Modelling the Economic Impacts of Superpower projects and a Carbon Solution Levy

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Modelling based on scenarios generated by the Victoria University Regional Model (VURM)

- CGE model of Australia's six states and two Territories with each region modelled as an economy in its own right, with 92 industries producing 92 products, 92 types of capital and investment, many households, etc.
- Calibrated to 2023 IO data, with emissions, energy and demographic data added to core IO
- Accounts for all emission sources - combustion and non-combustion
- Flexible production technologies
- Long history of use starting in the mid-1980s (when badged MMRF)
- Solved using the GEMPACK software

Key assumptions for policy scenarios

Labour markets

- National employment rate unaffected, but labour force (hence employment) responds positively to changes in real wage rate.
- Regionally, labour is assumed to be mobile between state economies. Labour is assumed to move between regions to maintain inter-state unemployment-rate differentials at their Base case levels.

Private consumption

- Private consumption is determined via a consumption function that links nominal consumption to Household Disposable Income (which includes allowance for CSL hand back).
- The national Average Propensity to Consume/Save is exogenous. Hence, in aggregated, the domestic saving rate does not change with changes in investment.

Key assumptions for policy scenarios

Investment

- Investment is allowed to deviate from its Base Case value in line with deviations in expected rates of *after-tax* return on the industries' capital stocks.

Government consumption and fiscal balances

- Public consumption is modelled via a fixed ratio of public (federal and state) to private consumption spending in each region. CSL revenue is returned to domestic households.

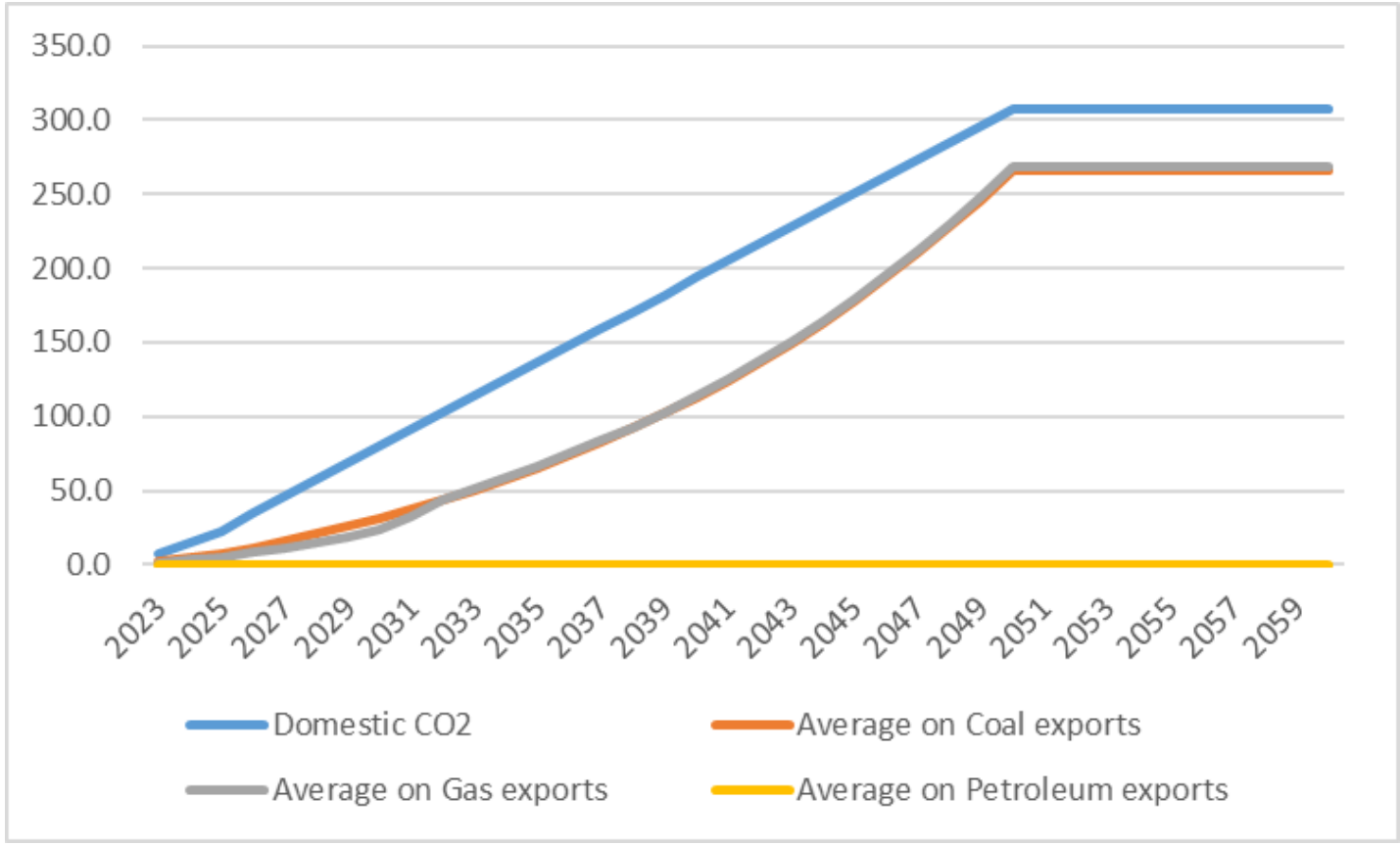
Production technologies and household tastes

- VURM and GTAP contain many variables to allow for shifts in technology and household preferences. Most are exogenous and have the same values as in the Base case. The exceptions are technology variables used to introduce shocks.

