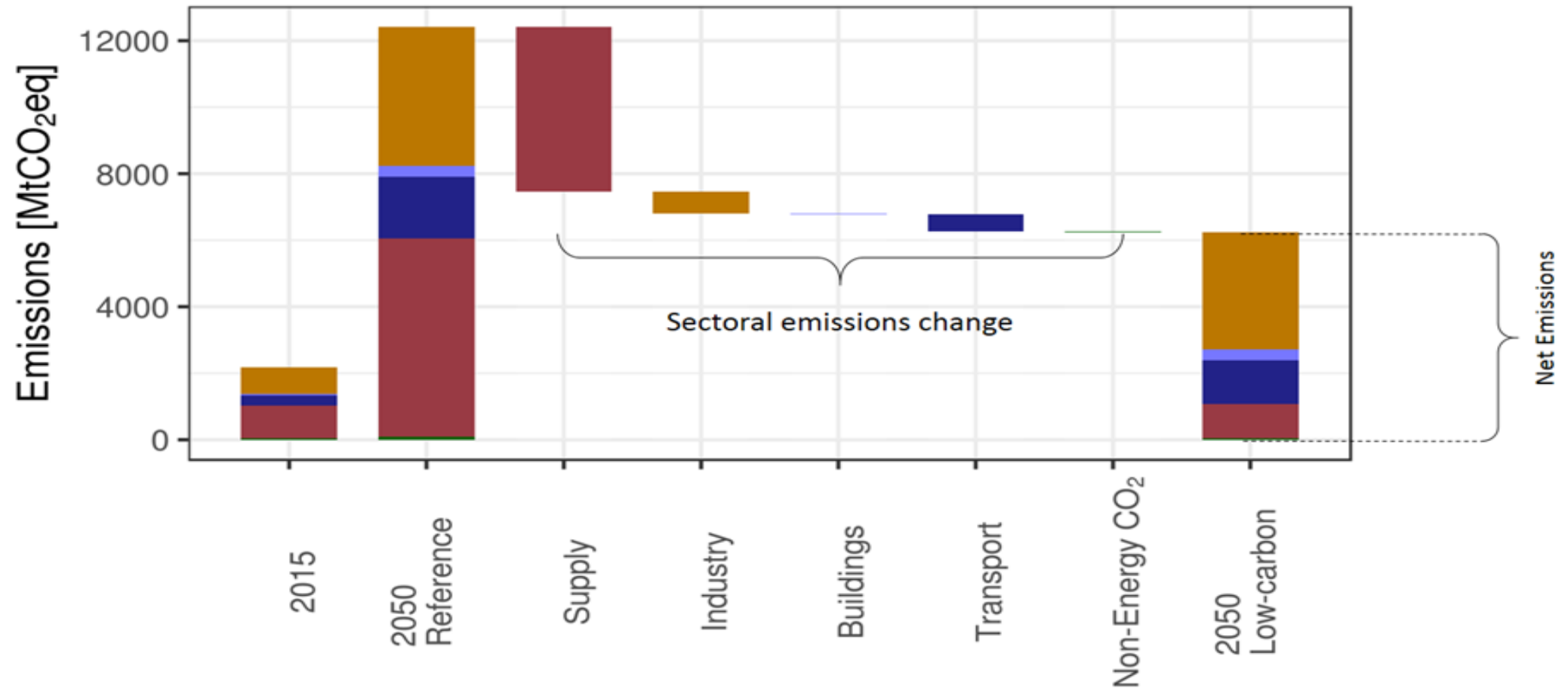
- “No-regret” options include:
  - Energy efficiency improvement in all sectors
  - Expansion of renewables
  - Electrification of energy uses
  - Advanced biofuels in transport
- But for “climate-neutrality” additional options are needed:
  - Hydrogen and clean e-fuels
  - Large amounts of electricity storage
  - Deep building retrofits
  - Heat pumps in buildings and industries
  - Material efficiency/circular economy
  - Sector coupling and market integration...

