Australia and Japan: Cooperation on Future Energy Technologies

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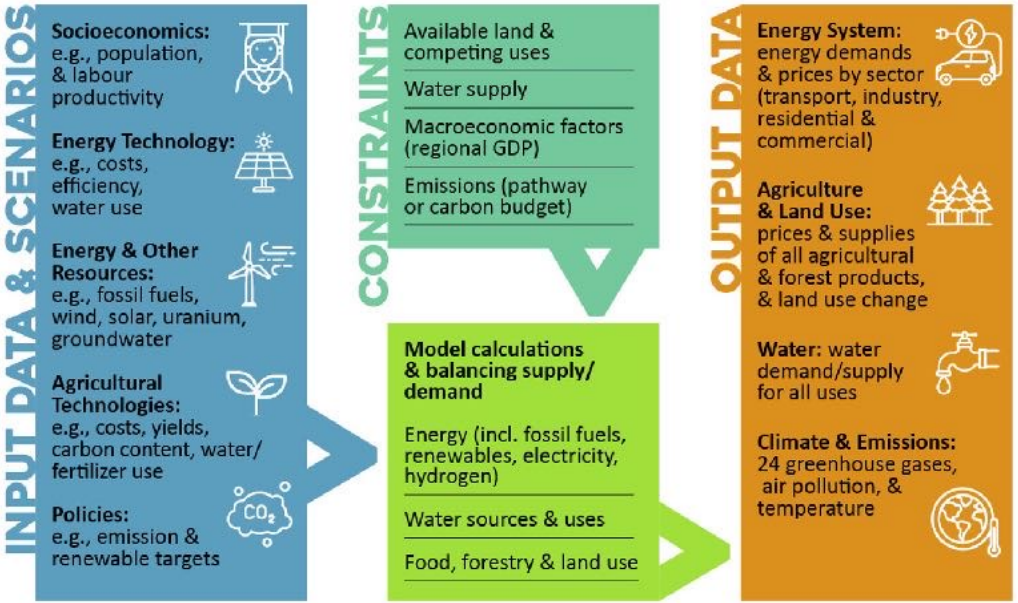
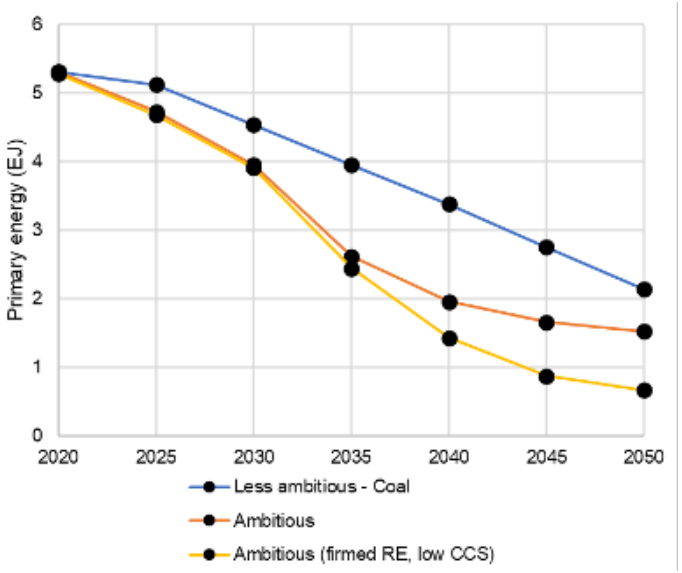
Global Change Analysis Model



- Open source model developed Pacific Northwest National Laboratory.
- Market equilibrium model for 1990 to 2100 with five-year increments.
- Approach:
  - Select a CO2 trajectory consistent with a given temperature increase.
  - Impose a carbon price to achieve given trajectory.
  - Allow for differences in technology availability, cost, or other factors, along with GDP/population etc. to determining optimal decarbonisation pathway globally.

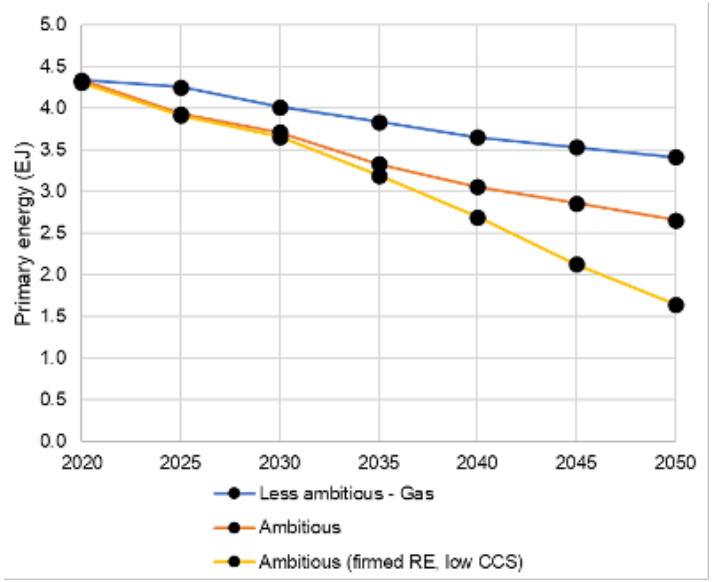
Scenario 1: Thermal Coal Use in Japan

Coal



- Coal exits in the near term across all scenarios.
- More (global) climate ambition means more rapid near-term exist.
- Capping CCS options and/or allowing for more firmed RE, reduces coal further in medium-term.

