



Institute of Actuaries of Australia

4th Financial Services Forum
Innovation in Financial Markets
19 and 20 May 2008 — Melbourne

The Economics of Charging for Carbon

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Introduction

- Climate change is changing risks for households and business:
 - Increasing the frequency of extreme weather events and ...
 - ... hurting asset values.
- The policy response to climate change is introducing its own set of risks and opportunities:
 - Through differential impacts of pricing carbon ...
 - ... and the uncertainties associated with new technologies.
- There are a few aspects of the policy deliberations on the ETS that may heighten risks for business.



Presentation outline

Four areas of uncertainty:

- (1) Which technologies will dominate?
- (2) What might interim emissions targets mean for carbon prices?
- (3) How will emissions permits be allocated?
- (4) For how long will trade-exposed sectors be protected?

Presentation will mainly focus on electricity.



Australia's Proposed ETS

- The Emissions Trading Scheme is likely to be based on:
 - a flexible 'cap and trade' model with auctioning of time-dated permits and a free allocation of at least some permits (compensatory approach);
 - the ability to partially 'bank' permits over time;
 - firmer longer-term emissions goals with less binding constraints in the initial periods; and
 - transitional arrangements for trade-exposed, emissions-intensive industries and initial exclusion of agriculture and land use.



Some background

- The economic impact of “deep cuts” in emissions by 2050 should not be large:
 - Perhaps around 5% to 10% off GDP, or 0.1-0.2% pa.
- Success will require changes in the capital stock throughout the economy:
 - Using a combination of price, regulations and incentives.
- It is less costly to change technology when replacing capital than retrofitting:
 - But this means any action on emissions will be slow.
 - For example, it takes 40 years for $\frac{1}{2}$ of the residential housing stock to be affected by a new standard on new buildings.



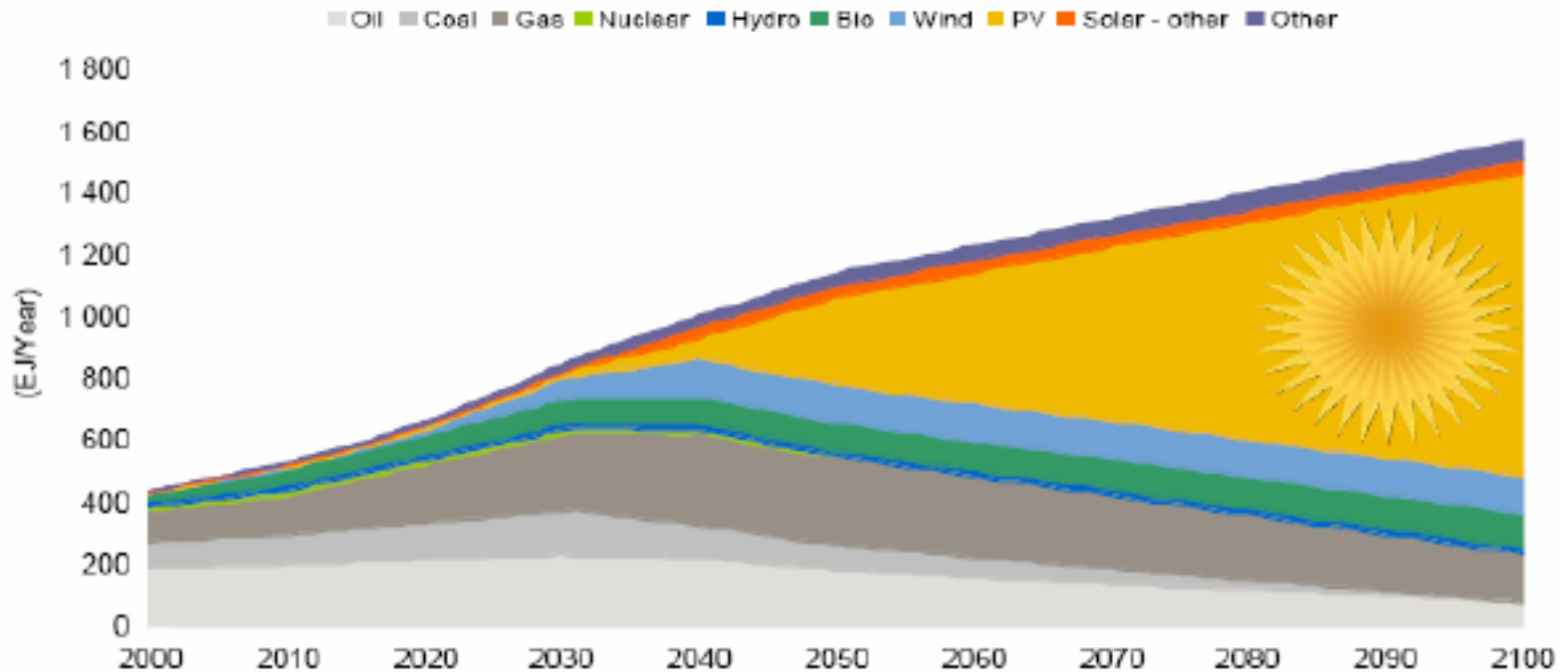
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1. Which technologies?