# Fact sheet: Japan



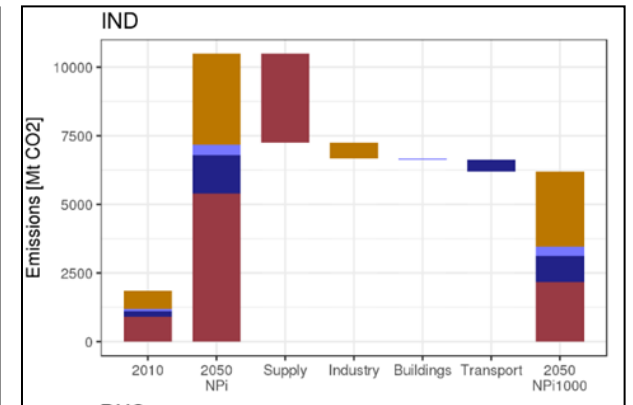
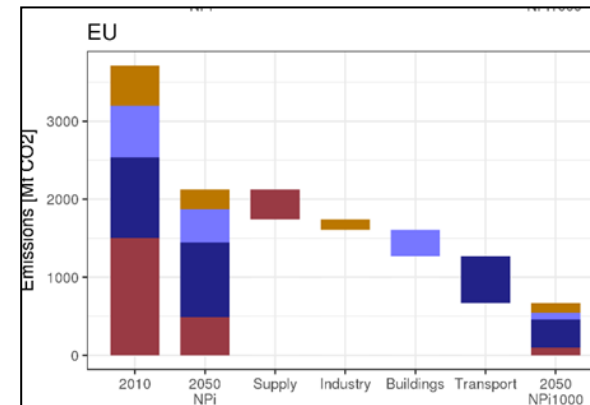
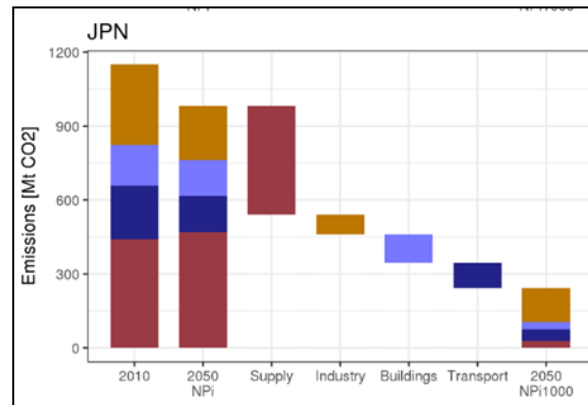
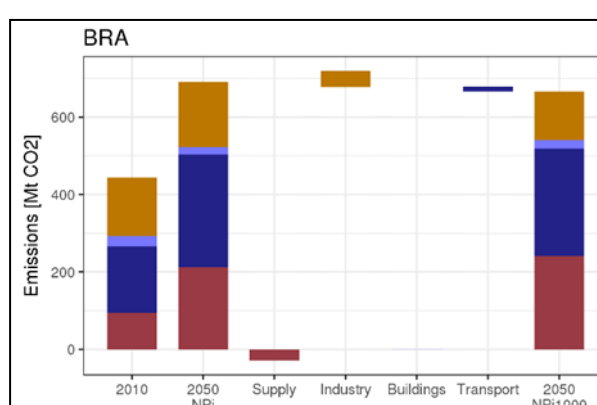
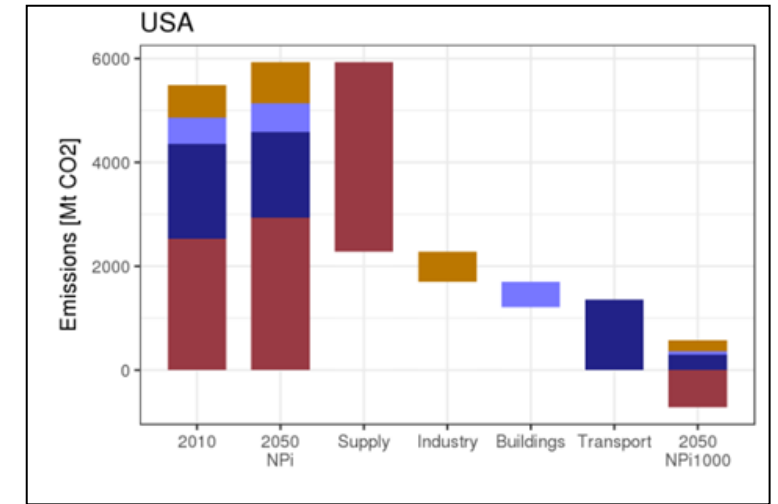
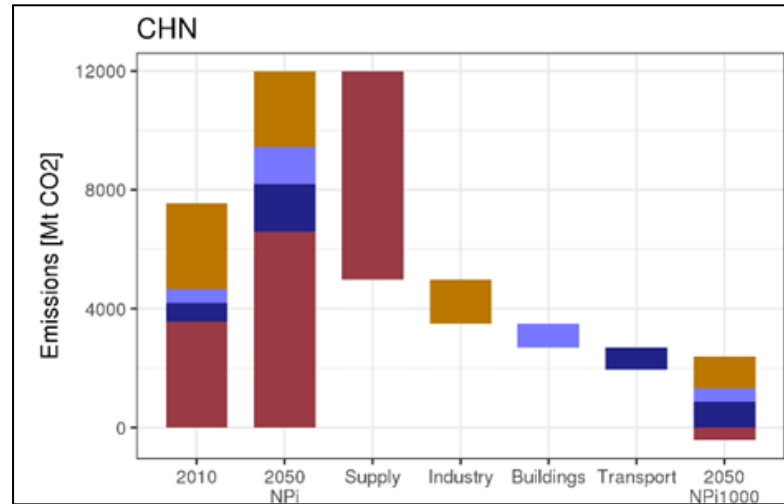
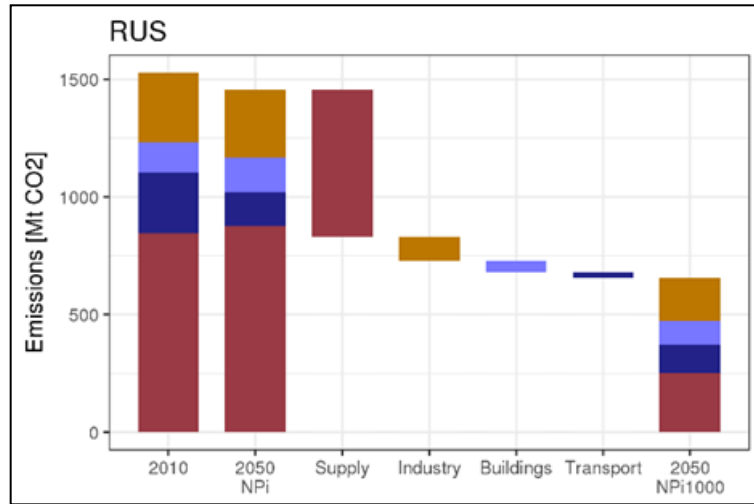
Reference scenario – NDC; Sectors - energy supply, industry, residential and commercial buildings, transport, industrial processes, non-CO<sub>2</sub>, and AFOLU; 2050 low-carbon scenario - consistent with 2°C; Non-CO<sub>2</sub> emissions - from AFOLU, energy use, waste treatment and industrial processes