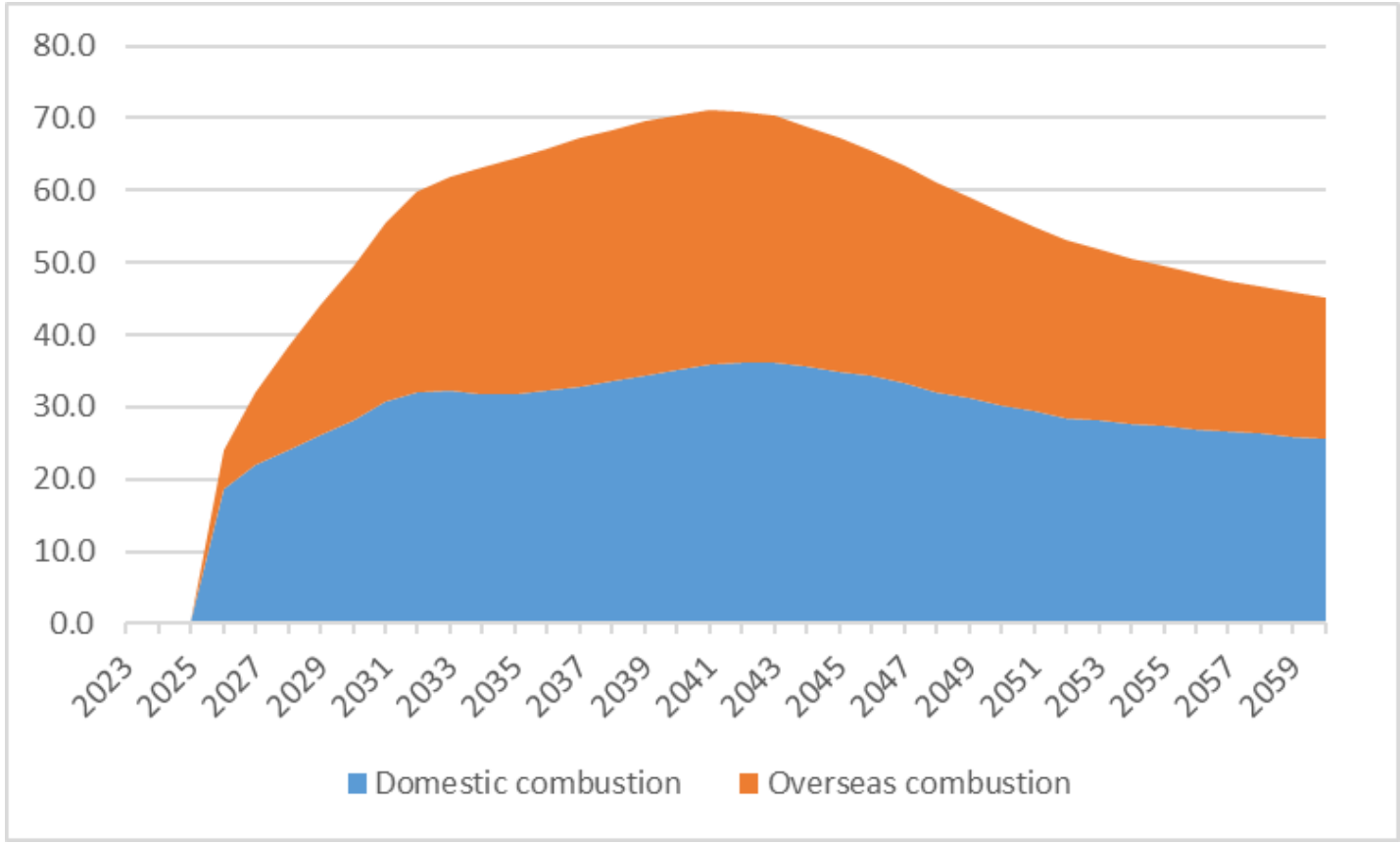
A Carbon Solution Levy (CSL)

- Applied to combustion and fugitive emissions only.
  - Applied domestically at a price set equal to the EU ETS price.
  - Also applied to fossil fuel exports, based on their CO2 content.
- Has two key benefits:
  1. Raises revenue to support initial Green-power investments.
  2. Encourages CO2 abatement in addition to existing policies to reduce emissions (e.g., the safeguard mechanism)

