



COMMIT national mid-century pathways *in the context of global mitigation scenarios*

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(E3Modelling)

Side event “NDCs, the Paris Agreement and the Sustainable Development Goals: Tracking progress and finding synergies”

11 December 2019, 12h30 – 14h00 EU Pavilion, Room Brussels, 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 (87% of global CO2 emissions in 2015)
 - 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

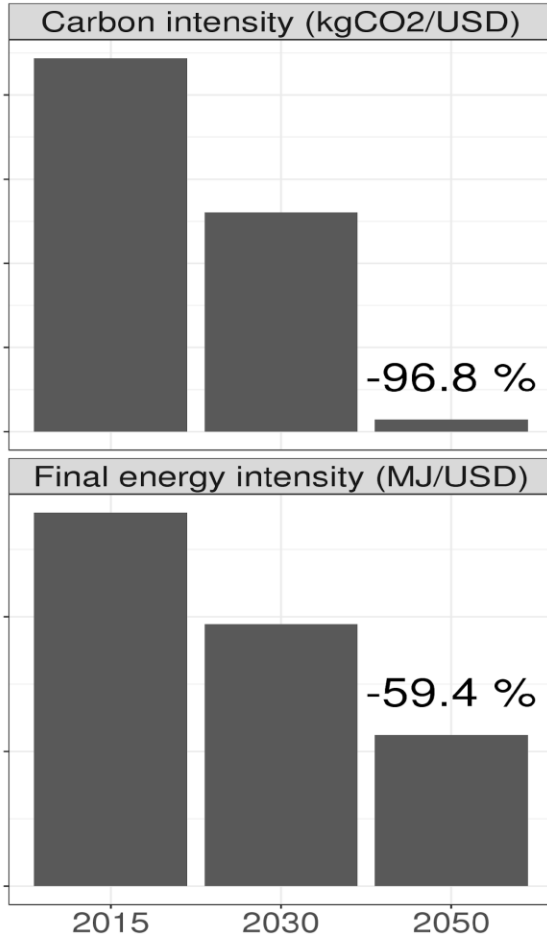
- Objective: Develop national low-carbon development strategies for major developing and developed G-20 economies
- Common indicators and figures were developed for all countries:
 - Energy-economy indicators (e.g. energy and carbon intensity of GDP)
 - GHG and CO2 emissions by major emitting sectors
 - Energy system transformations (e.g. energy efficiency, RES share electrification)
 - Other national relevant issues (e.g. non-CO2, land-use, technology uptake)
- 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



Fact sheet: EU-28 by 2050



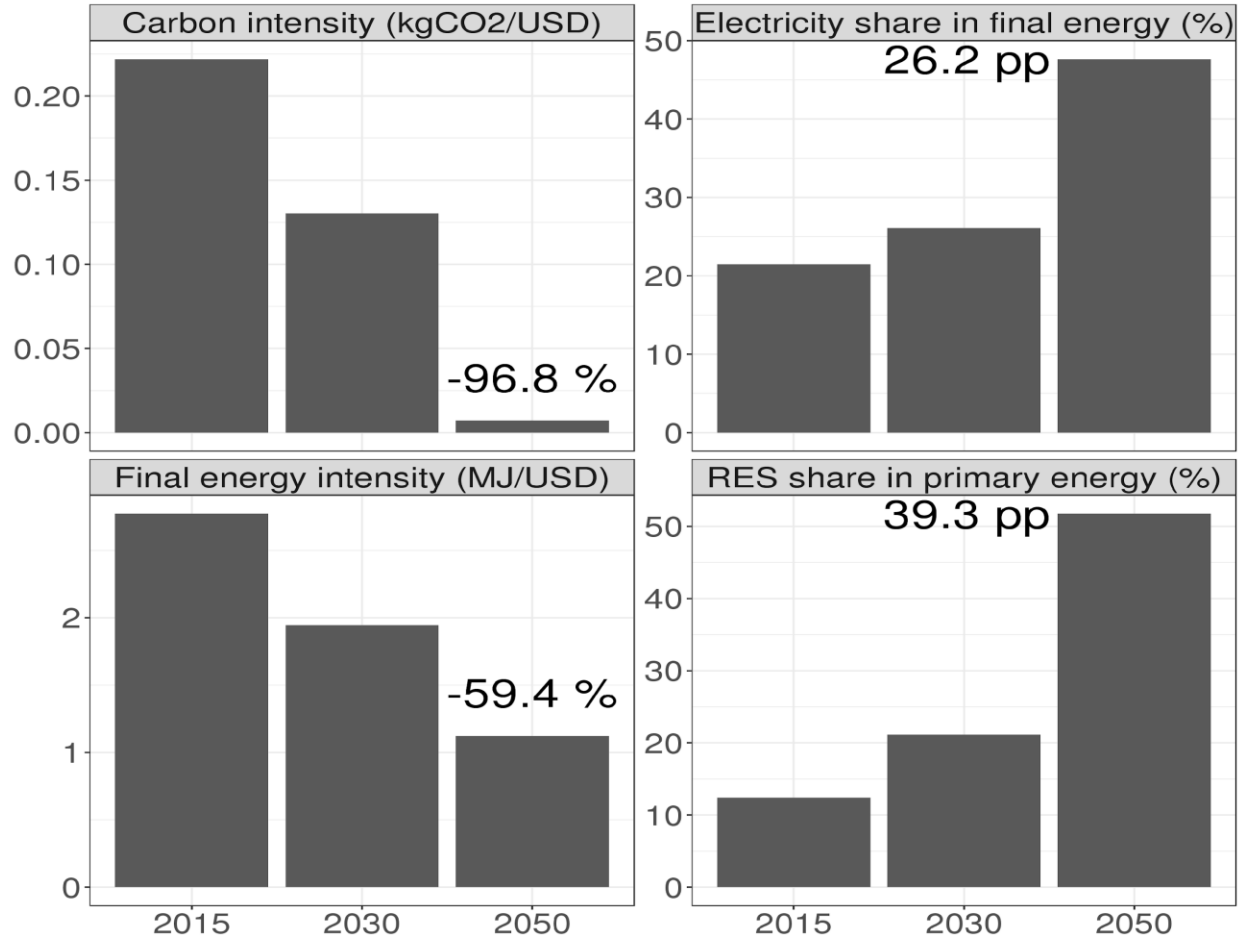
EU-28



Fact sheet: EU-28 by 2050



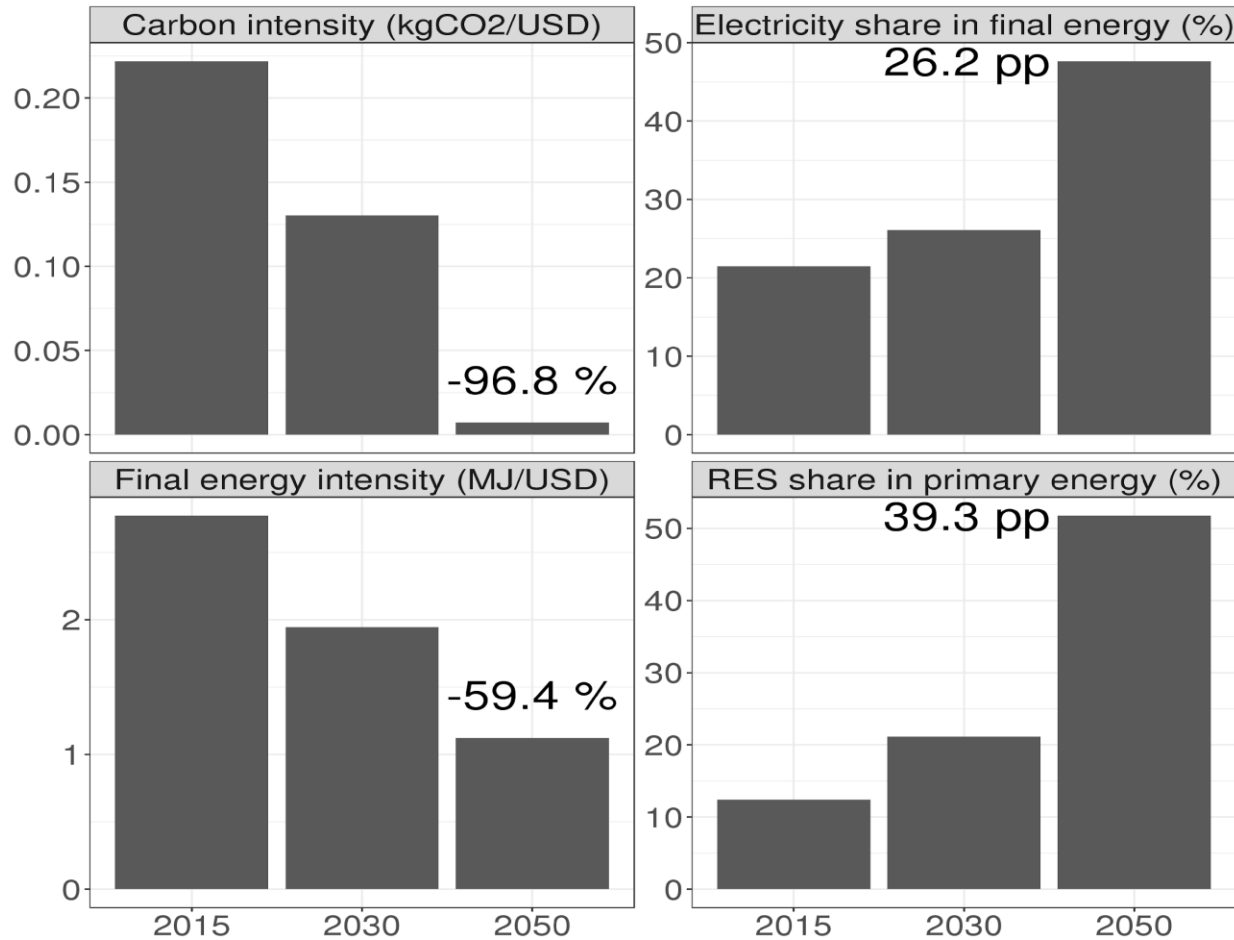
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Fact sheet: EU-28 by 2050