# Fact sheet: India



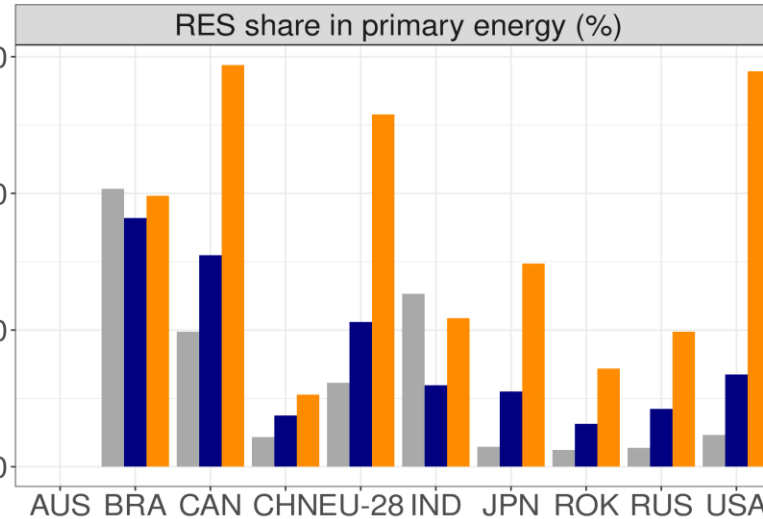
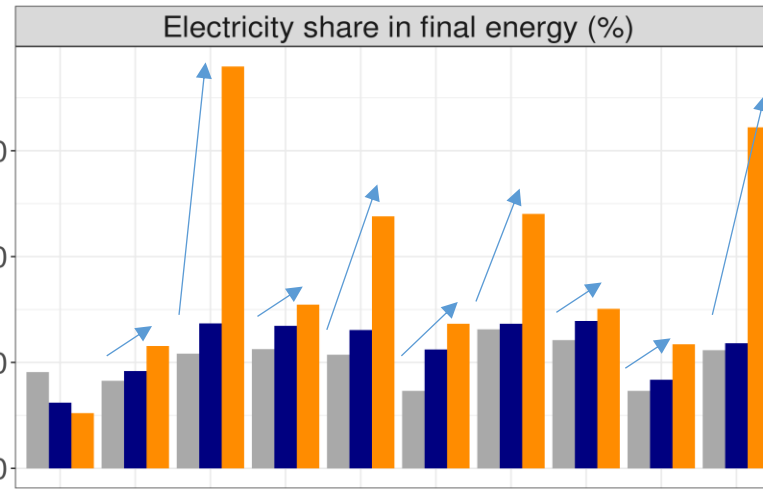
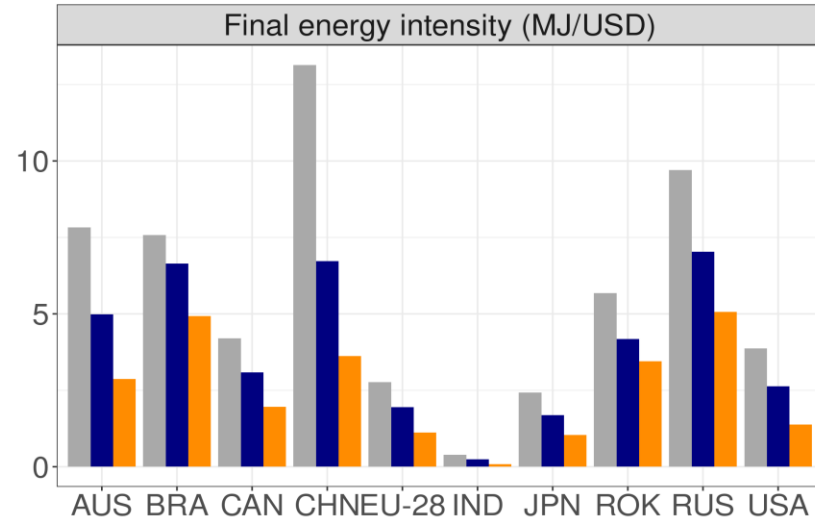
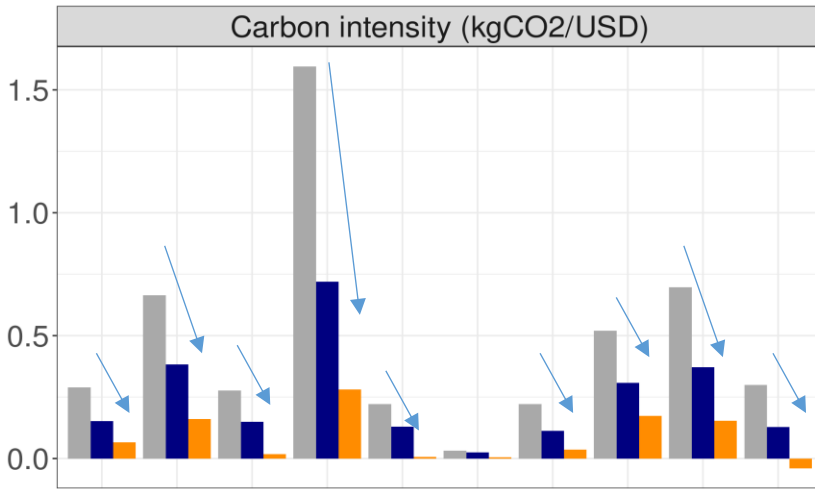
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# Fact sheets for many COMMIT countries