1. One view of energy consumption



Source: Solarwirtschaft.de



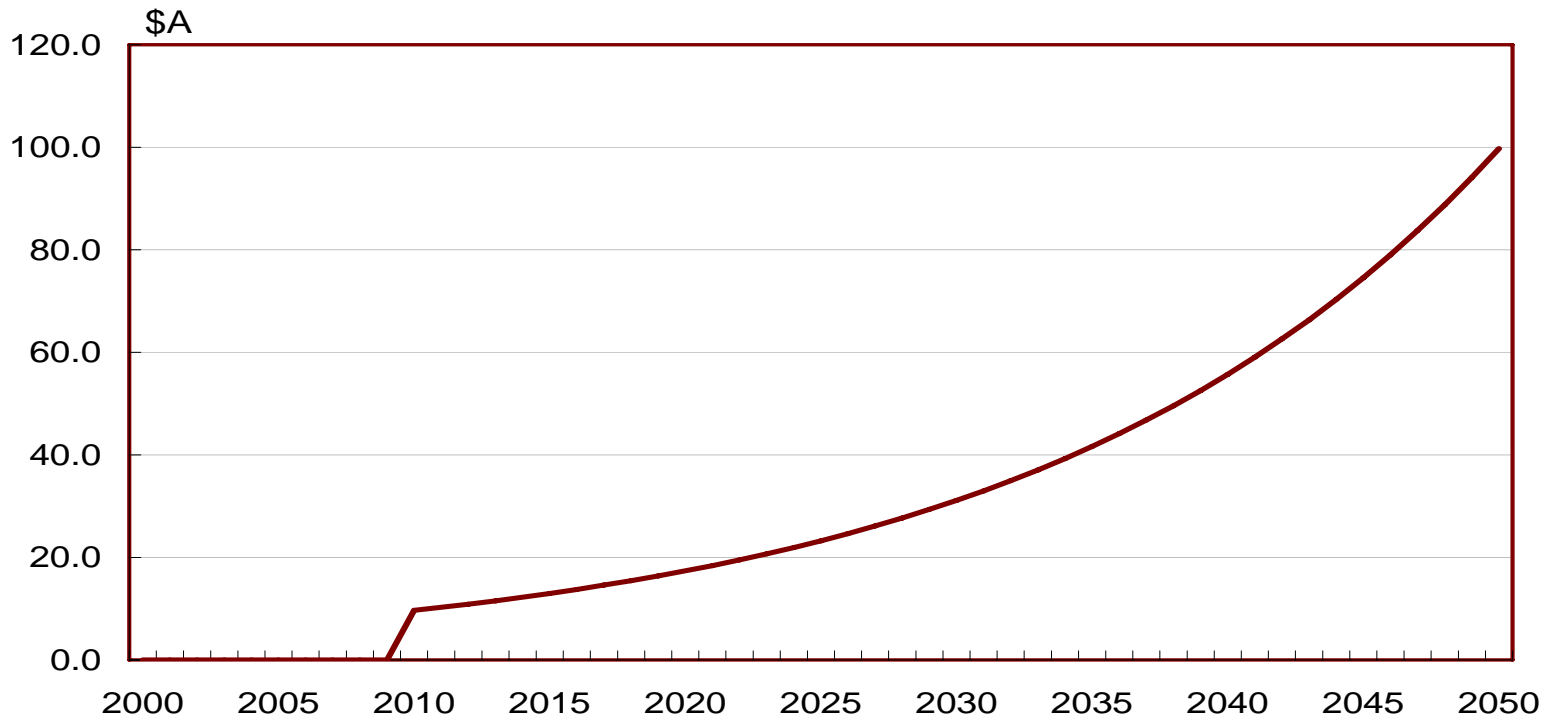
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2. Determining interim targets