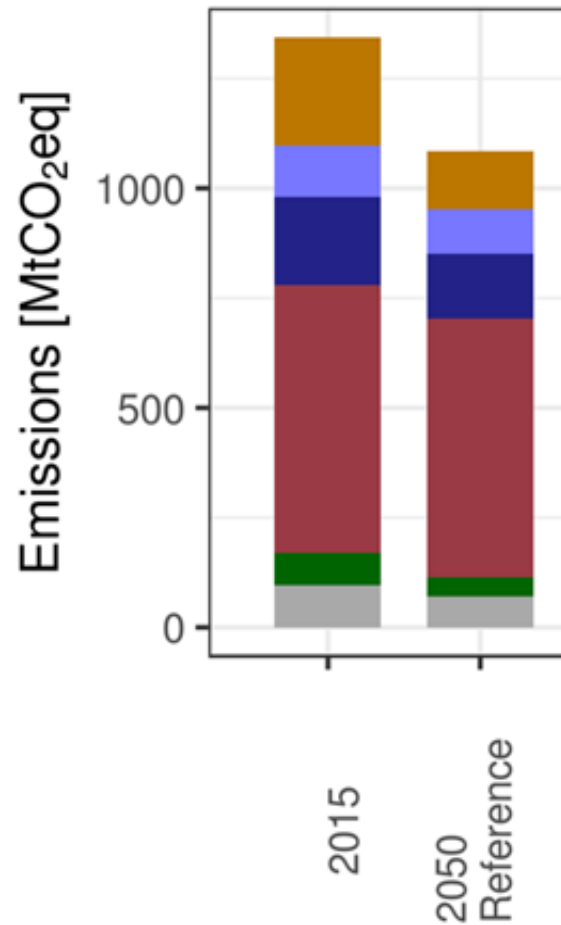


EU-28



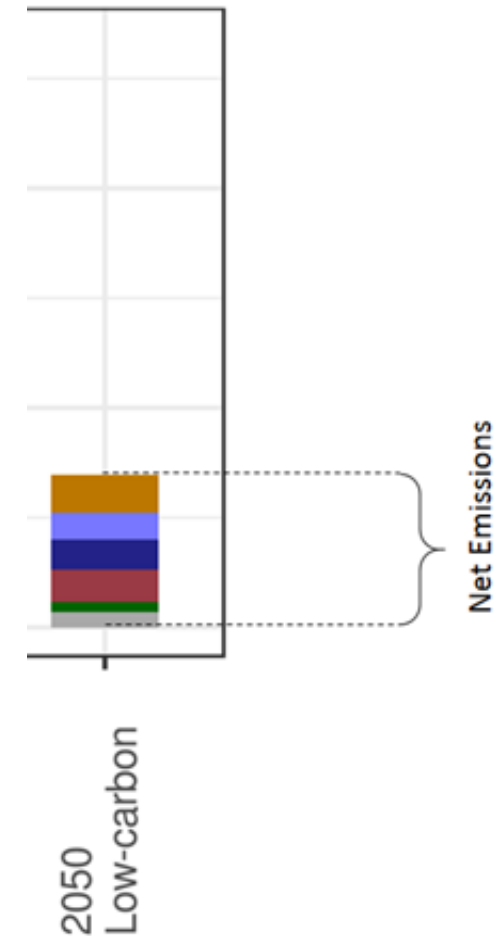
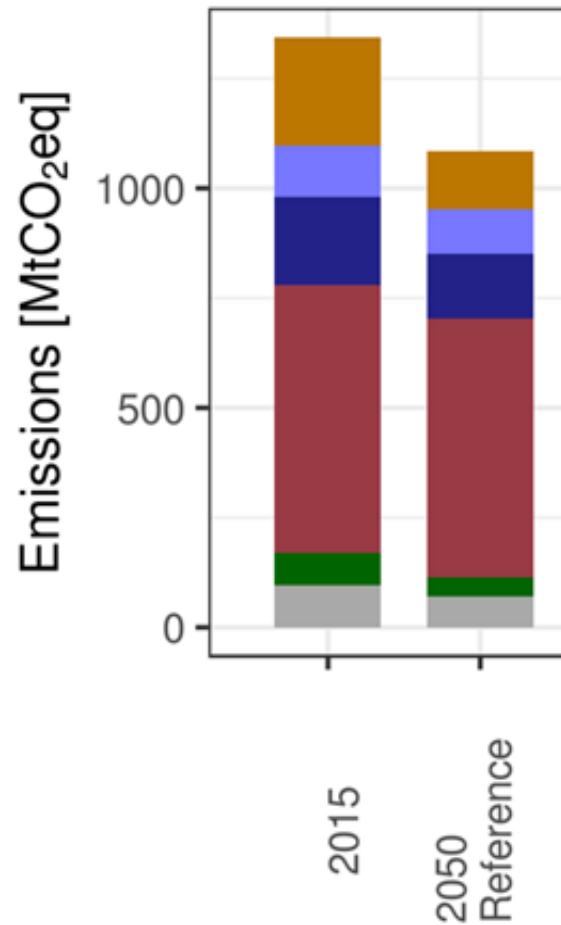
- “No-regret” options include:
 - Energy efficiency improvement in all sectors
 - Expansion of renewables
 - Electrification of energy uses
 - Advanced biofuels in transport
- But for “climate-neutrality” additional options are needed:
 - Hydrogen and clean e-fuels
 - Large amounts of electricity storage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