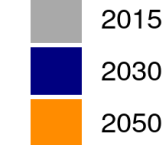




# Key decarbonization options for large economies



year



Specific options differ by country:

- Nuclear and LNG in Japan/Korea
- Hydrogen, e-fuels in EU
- Non-CO<sub>2</sub> and LULUCF mitigation in Brazil and Indonesia
- Methane leakage and forest sinks in Russia

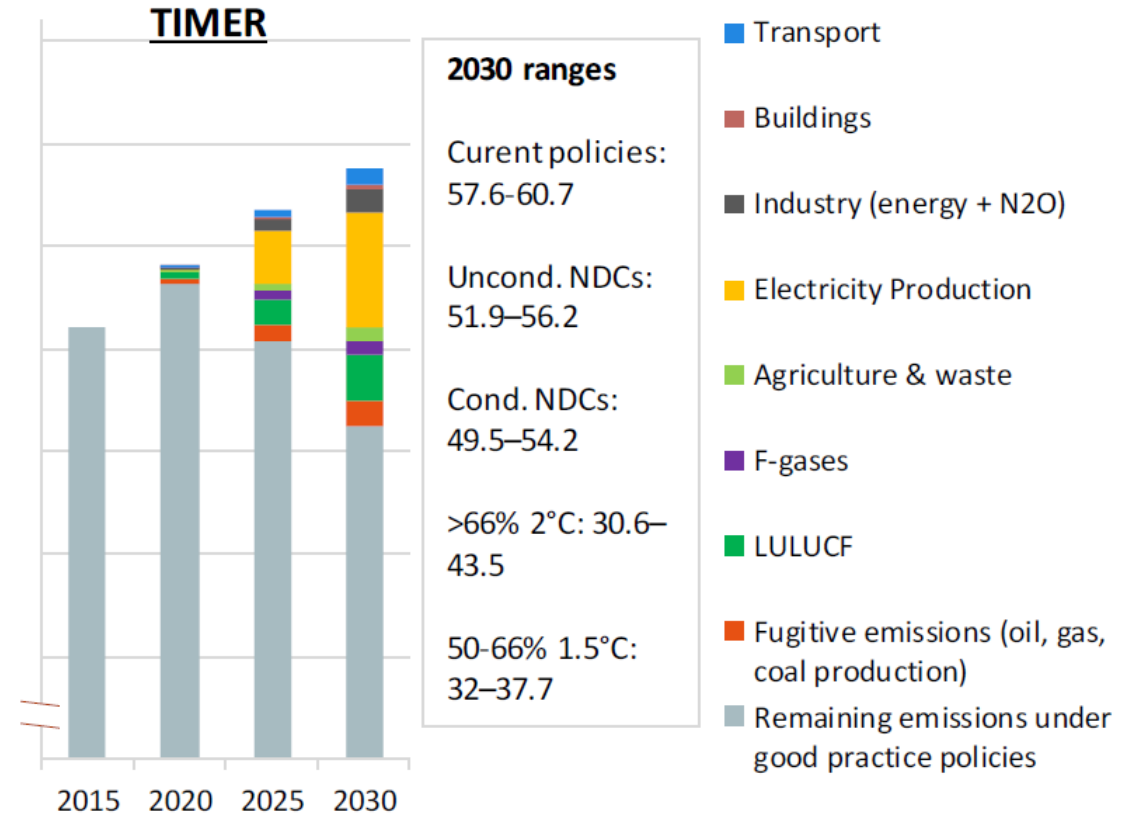
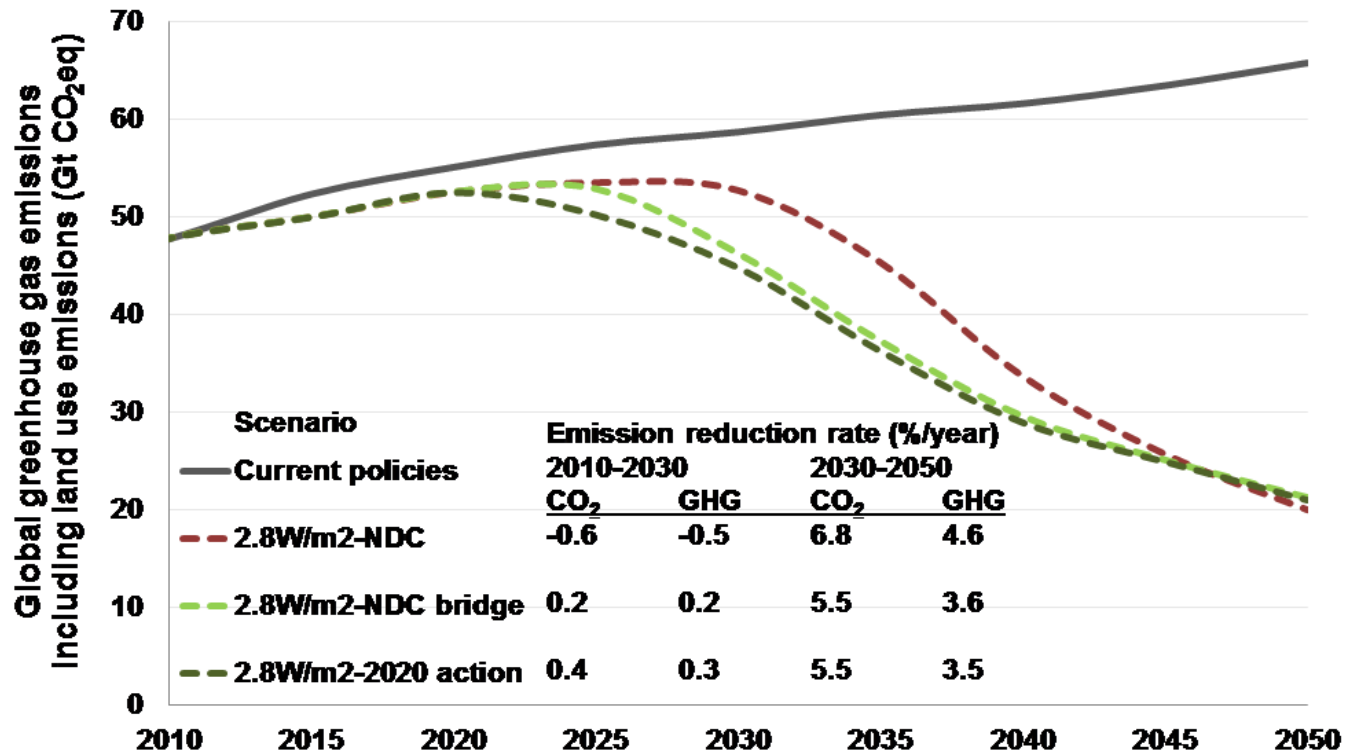
COMMON OPTIONS:

1. Energy efficiency improvements in all end-use sectors
2. Significant expansion of RES in power generation
3. Electrification of final energy demand
4. Large improvement in CO<sub>2</sub> intensity of electricity production

# Bridging scenarios: work in progress



Offer more realistic scenarios than the national '2 °C' pathways based on cost-optimal