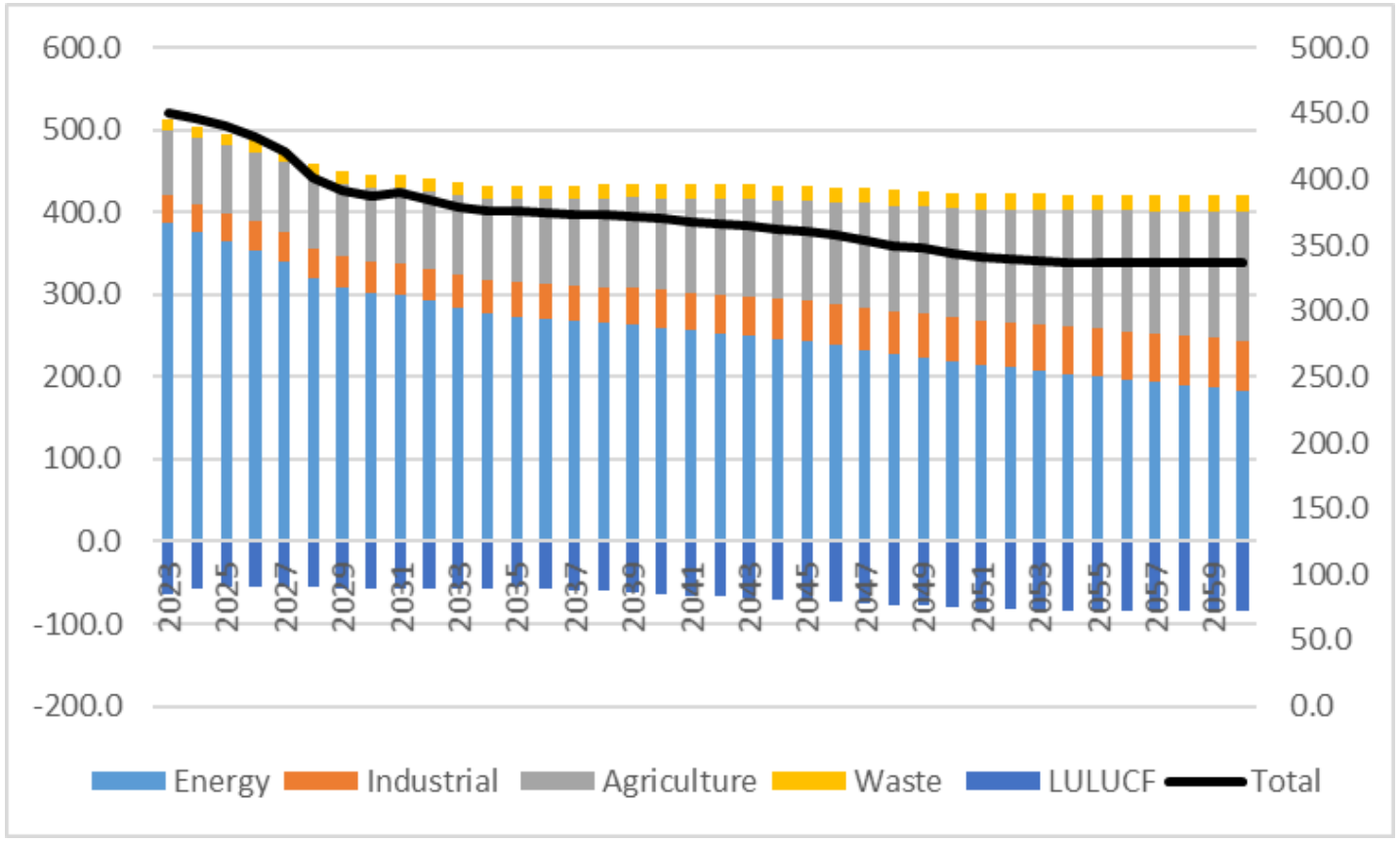
CSL price ($A per tonne of CO2-e)