Fact sheet: Japan



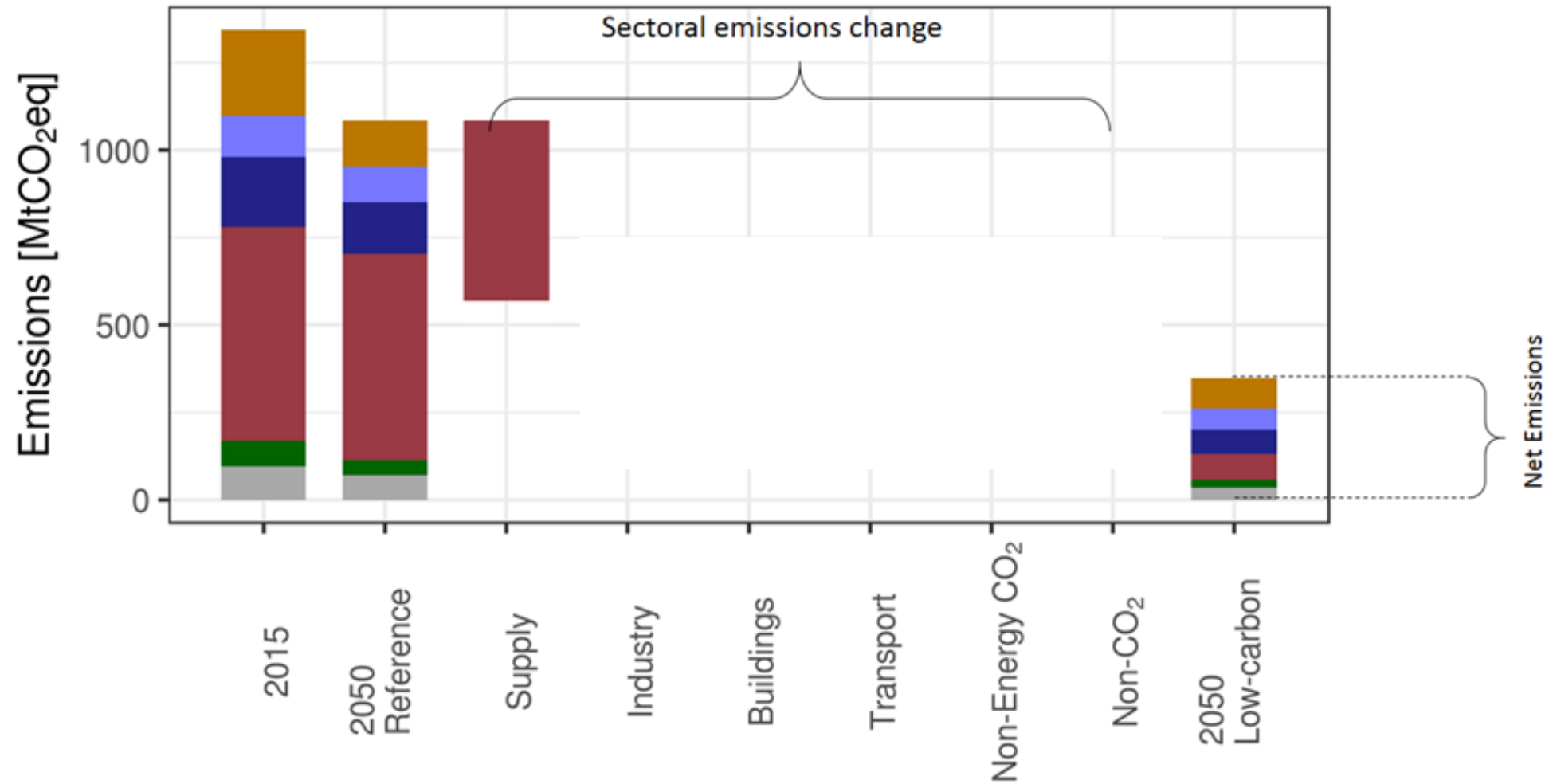
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2050 low-carbon scenario - consistent with 2°C; Non-CO₂ emissions - from AFOLU, energy use, waste treatment and industrial processes