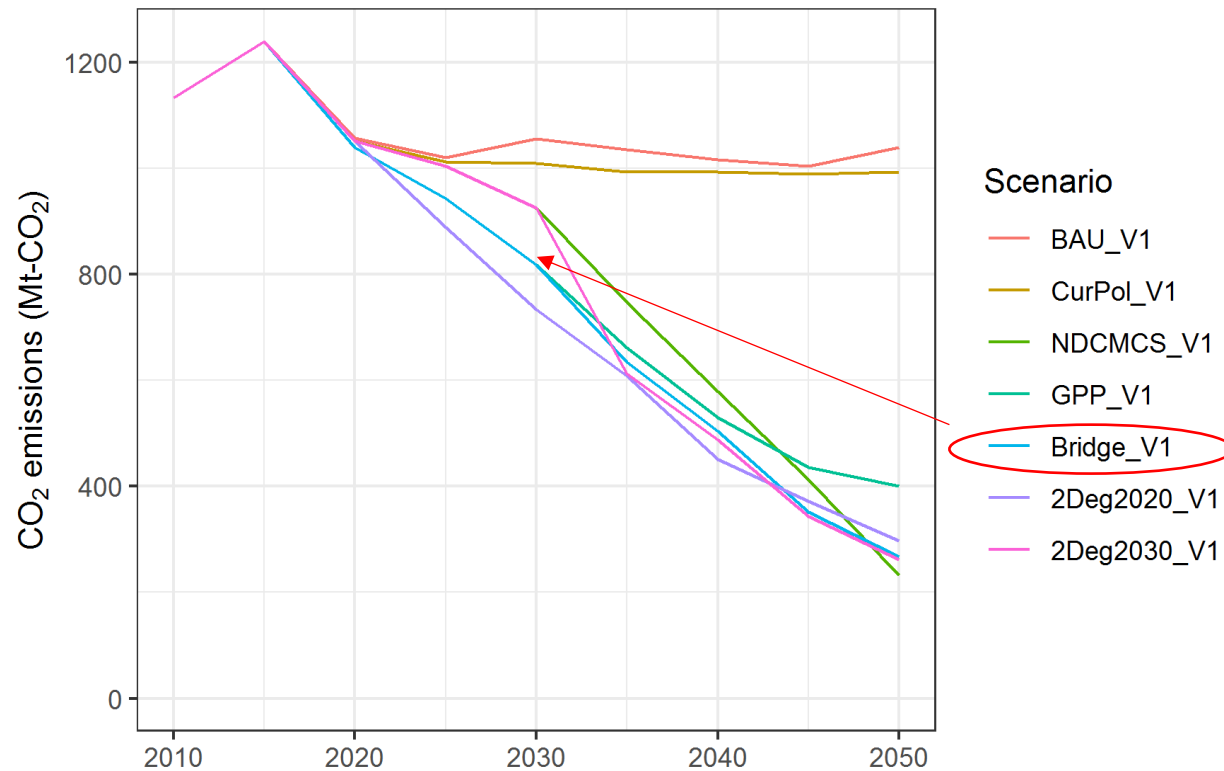
# Bridging scenario: CO2 emissions in Japan