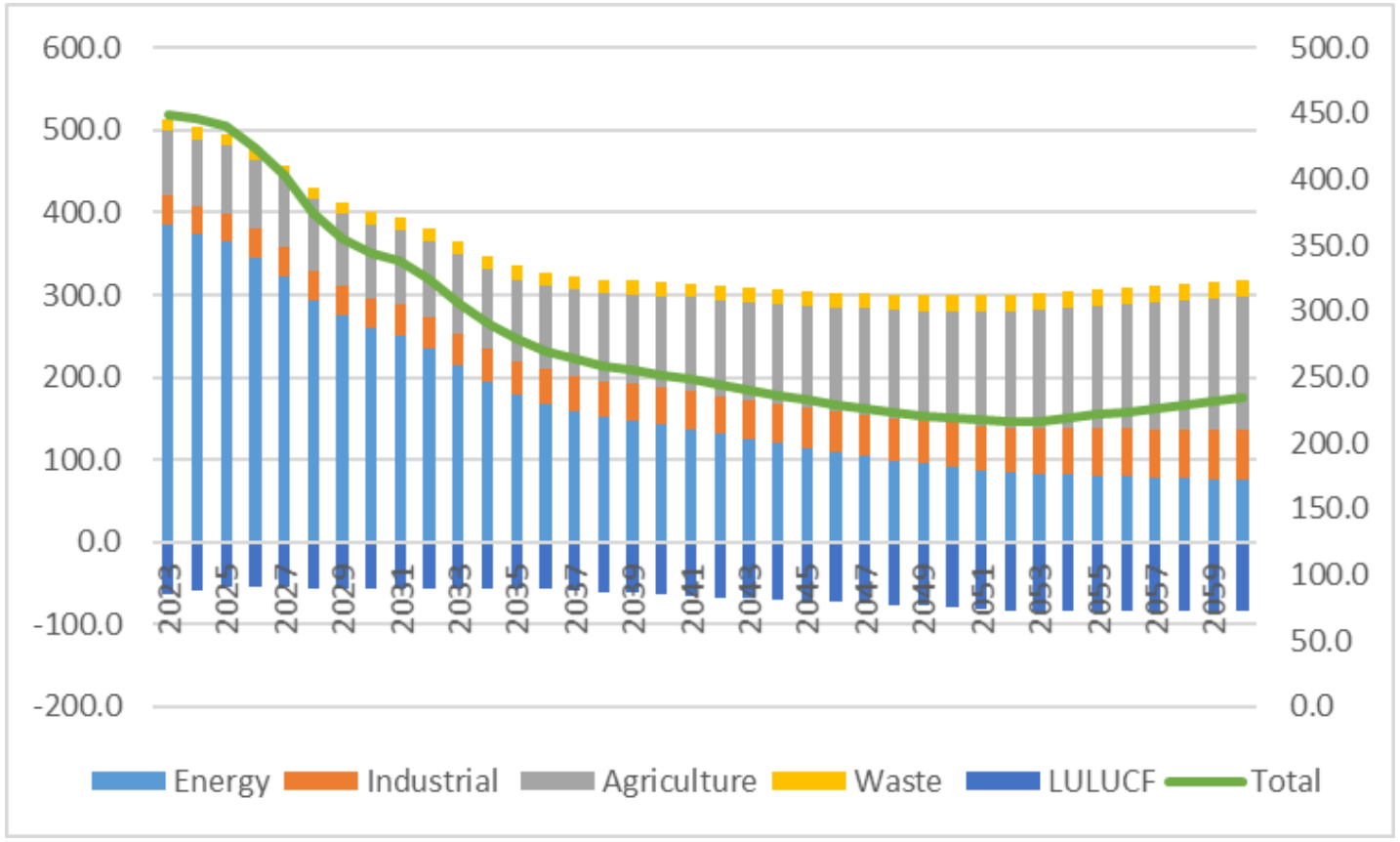
Benefit: Projected CSL revenue ($b per year)



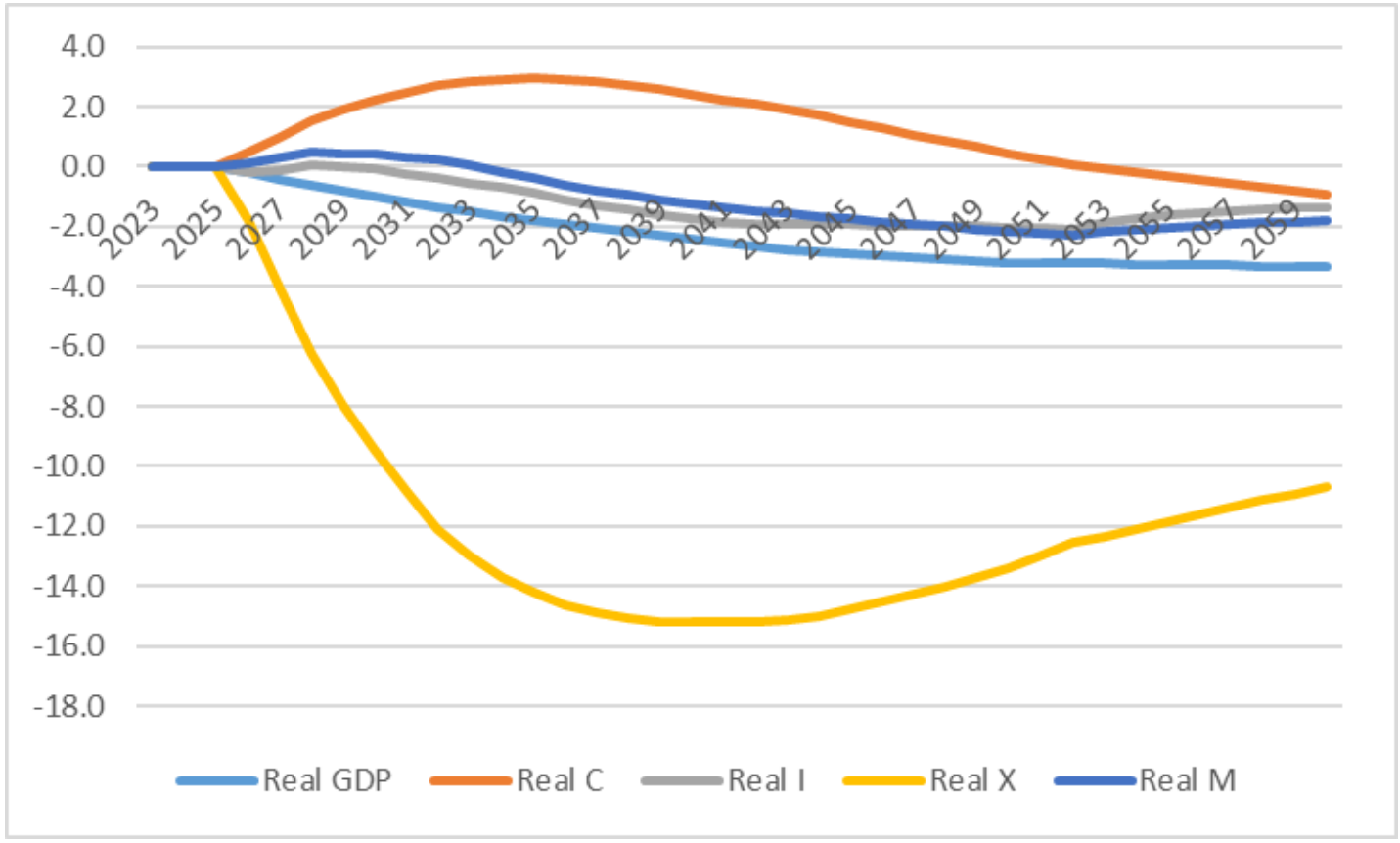
Base case emissions (national, Mt CO2-e)