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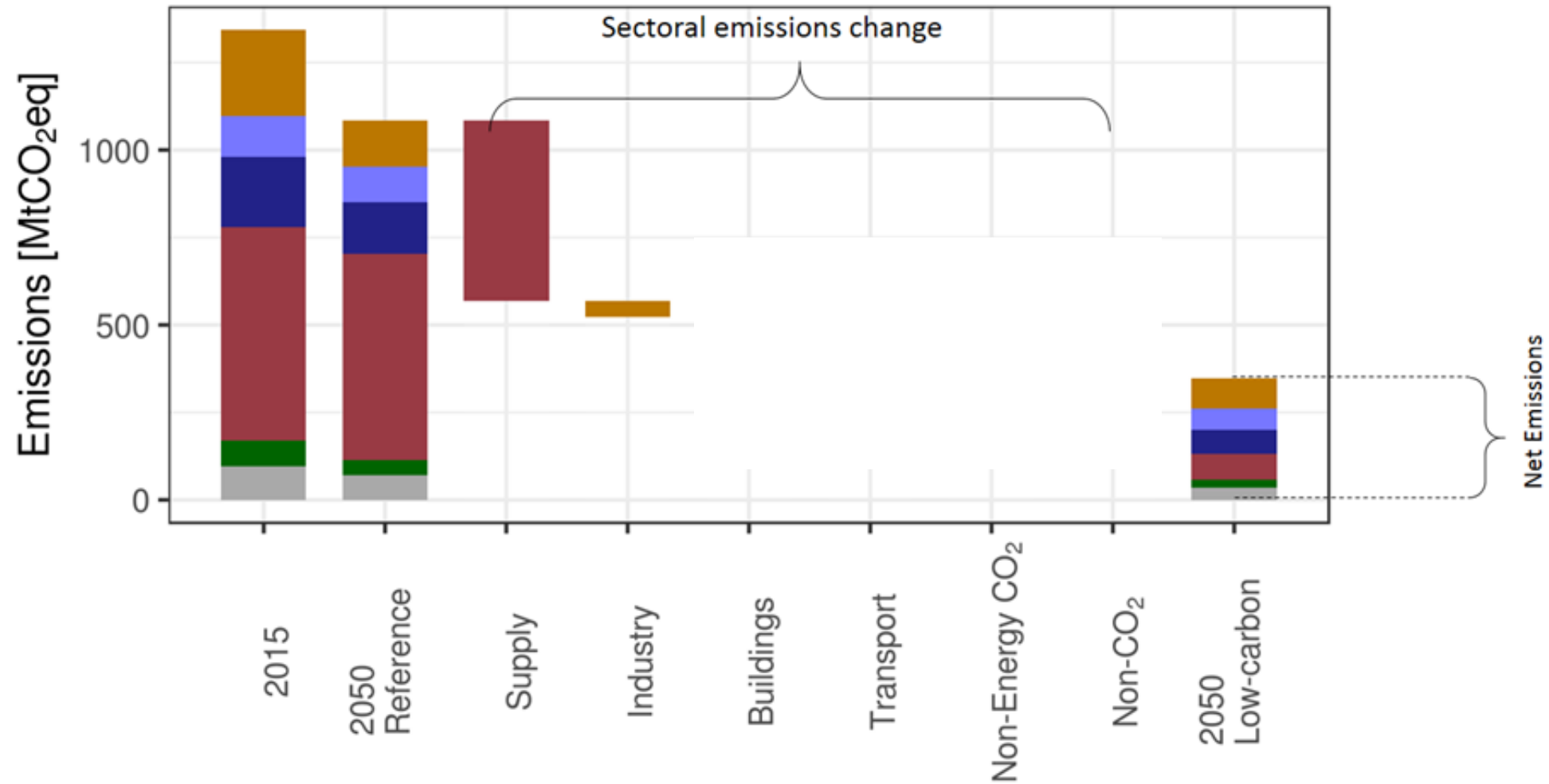
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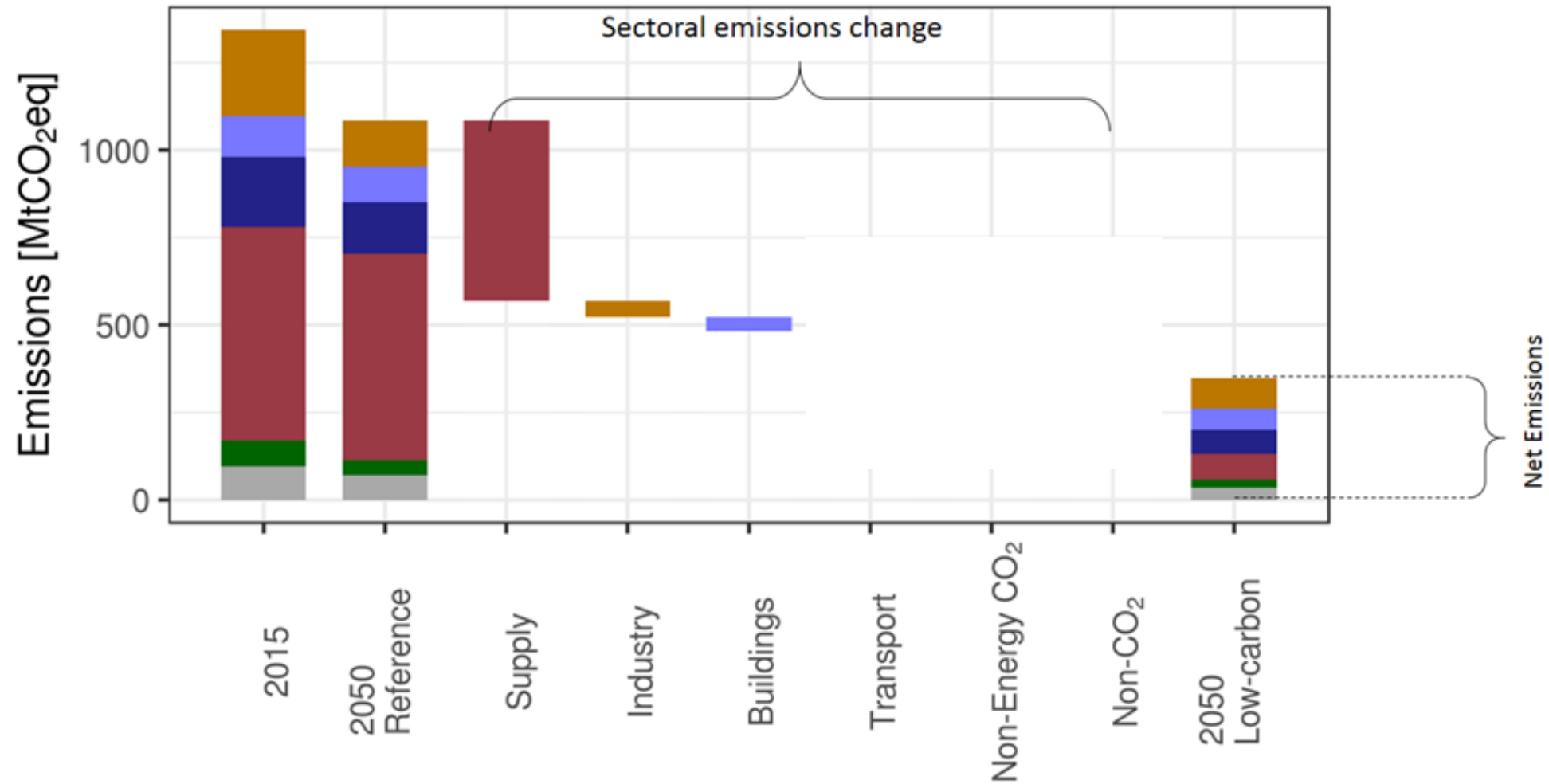
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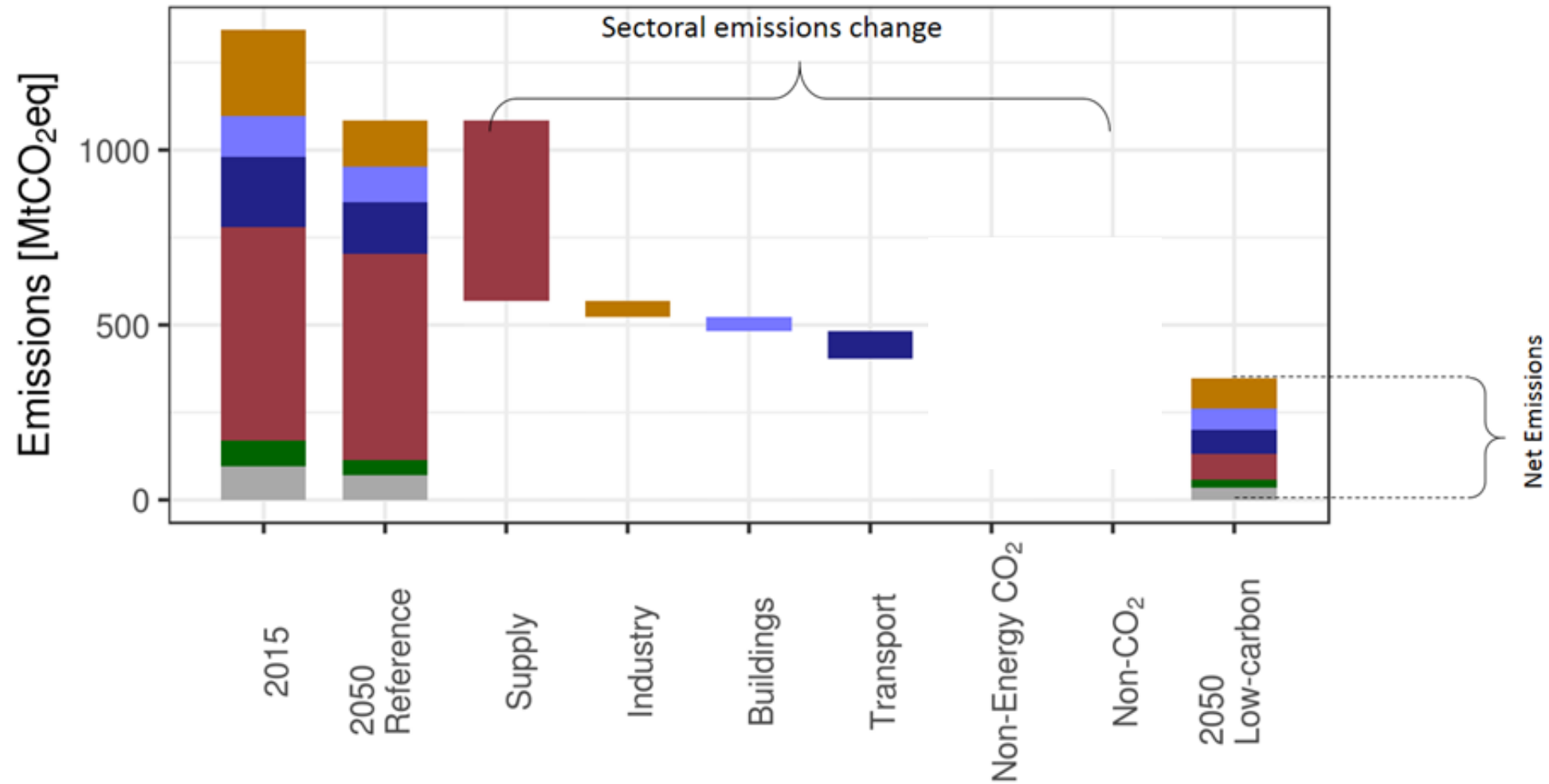
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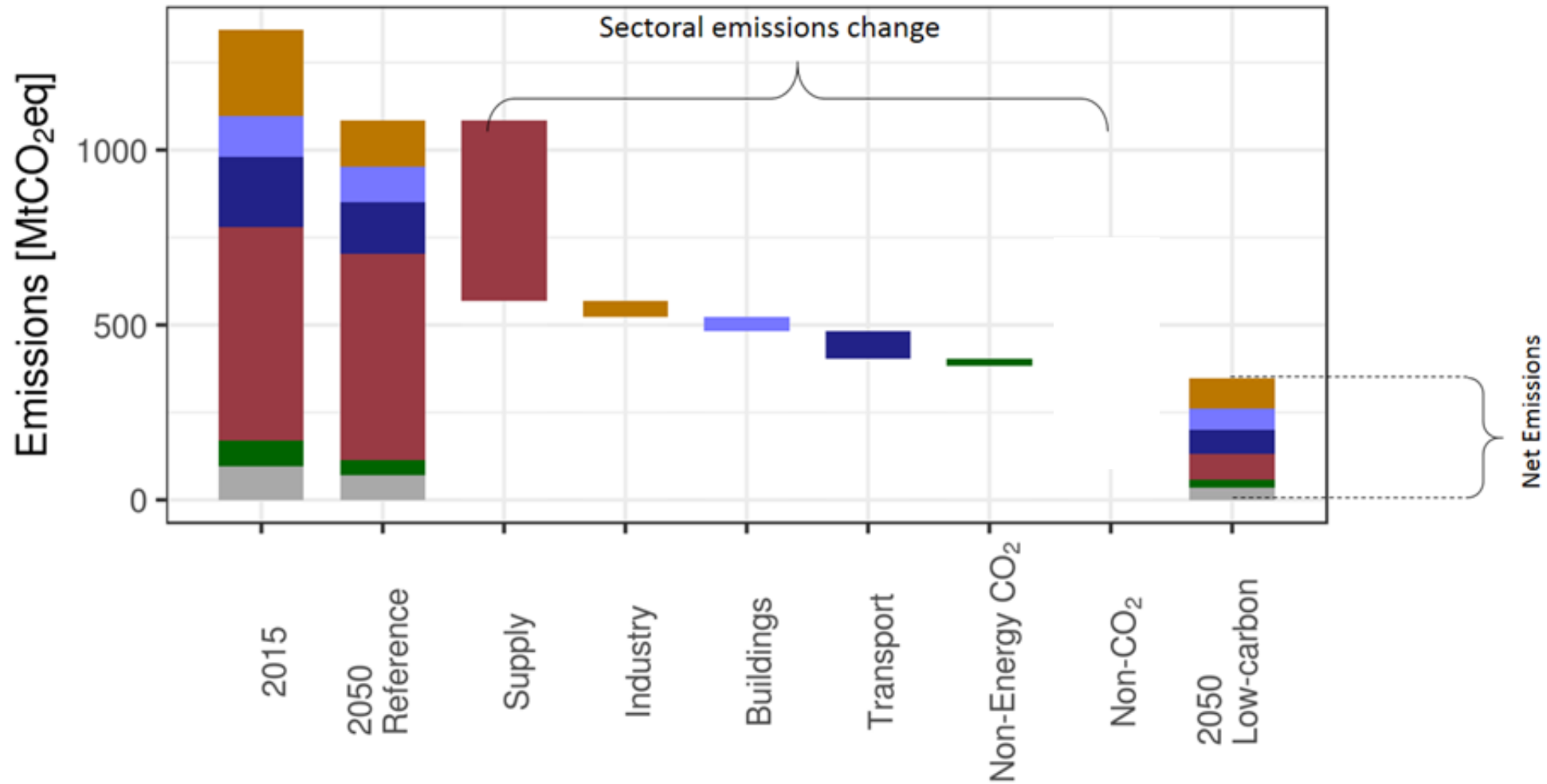