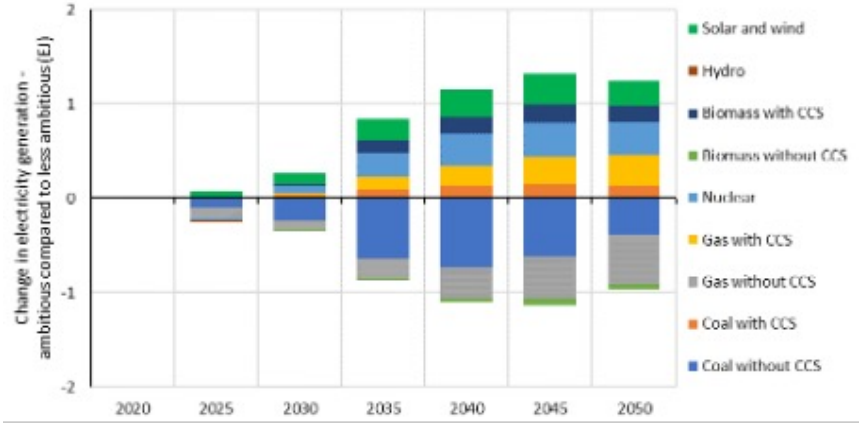
Gas



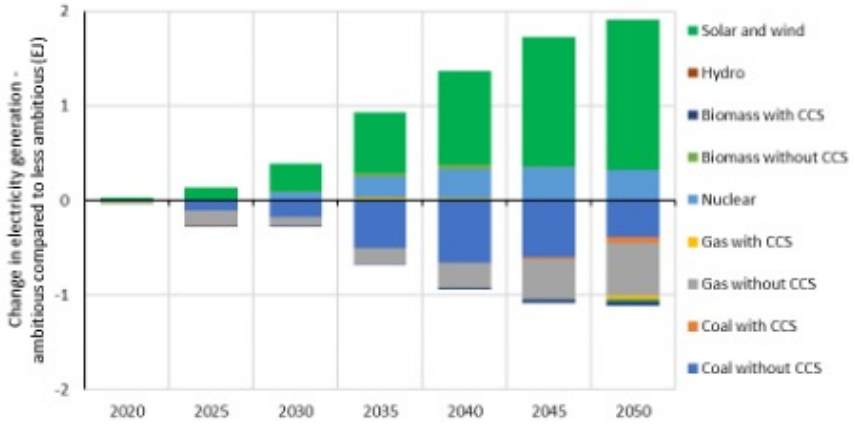
- For Japan, gas use falls across scenarios. But much less gas will be used be used if CCS is not available and/or RE storage options are available.

Change in Electricity Generation: Japan

Japan: Ambitious Climate Scenario
Less Renewables, More CCS



Japan: Ambitious Climate Scenario
Firmed Renewable Energy, Low CCS



Financial services group Orix, utility Kansai Electric construct 113MWh battery storage system in western Japan

By Andy Colthorpe

July 19, 2022

Asia & Oceania, Central & East Asia | Grid Scale | Business, Market Watch

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Concept drawing of the BESS being built at Kinokawa Substation, Wakayama, Japan. Image: Orix.

Japanese solar building up resiliency against curtailment

Mitsubishi and Japanese utility Kyushu Electric Power are teaming up to use more grid-scale storage, in order to reduce financial losses caused by curtailment.

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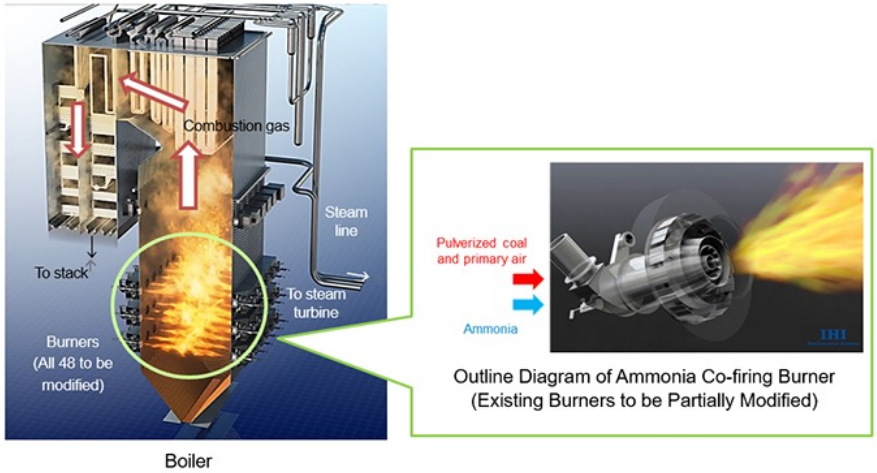
Mitsubishi built this rooftop solar-plus-storage system.