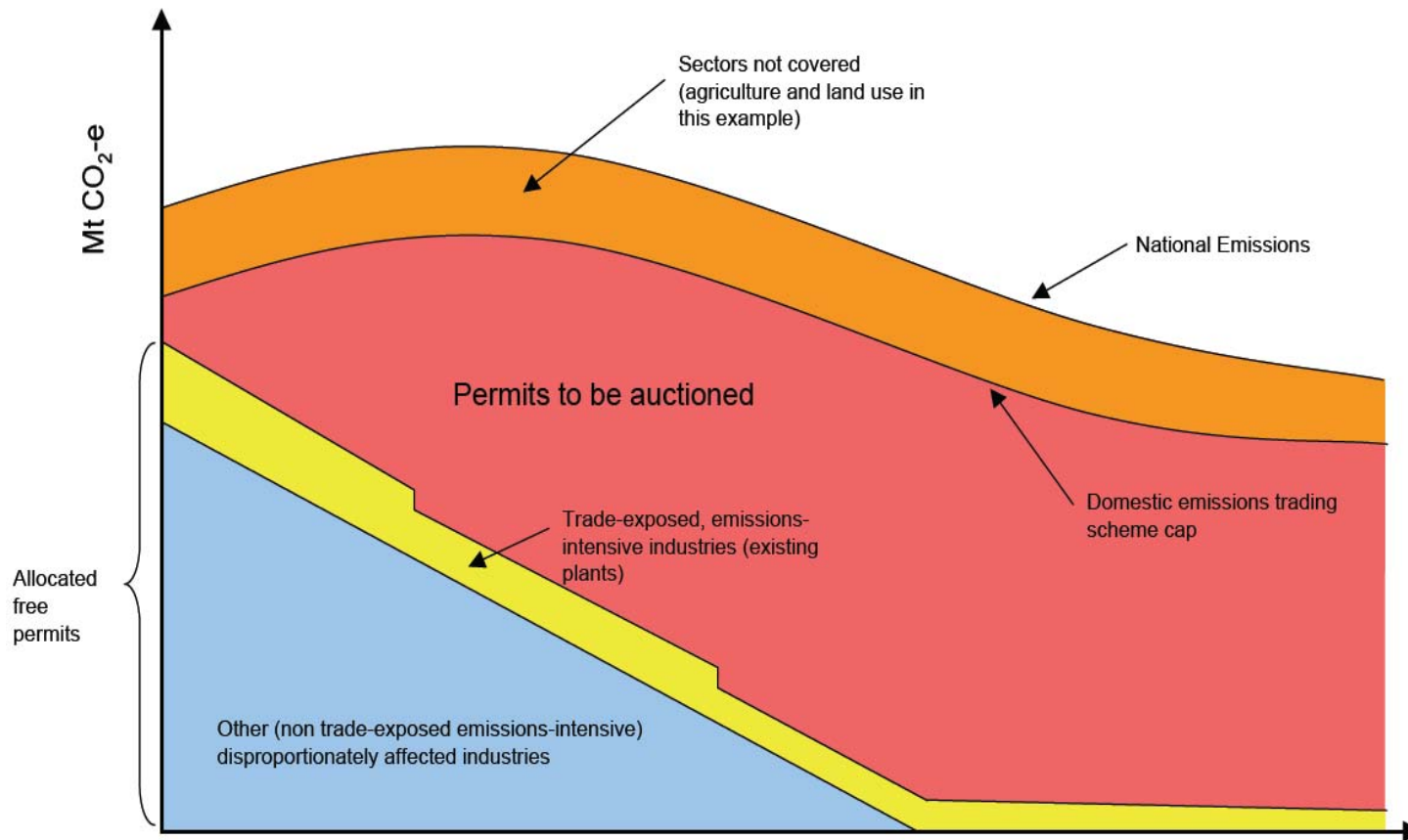


2. Optimal price path?



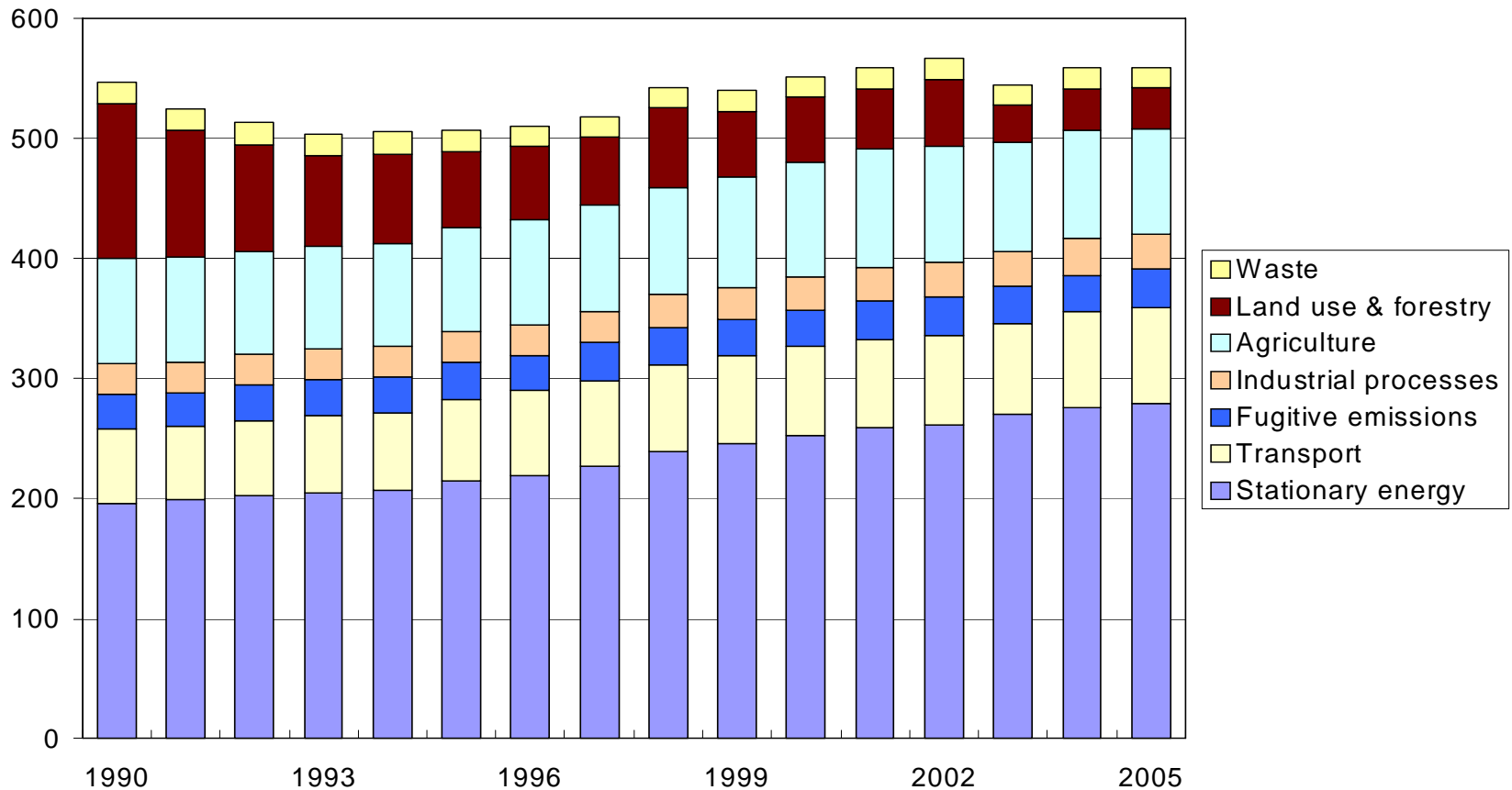


2. Optimal emissions path?





2. GHG emissions



Units are millions of tonnes of CO₂ equivalents



2. Some implications

- The Government would like to assume a leading role in reducing emissions.
- A Bali-level target would see the carbon price well above \$100/tonne over the first two decades.
- In a world of certainty, an emissions target or a tax on carbon emissions can deliver identical results. In a world with uncertainty, theory says:
 - use an emissions target when more concerned with the risks associated with excessive emissions; and
 - use a price (carbon tax) if most concerned with the risks associated with economic growth.