Benefit: Reduced Emissions in CSL scenario (national, Mt CO2-e)



CSL Macroeconomic Effects (national % deviations)

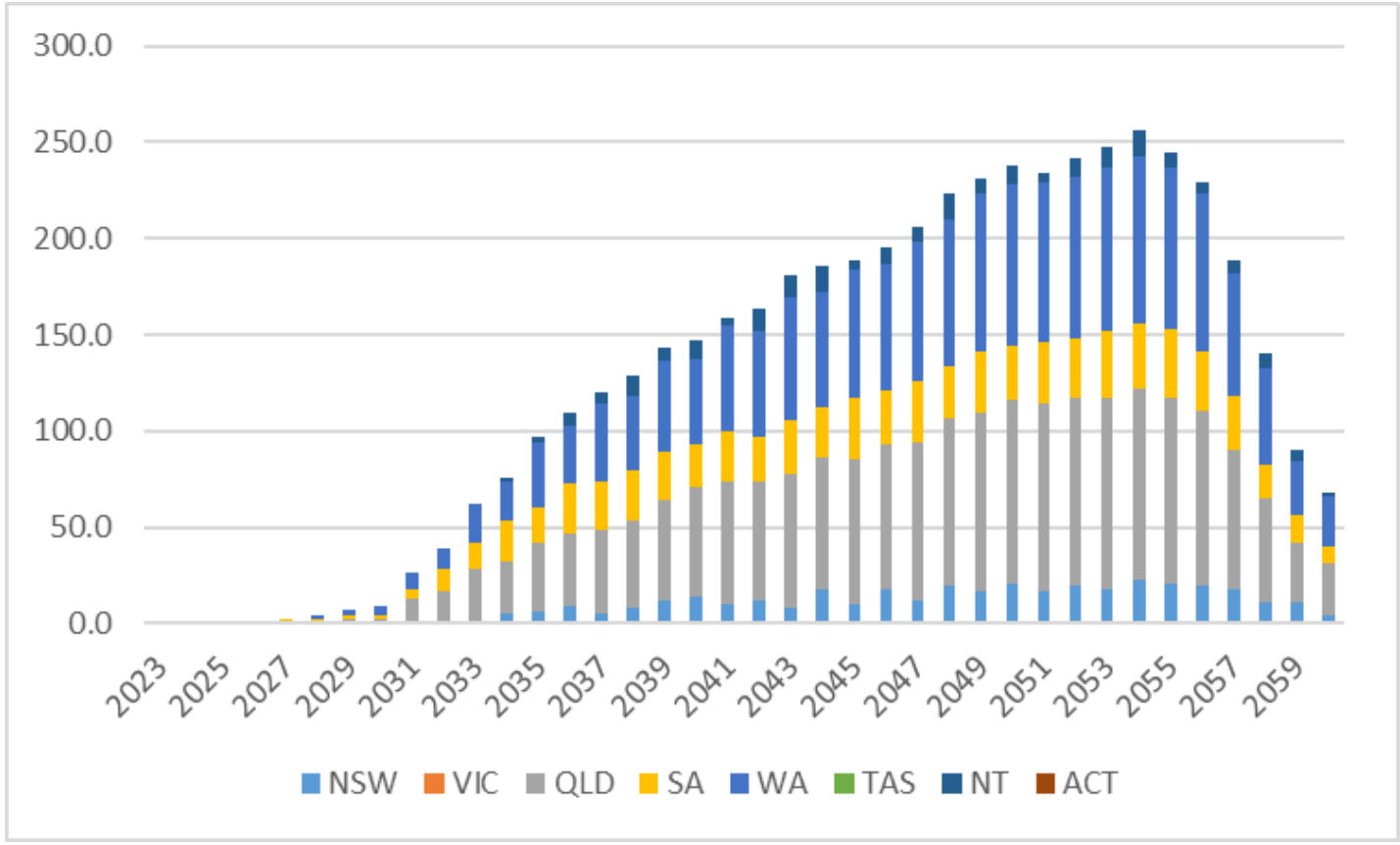


CSL Macroeconomic Effects (national % deviations)