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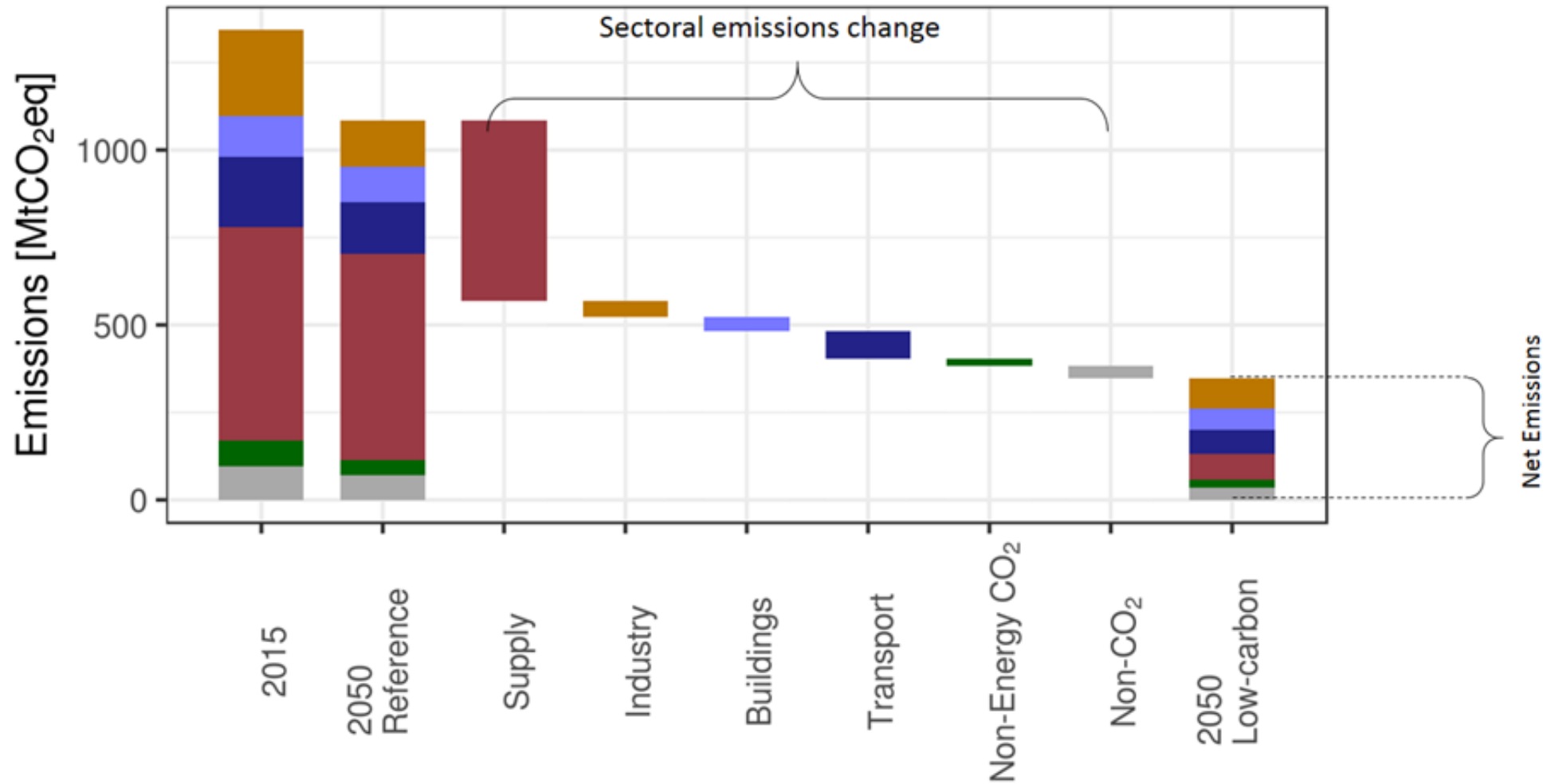
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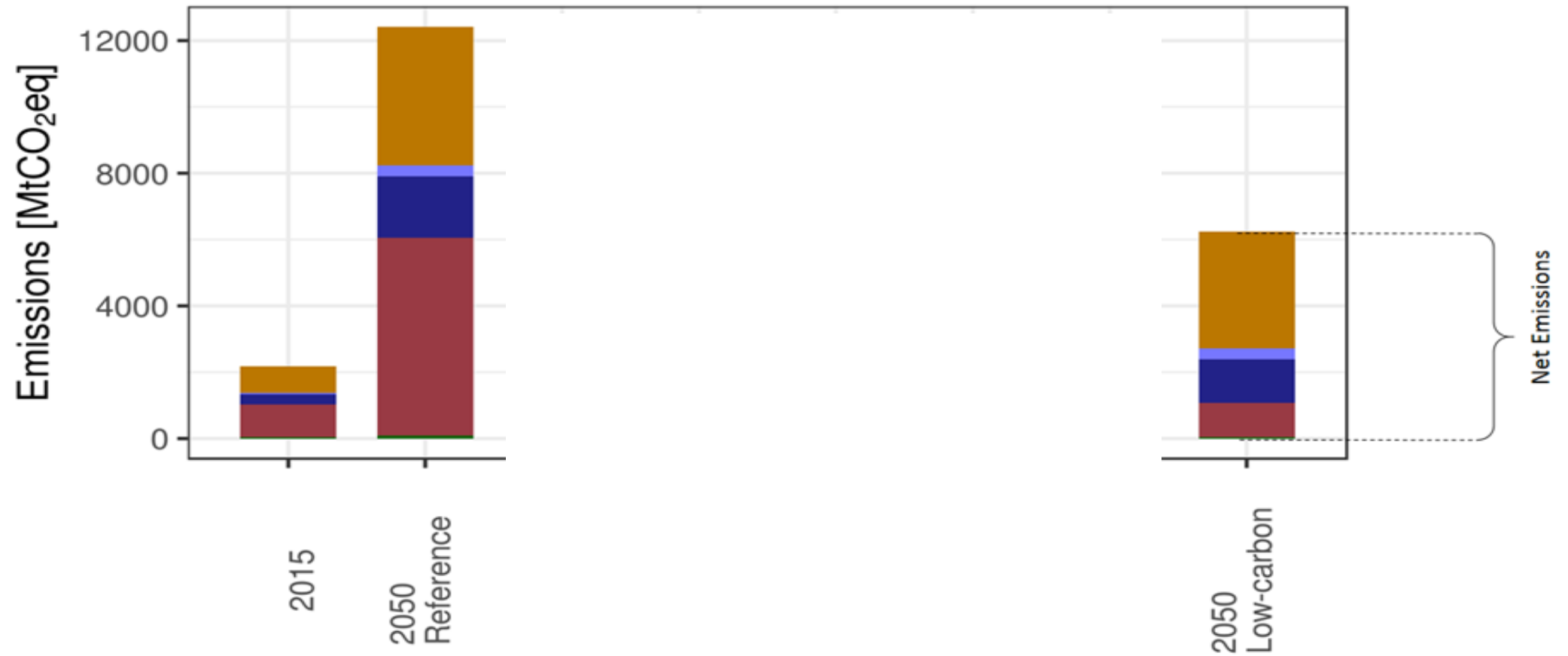
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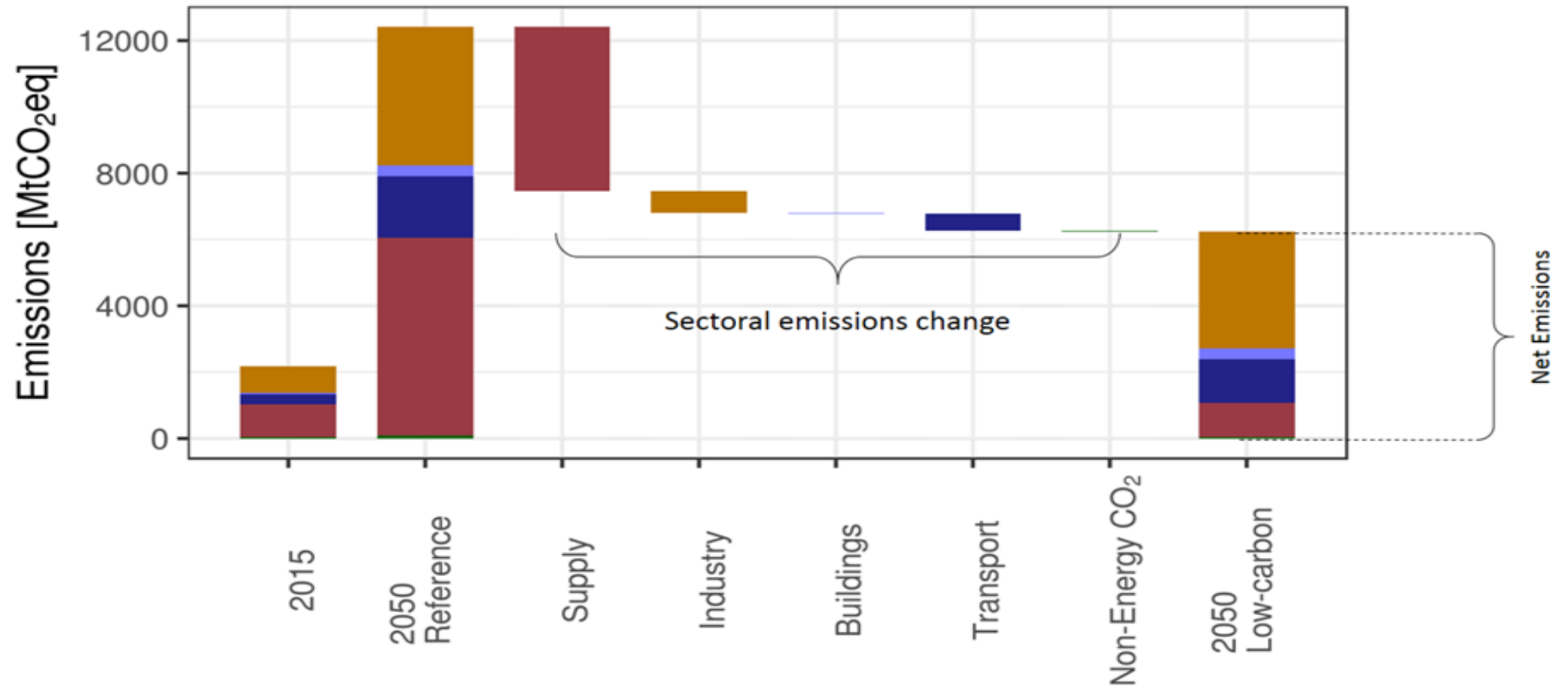
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Fact sheet: India