2. Some implications (cont)

- A safety valve in the form of a price ceiling might achieve a reasonable balance:
 - Garnaut has indicated that he does not favour such a safety valve.
- So, businesses directly exposed to the carbon price or sensitive to economic growth should be watching developments related to:
 - how ambitious interim targets are; and
 - the design of any safety net.



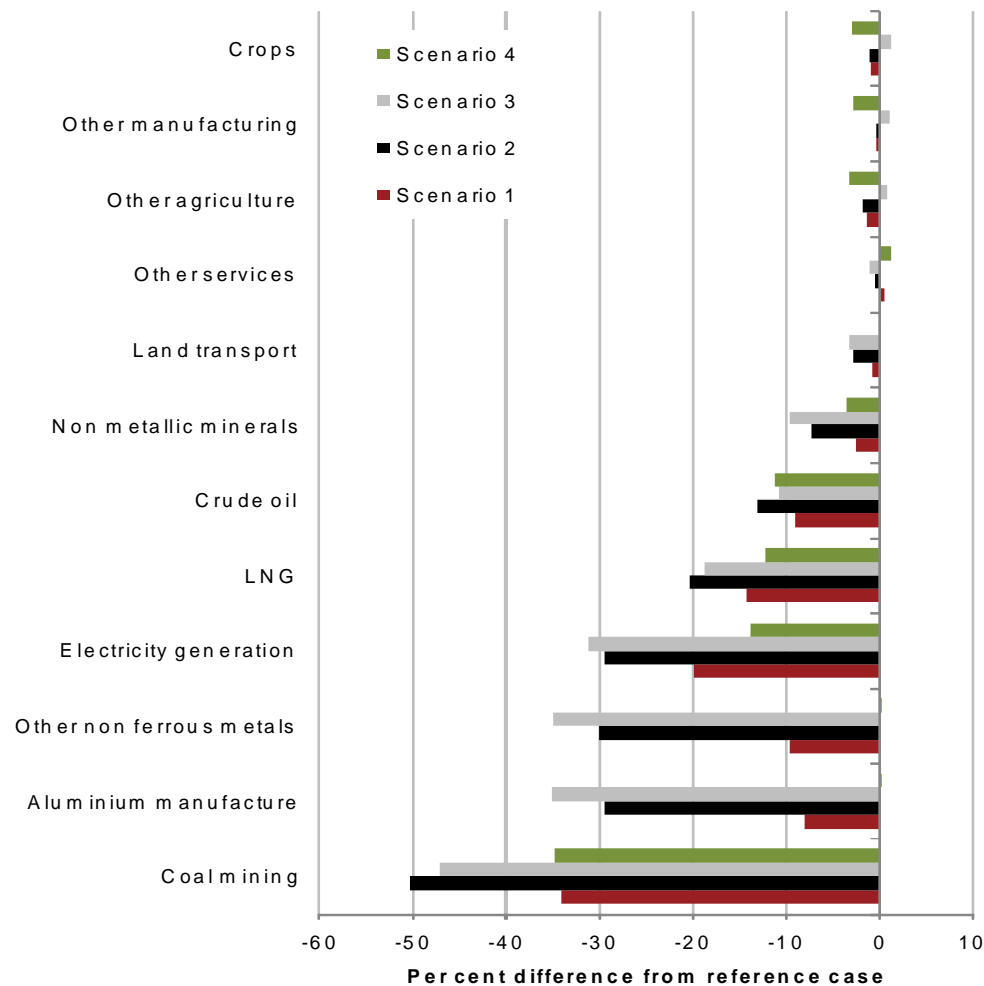
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3. Allocating permits