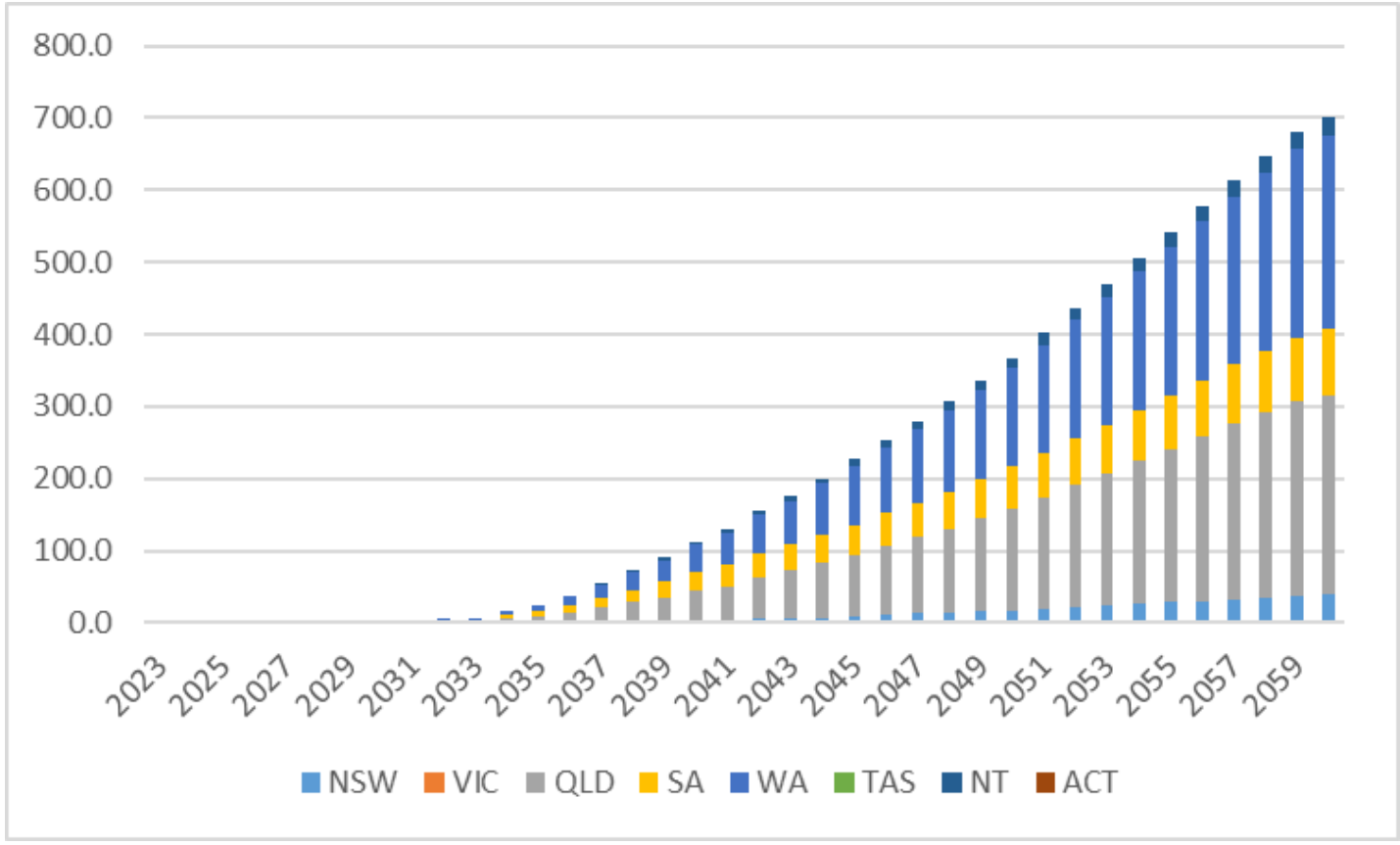
Super power simulations

- Driven by assumptions for the cost and sales structures of individual Superpower activities, and by projections for CAPEX and real Output (exports) by year.
  - CAPEX assumptions accommodated by reductions in required rates of return.
  - OPEX assumptions accommodated by shifts in export demand and supply (thus controlling volume and price).