Overall

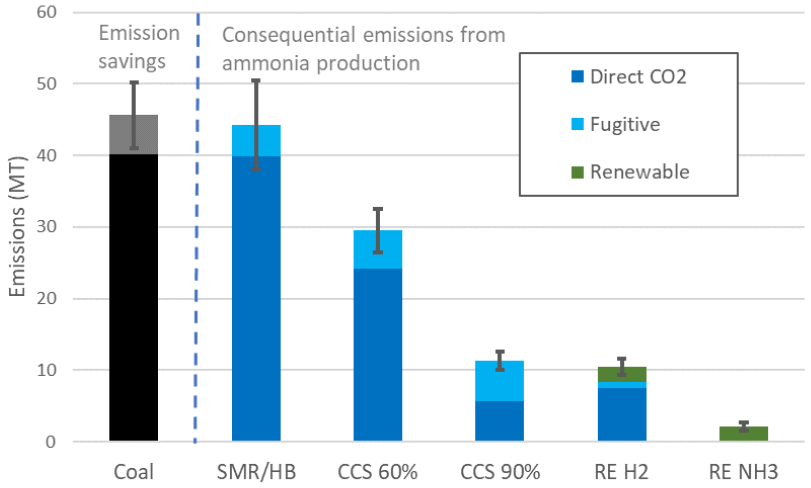
- GCAM results suggest changes in coal and gas use in Japan (and other major energy importers in the Indo-Pacific) are dependent on three factors:
  - The global level of climate policy ambition;
  - Available resources in each country, including land, solar irradiance, wind, and carbon storage sites;
  - The available technology options supporting decarbonisation, such as carbon capture and storage, and options for firming renewables such as batteries and pumped hydro.

- All countries increase their exposure to supply chain risks associated with solar, wind, and firming technologies as they decarbonise.
- There are large uncertainties in the technology pathways as they decarbonise.
  - Information and markers on regional decarbonisation pathways are crucial for understanding risks and opportunities as the region decarbonises.

Also, we need to get this right…



https://www.ihi.co.jp/en/all_news/2021/resources_energy_environment/1197406_3360.html



Annex

The Team

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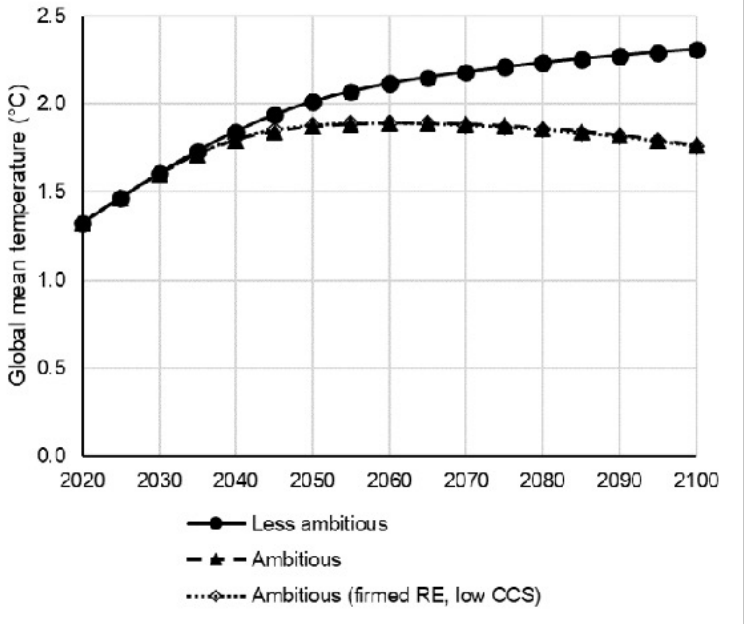
Global Mean Temperature by Level of Climate Ambition



- Concentration pathways are consistent with global radiative forcing of 2.7°C and 1.8°C in 2100.
- GCAM model achieves these pathways by imposing a carbon price to increase the costs of emissions intensive fuels.
  - The use of carbon price is shorthand for a suite of policies governments are likely to use in order to achieve different levels of climate ambition.