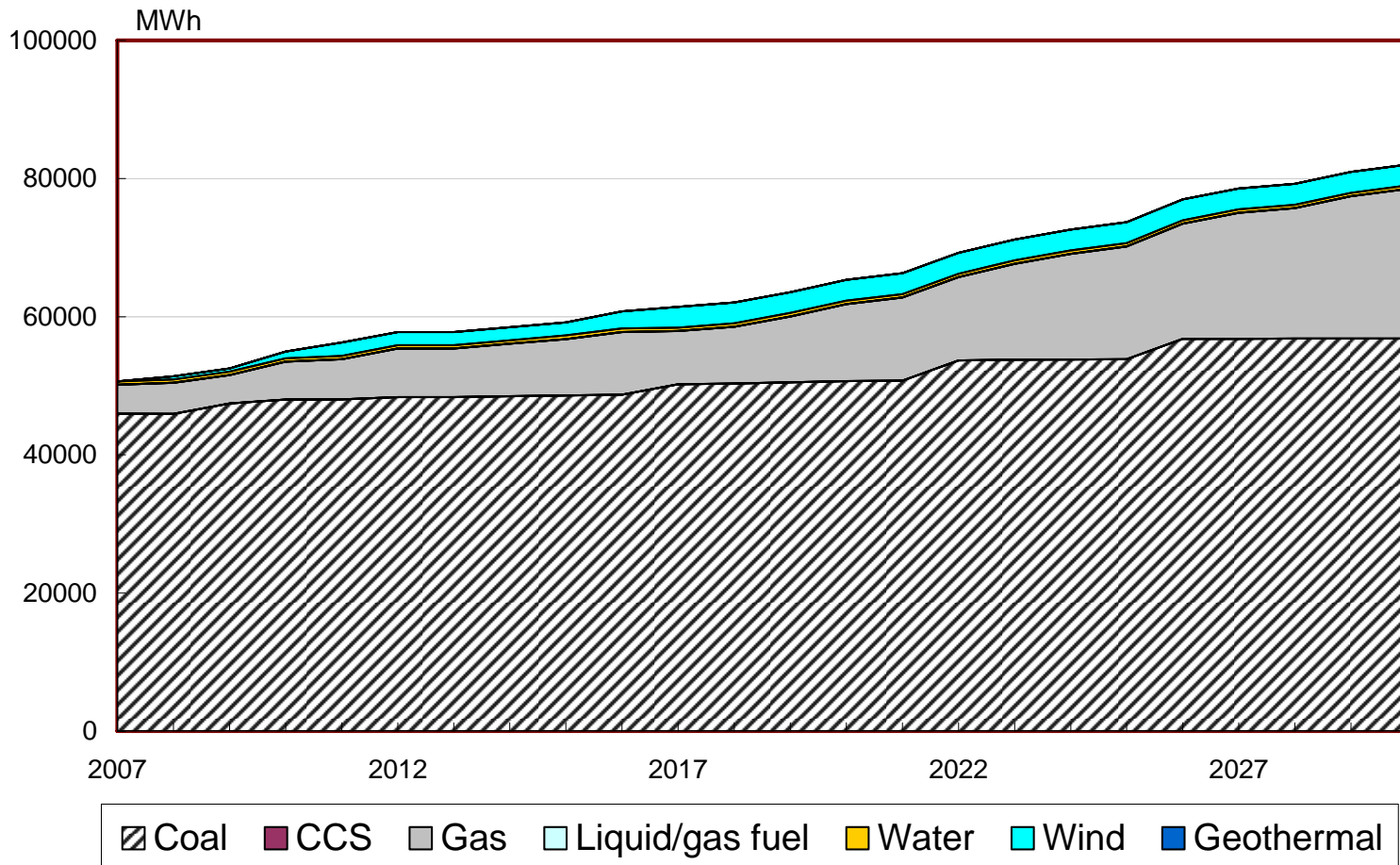


3. Very uneven sectoral impacts



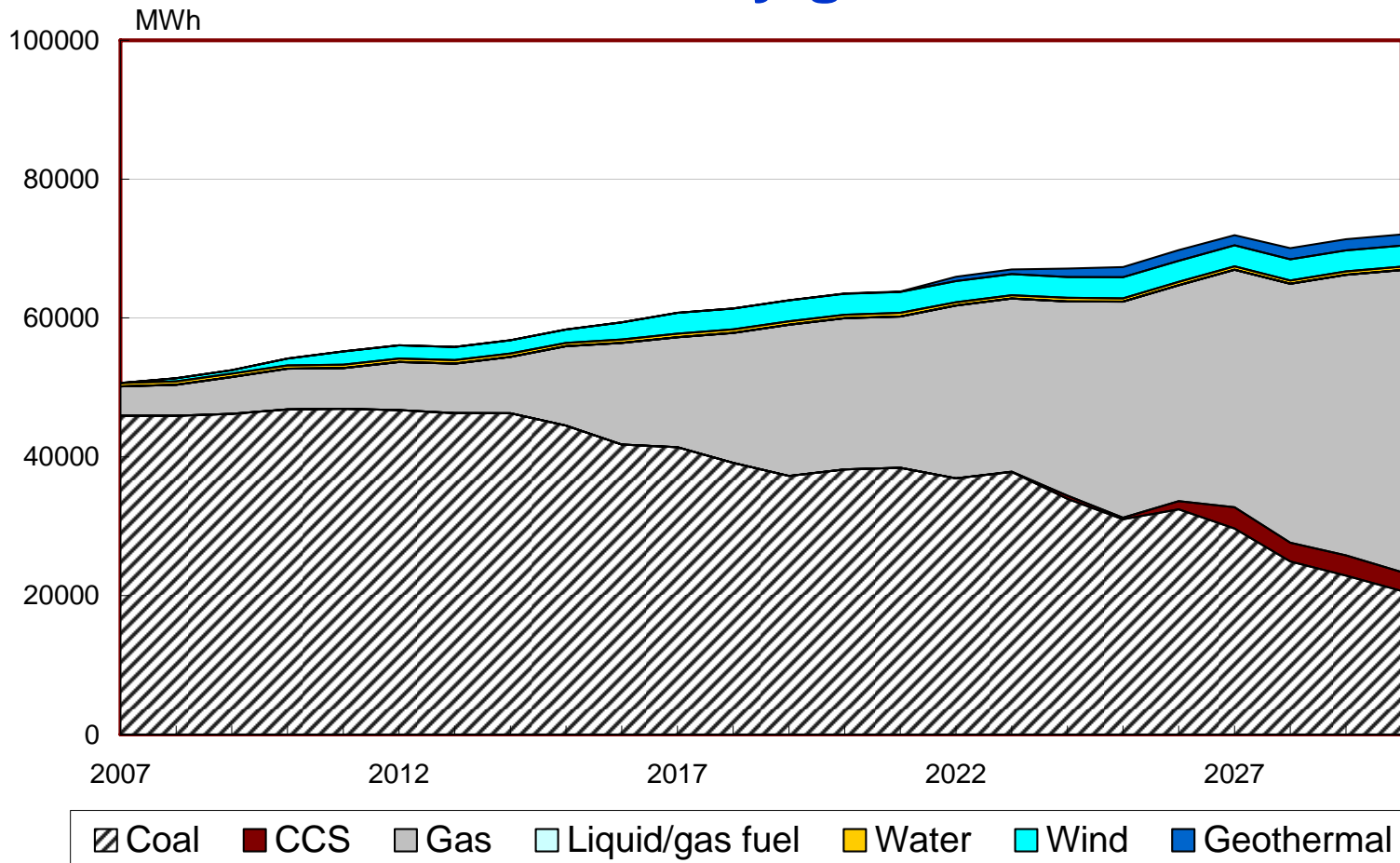


3. Victoria's electricity generation: BAU



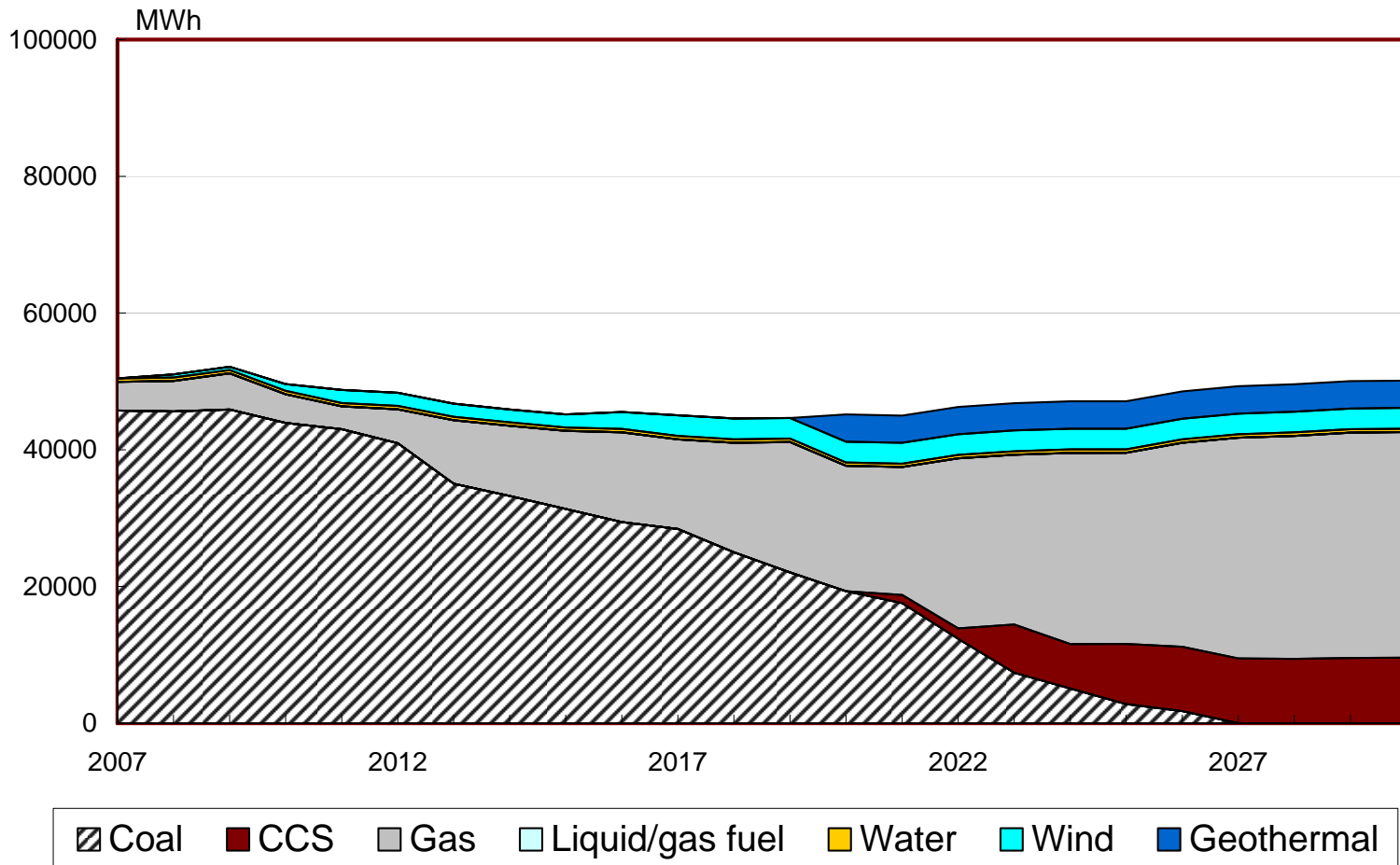


3. Victoria's electricity generation: \$50/t



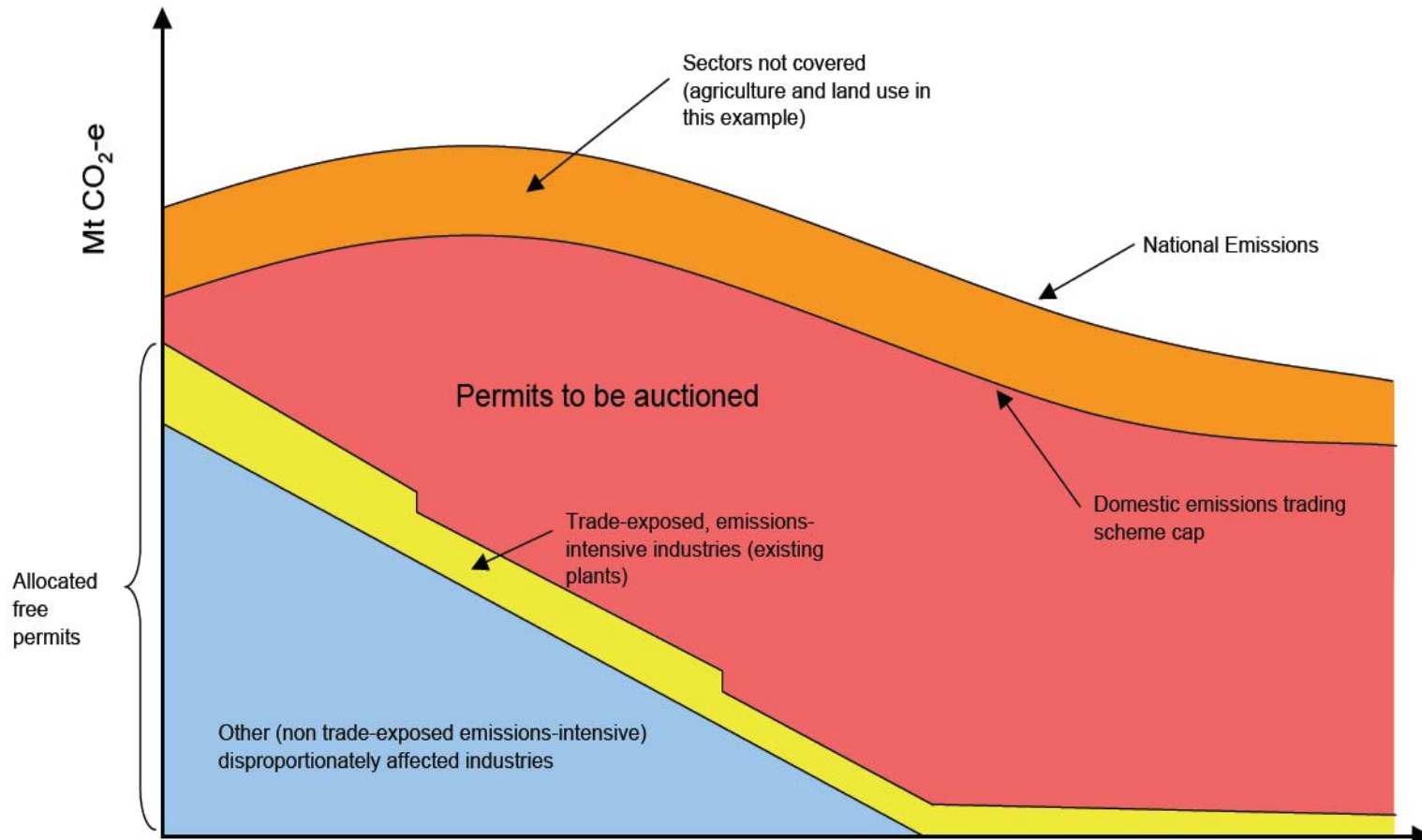


3. Victoria's electricity generation: \$100/t





3. The PM's Task Group's approach





3. Impact on asset values

- PM Task Group approach:
 - Asset values (approximately) unaffected.
- Garnaut has taken a hard line against the “polluters”:

“There is no tradition in Australia of compensating capital for losses associated with economic reforms of general application...”
- Asset values could be hit by over 50% for certain electricity assets under the Garnaut approach.
 - Hence the NSW Government’s angst.
- This will be a big swing variable for many.



4. Trade exposed sectors

- Trade-exposed and emissions intensive industries (TEEII) will at least initially be insulated from the full effects of the ETS:
 - Otherwise, production might shift offshore with no reduction in global emissions.
- Definitions of “trade-exposed” have yet to be settled.
- Exemption of TEEIIs will have significant effects on the impact on other sectors.



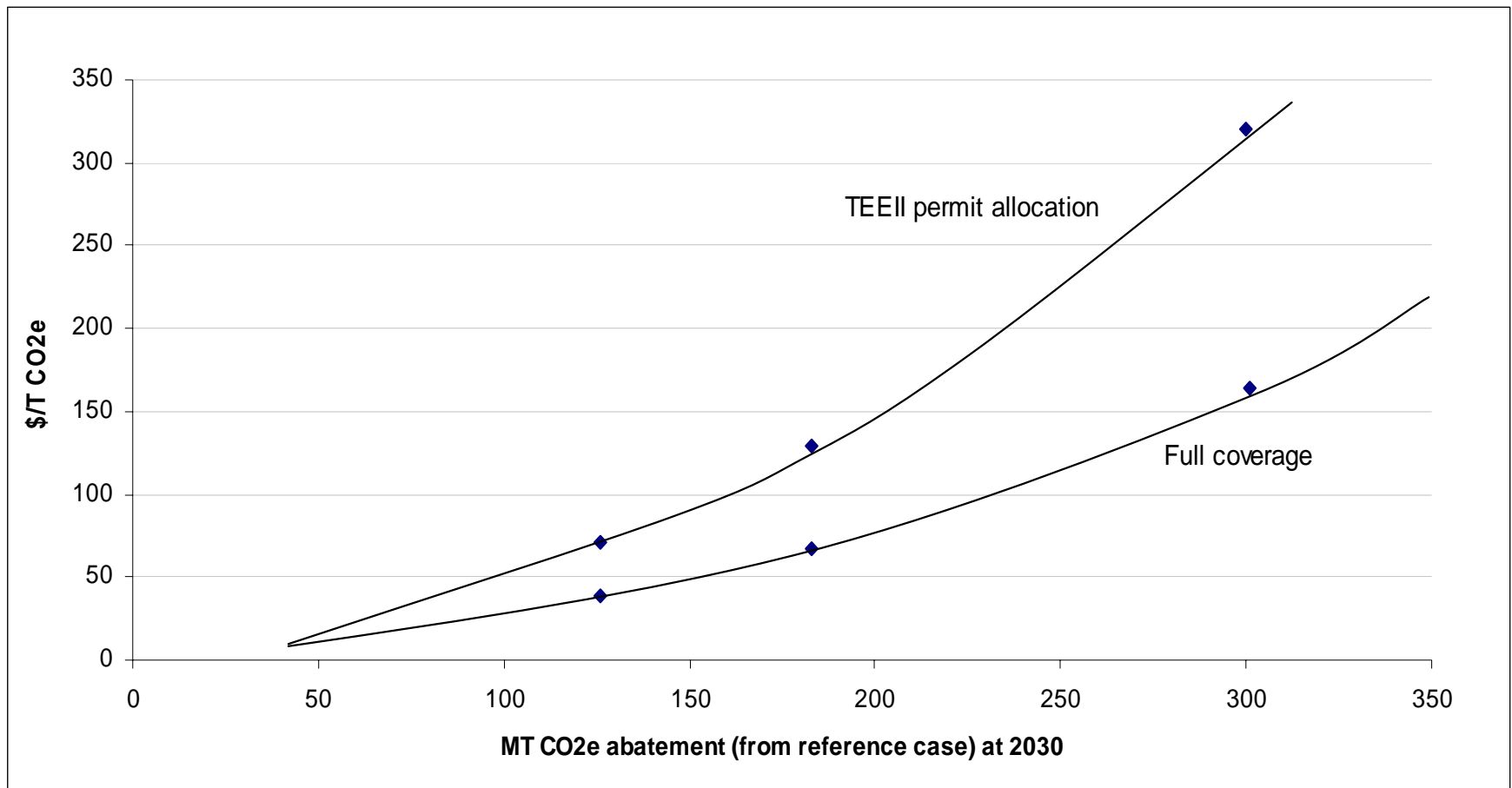
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4. Trade exposed sectors