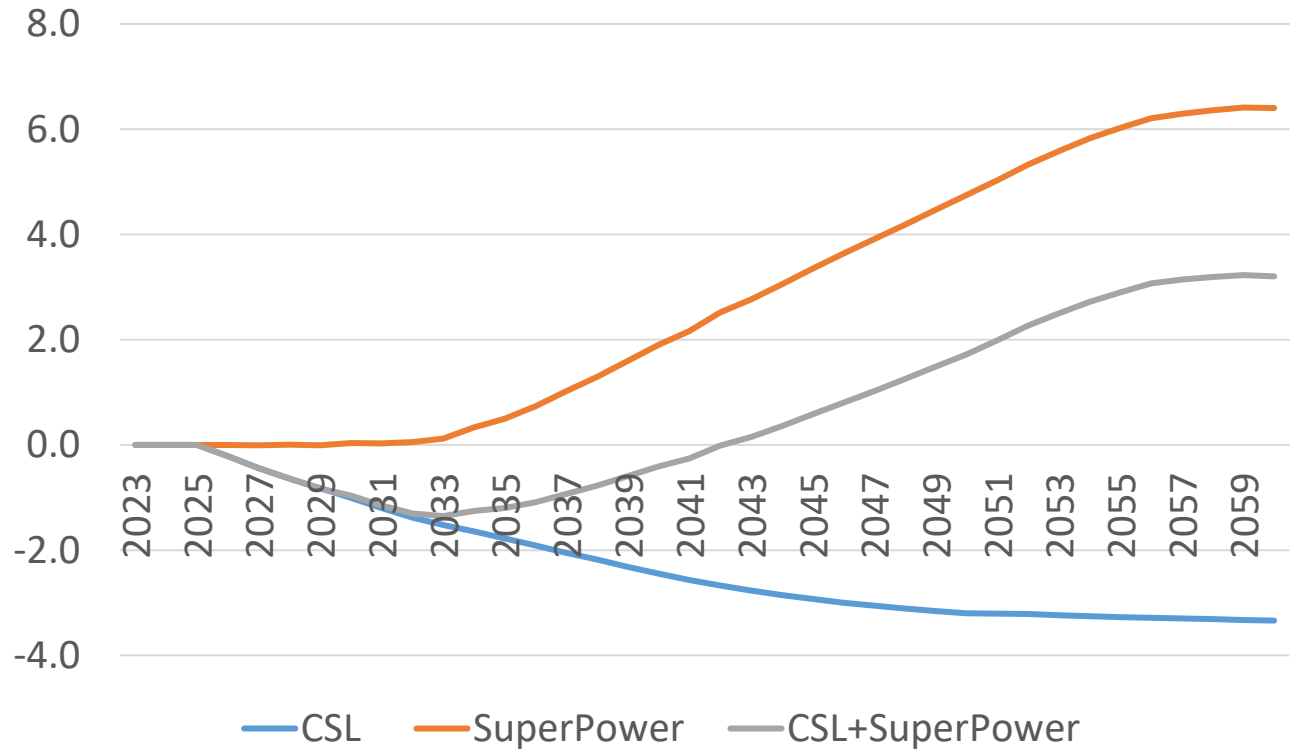
Super power CAPEX expansions ($b, real)



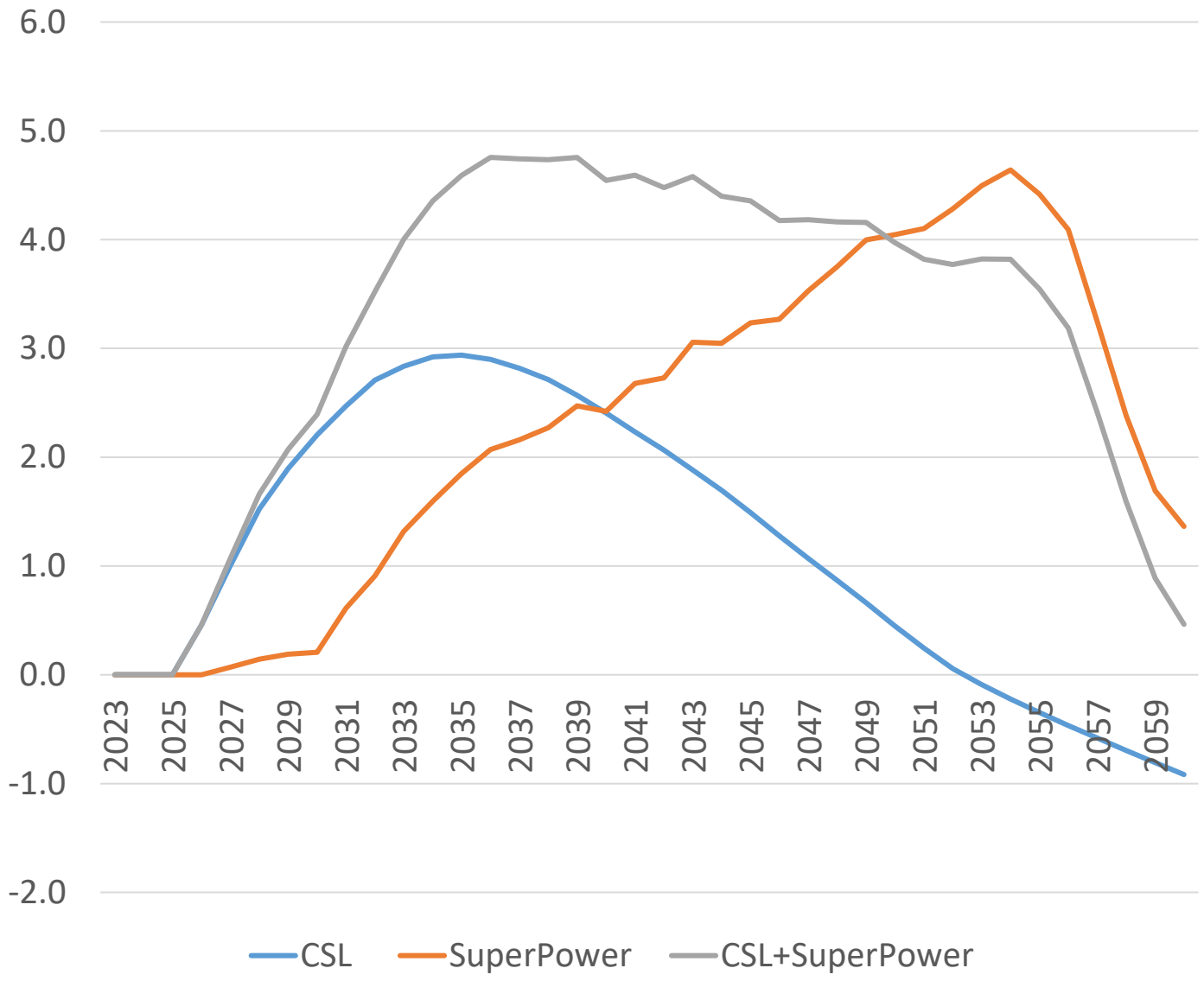
Super power OPEX expansions ($b, real)