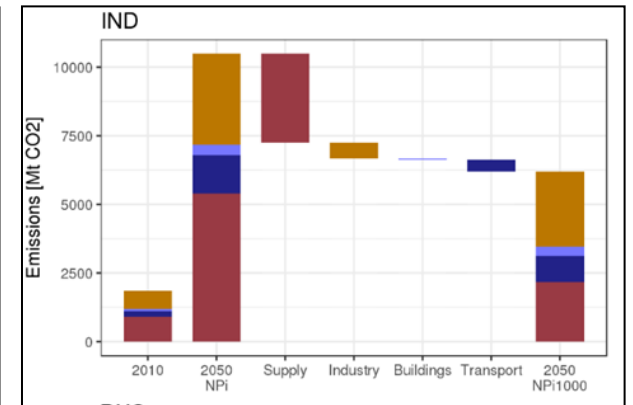
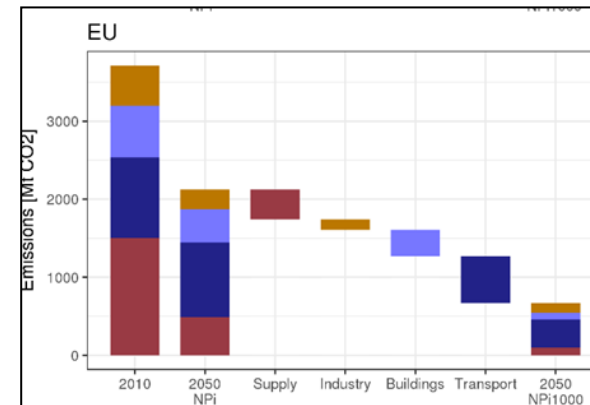
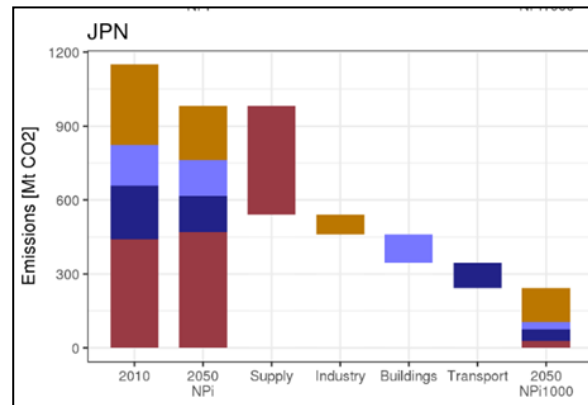
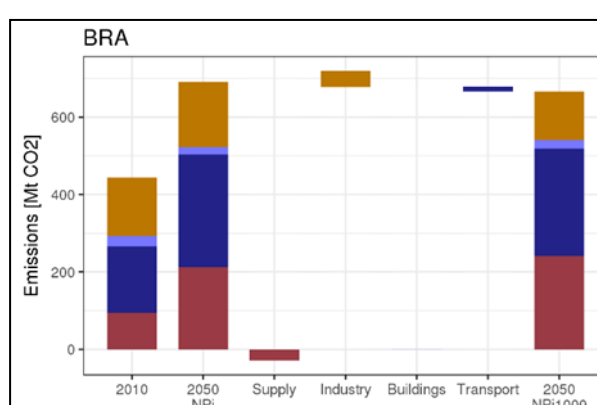
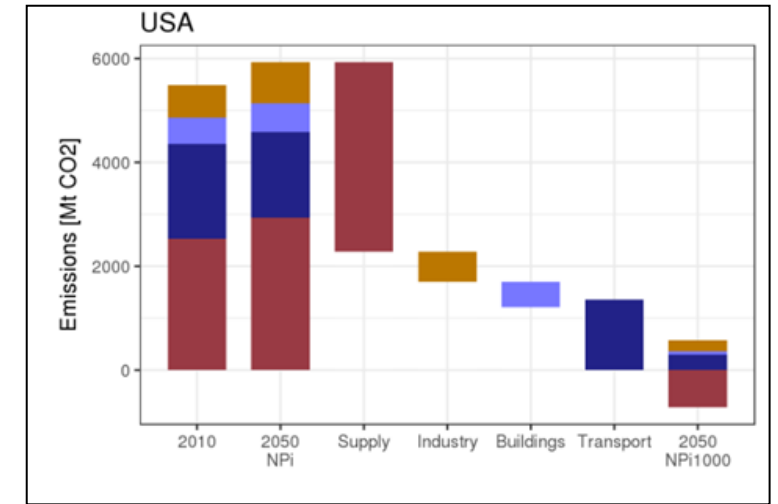
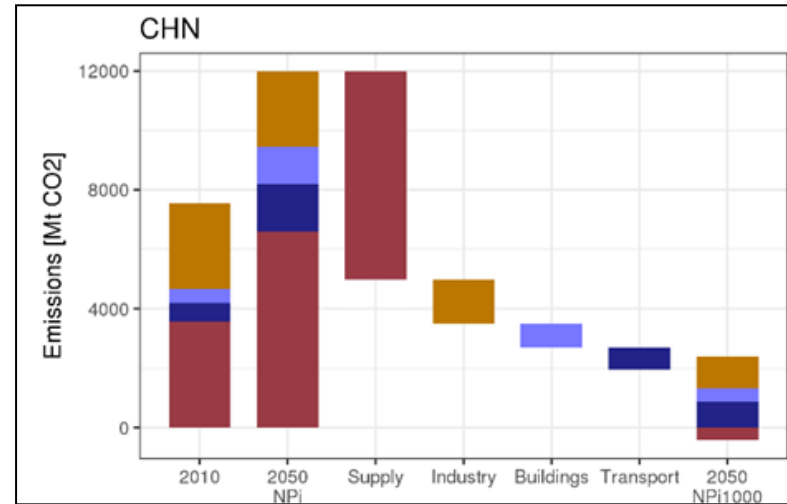
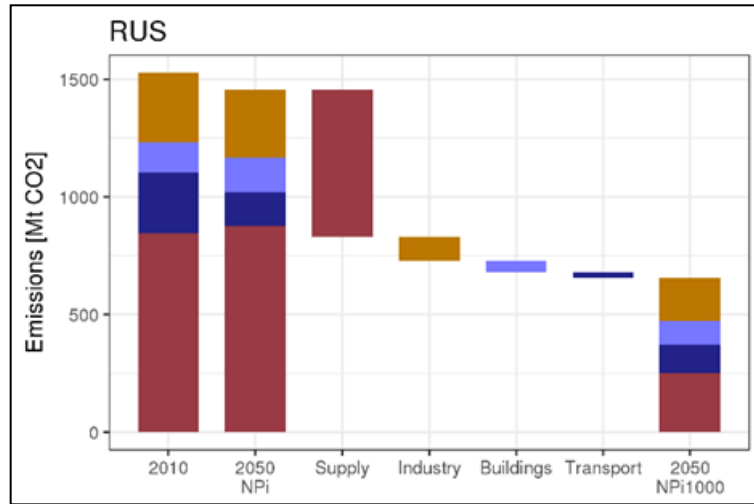
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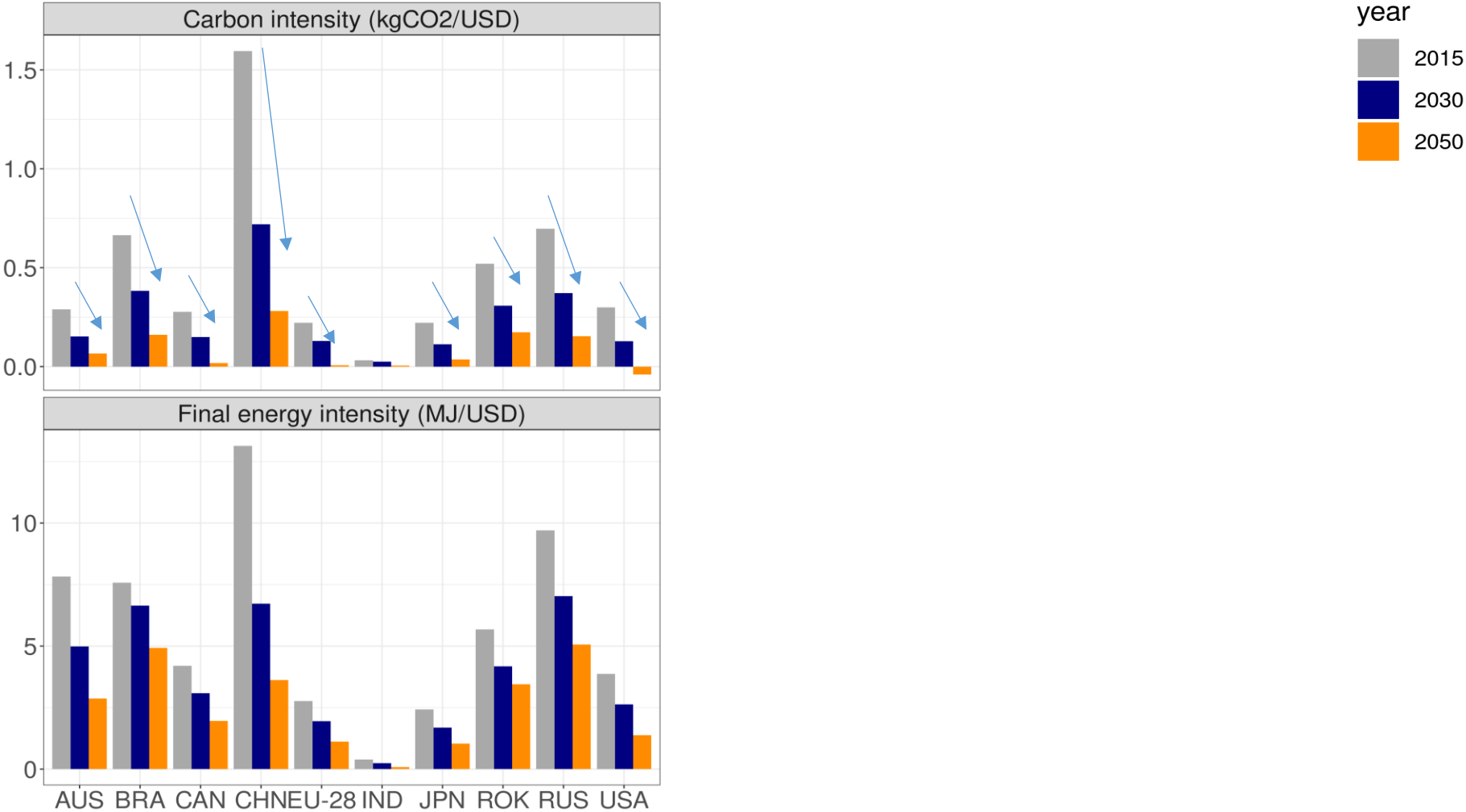