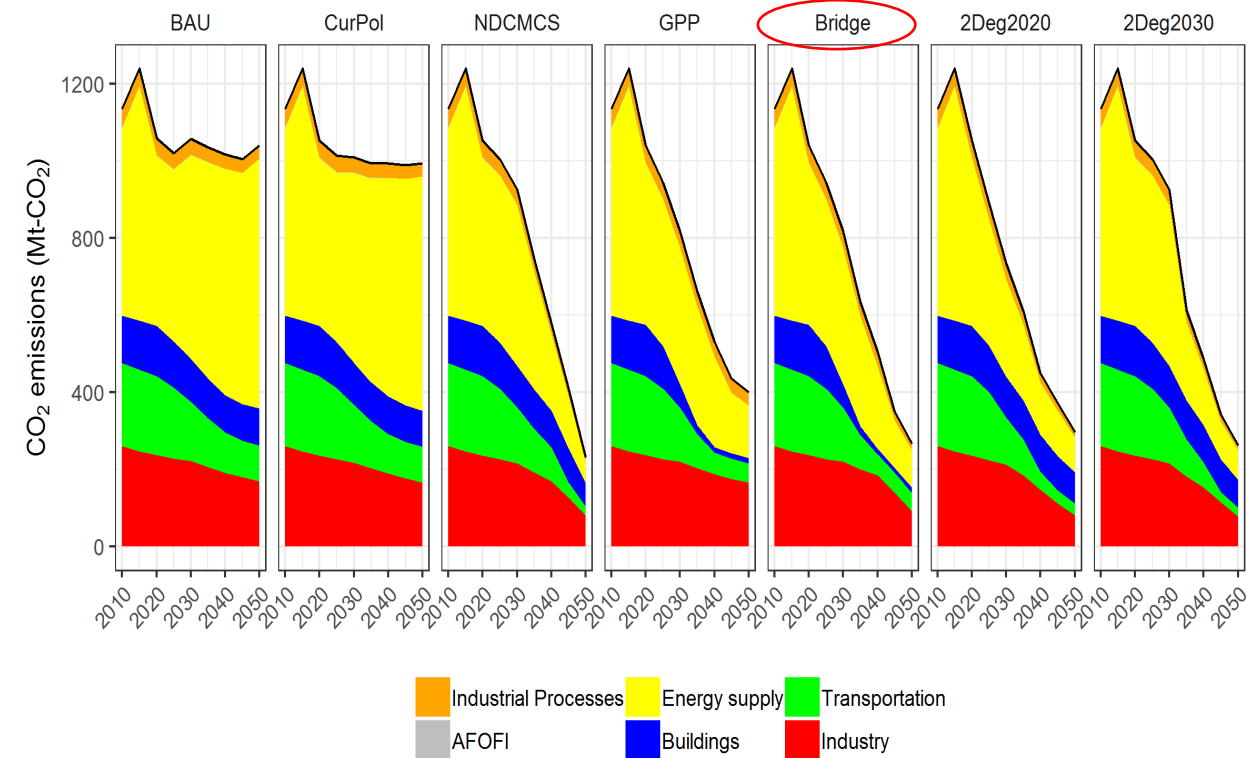
Good practice policy halves the CO2 emission gap between NDC and 2Deg2020 in 2030.

Emissions from buildings and transport decline rapidly in “Good practice policy” and “Bridge” scenarios.

Emissions|CO2FFI



Emissions|CO2FFI



- Longer-term national decarbonization pathways:
  - Connect short-term targets to long-term strategies
- Options for individual countries and regional projects:
  - Hydrogen and clean synthetic fuels (EU)
  - The role of nuclear and LNG (Japan and Korea)
  - Investment and Financial requirements (China, India)
  - Sustainable Agriculture (Brazil)
  - Oil sands (Canada)
  - State-level policies (USA)
  - International markets and carbon regulation impacts (Russia)
  - Asian Super-Grid and similar initiatives...

## Modelling results:

- Scenario projections of investment costs
- Energy supply vs energy demand investment
- Uptake of specific technologies in countries (nuclear, H2, CCS, e-fuels)...

- **National-level models capture country specificities:**  
technological options based on policy priorities,  
energy resources and socioeconomic considerations
- Country specificities play a **key role in designing nationally-relevant low-emission strategies**
- Different starting points and dynamics of economic growth and energy systems' evolution mean **differentiated low-carbon transition pathways** by country

# Conclusion 2 – Paris targets are achievable



- **Ambitious** low-carbon scenarios of major economies **are consistent** with a pathway limiting global warming to “well-below 2°C”
- Major economies are projected to:
  - Improve carbon intensities
  - Diversify energy and electricity mix
  - Improve energy efficiencies
  - Use multiple country-specific mitigation options

- The key decarbonization pillars **are common to all countries**:
  - Expansion of RES in power (mainly, PV and wind), transport and heat (RES shares >50%)
  - Energy efficiency improvements in all demand sectors
  - Electrification of final energy demand in mobility and heating (the share of electricity in final energy demand increases from global average of 20% to 25-80%)
- Deployment of **other low-carbon options** (CCS, nuclear, advanced biofuels, hydrogen, synthetic fuels) depends on national circumstances, policy considerations and priorities



# Thank you!

Much more information:

<https://themasites.pbl.nl/commit/>