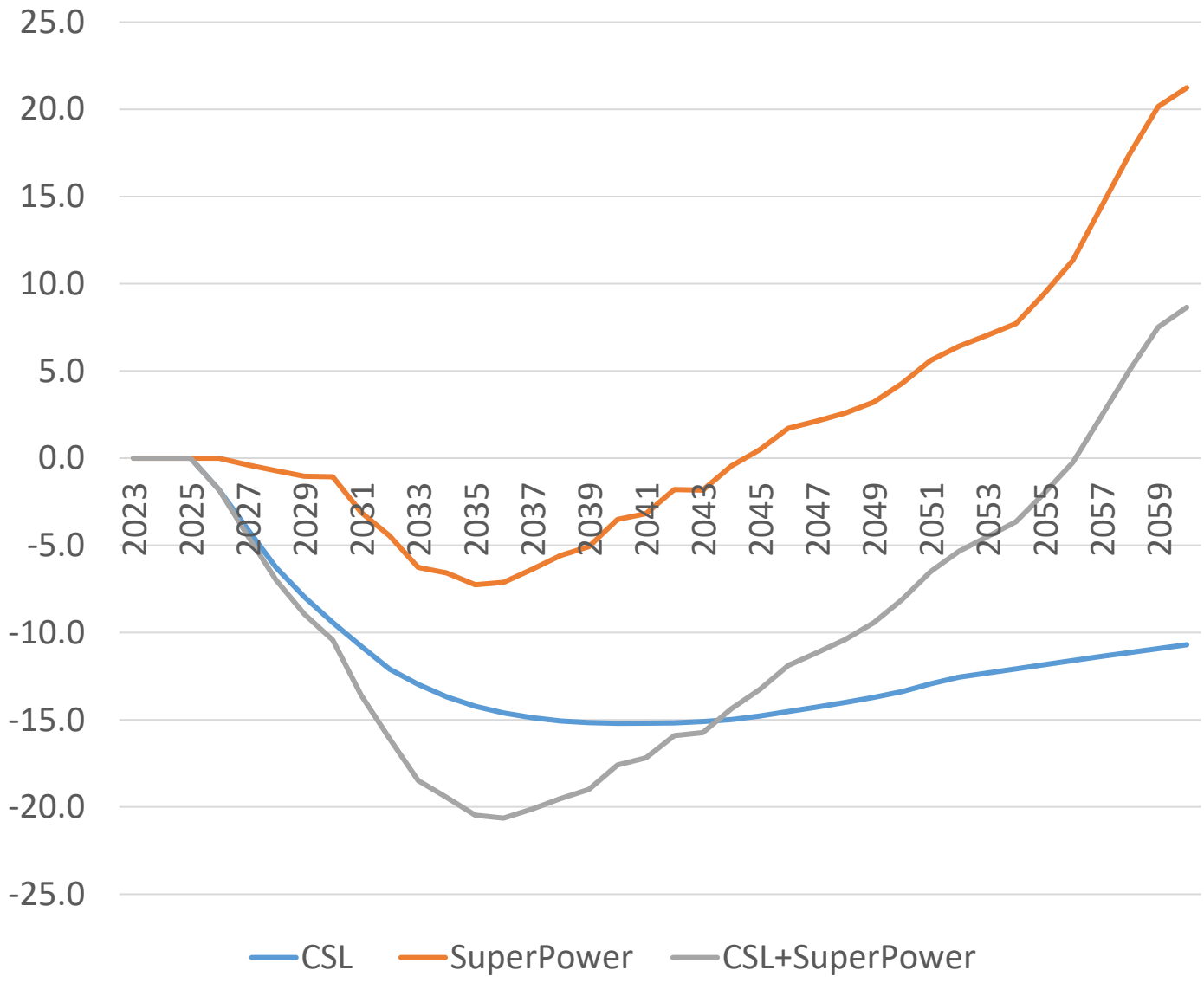
Real GDP (national, % deviations)



Real Consumption (national, % deviations)



Real Exports (national, % deviations)



Employment (national, % deviations)