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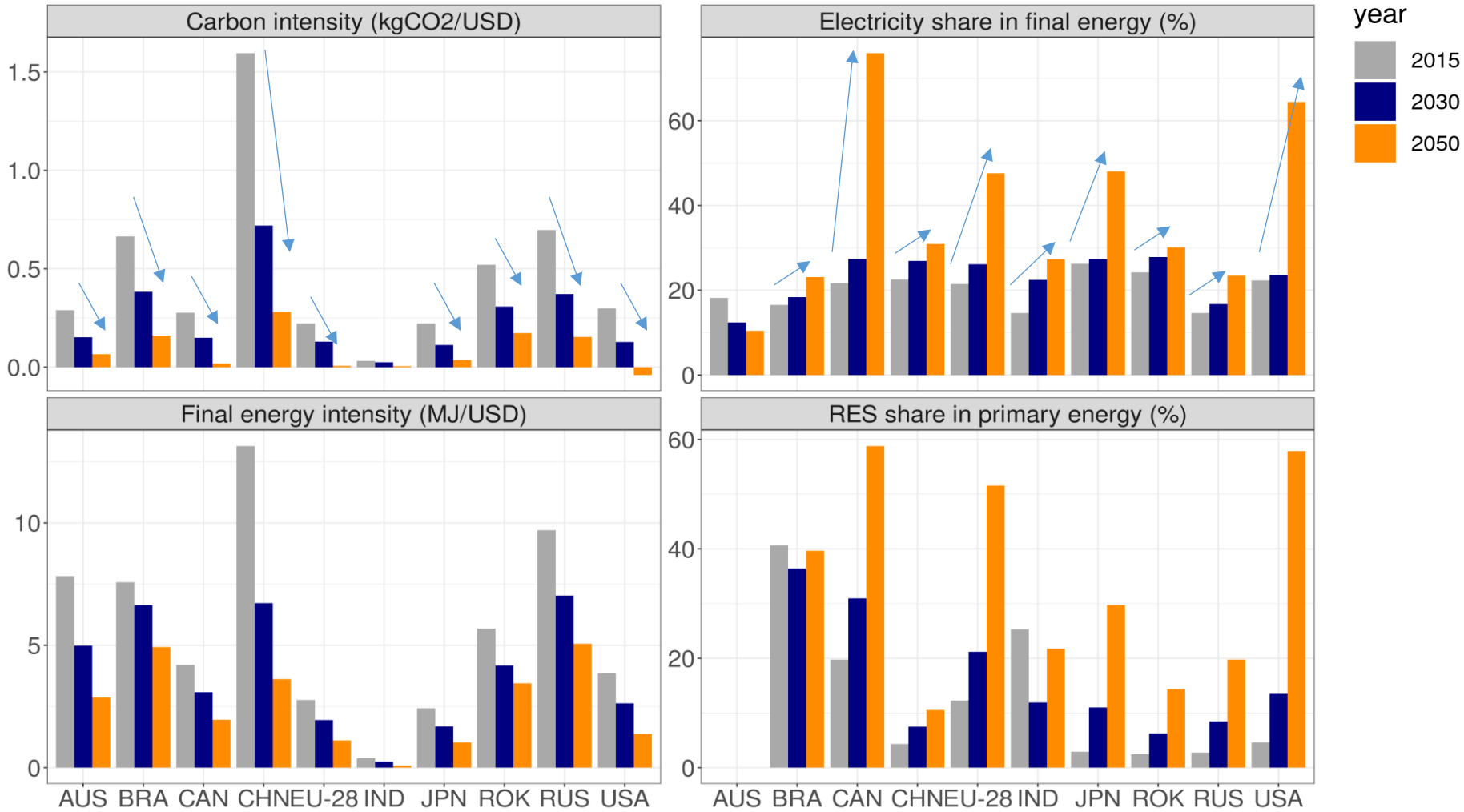
Fact sheets for many COMMIT countries