4. TEEI: impact on carbon prices





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Conclusion



Concluding comments

- Climate change and its policy response will have a profound effect on the structure of the economy over the next few decades.
- In the early phase, asset values will be especially sensitive to decisions on:
 - interim targets;
 - any safety valve;
 - the extent to which permits can be banked; and
 - permit allocations.
- Financial markets need clarity on the rules of the game to meet their roles re derivatives and provision of capital.



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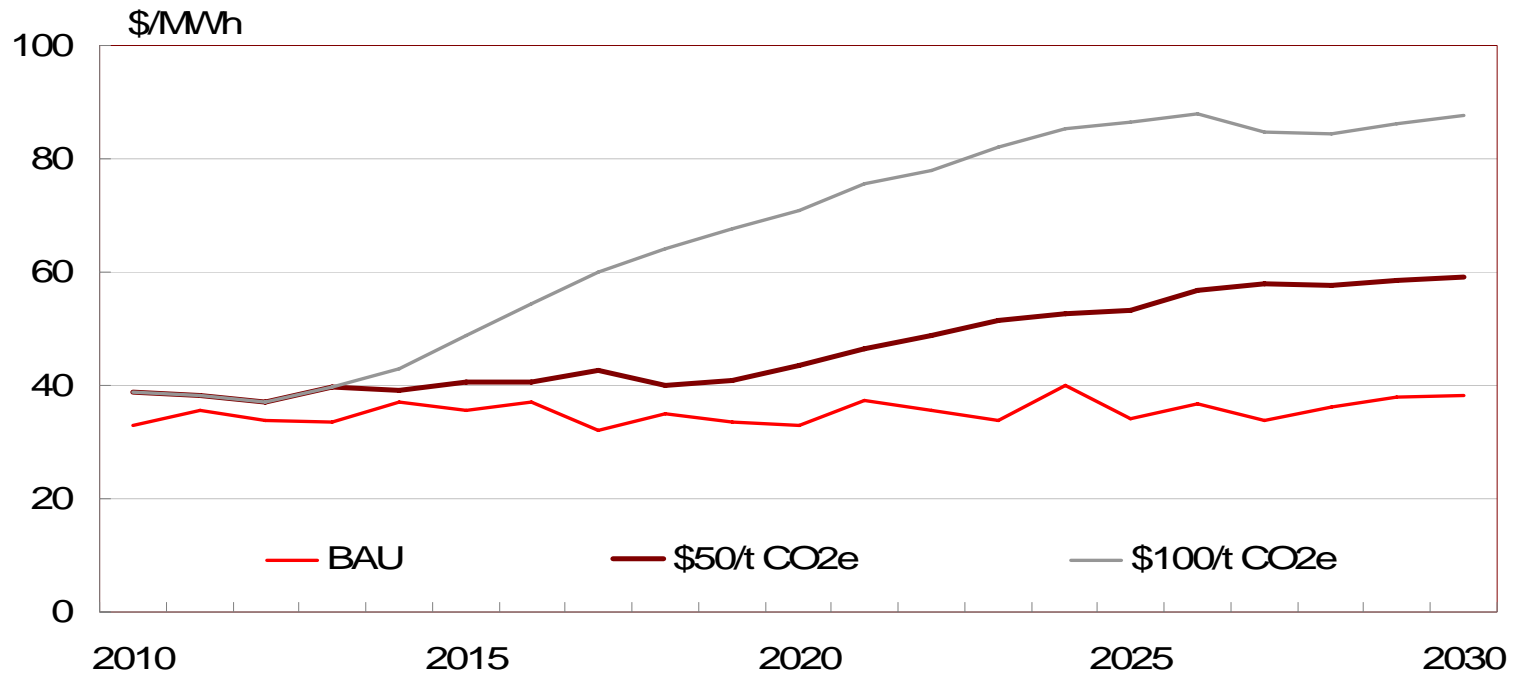
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3. Impact on electricity prices





3. Generator output: \$100/t case