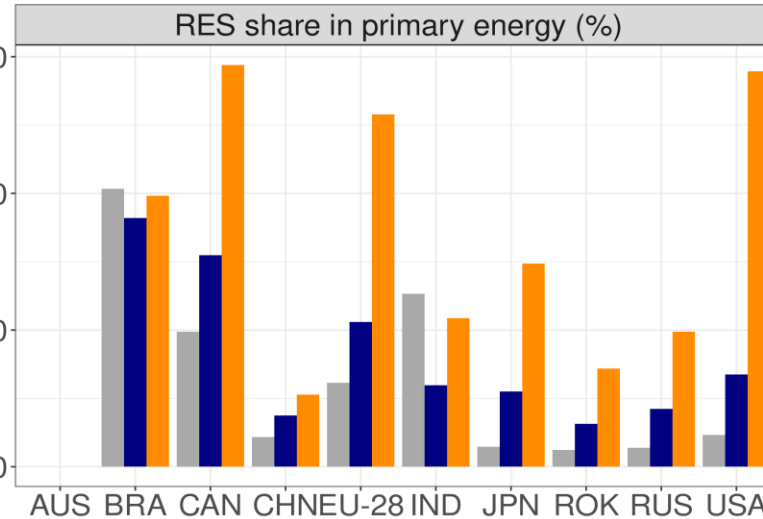
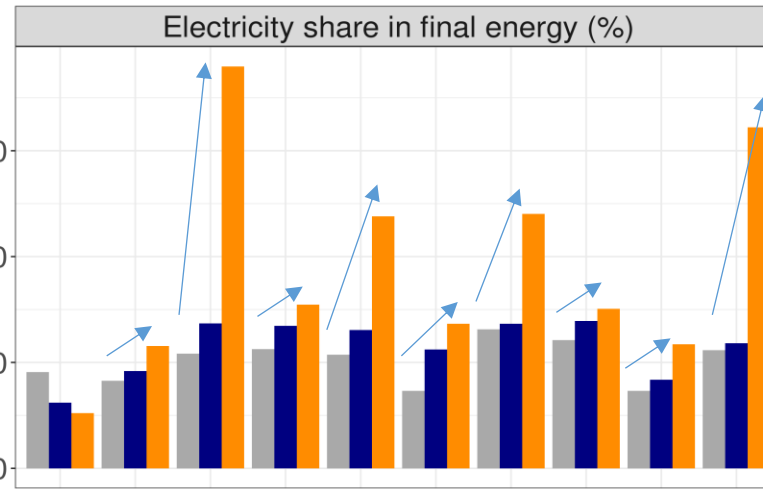
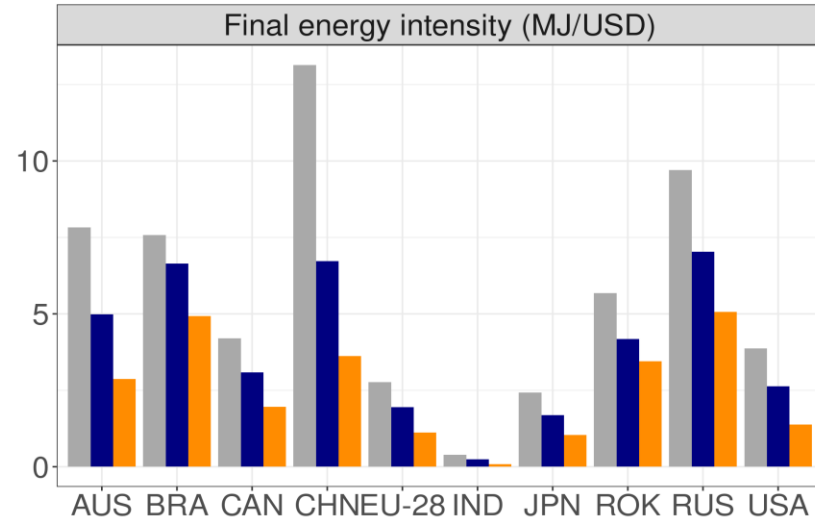
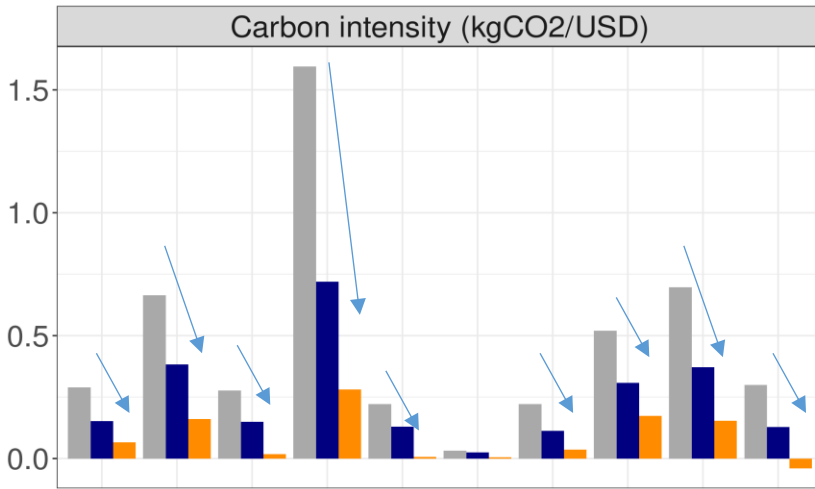
Overall view: key decarbonization options



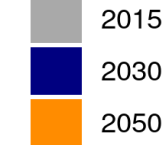
Key decarbonization options for large economies



Key decarbonization options for large economies



year



Specific options differ by country:

- Nuclear and LNG in Japan/Korea
- Hydrogen, e-fuels in EU
- Non-CO₂ 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 CO₂ intensity of electricity production

- 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:** different technological options can be used regarding policy priorities, energy resources and socioeconomic considerations
- Country specificities play a **key role in designing nationally-relevant low-emission strategies:** must be consistently integrated in assessment of low-carbon transition
- Different starting points and dynamics of economic growth and energy systems' evolution lead to **differentiated low-carbon transition pathways** by country

- **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/>