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POWER

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OZ CARBON TRADING CONFERENCE

Please see the attached presentation to be delivered by Dr Paul Simshauser, CEO of Babcock & Brown Power (ASX:BBP) at the Oz Carbon Trading Conference.

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About Babcock & Brown Power Limited

Babcock & Brown Power (ASX: BBP) is a power generation business, with assets diversified by geographic location, fuel source, customers, contract types and operating mode. Its aim is to grow returns to its securityholders through optimisation of its existing power generation business and the addition of further power assets via a combination of new construction and strategic acquisitions.

The initial portfolio has interests in seven operating power stations and one power station under construction and due for completion in late 2008. The portfolio has a total electricity generation capacity of approximately 2,900 MW.[1] Babcock & Brown has been developing, operating and acquiring the generation portfolio over a period of 10 years. Four of the power stations have been co-developed by Babcock & Brown from green field development opportunities and four have been acquired from other operators.

[1] Some assets have minority shareholders. BBP's equity interest in the assets is equivalent to 2,350 MW.

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Portfolio Summary

Power station	Location	Equity interest (%)	Fuel	Operations Start Date	Capacity (MW)	Operating Mode	Offtake
Operating power stations							
Braemar	Queensland	85%[1]	Gas	September 2006	455MW	Intermediate	Energex/Market
Oakey	Queensland	50%	Gas	January 2000	286MW	Peak	Enertrade
Redbank	NSW	100%	Coal	April 2001	135MW	Base load	EnergyAustralia
Ecogen (Jeeralang)	Victoria	73%	Gas	1980	449MW	Peak	TRUenergy
Ecogen (Newport)	Victoria	73%	Gas	1980	510MW	Peak	
Flinders (Playford)	South Australia	100%	Coal	1960-1964	240MW	Intermediate	Various/Market
Flinders (Northern)	South Australia	100%	Coal	1985	527MW	Base load	Various/Market
Under construction							
NewGen Kwinana	Western Australia	70%[1]	Gas	late 2008 (projected)	320MW	Base load	Synergy
Total of operating and under construction					**2,922MW[2]**		
Contracted power offtake							
Osborne contracts	South Australia	100%	Gas/ cogeneration		180MW	Base load	Various/Market

1 Direct and indirect equity interest.
2 BBP's equity interest in the assets is equivalent to 2,350MW.

For further information please visit our website: www.bbpower.com

On Emissions Trading, Wealth Transfers & the Wounded-Bull Scenario

Paul Simshauser

Oz Carbon Trading Conference
Sydney
31 May 2007

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Introduction

- CO2 emissions from power generation accounts for about 35% of the national total
- These emissions come from less than 100 sites, and consequently, the power industry is a key target for an Emissions Trading scheme
- As an industry that is naturally long CO2, power generators generally accept that emissions trading is an important piece of the policy mix required to deal with reduction targets, but…
  - Industry support for emissions trading is very much contingent on a suitable permit allocation policy
  - The key issue is the potential for large 'wealth transfers' in the $40 Billion power generation sector
  - This ultimately requires a level of permit 'Grandfathering' (i.e. free allocation of permits) in order to neutralise wealth transfers
- Policy makers and academic research have focused extensively on the so-called 'windfall gains' that occurred in the EU scheme
- The apparent windfall gains have made Grandfathering extremely unpopular with policy markers, but…
  - There are very important differences between the supply-side in the EU and Aust.
  - Seldom has the consequences of an inadequate permit allocation policy been dealt with in academic work, hence the purpose of this paper/presentation

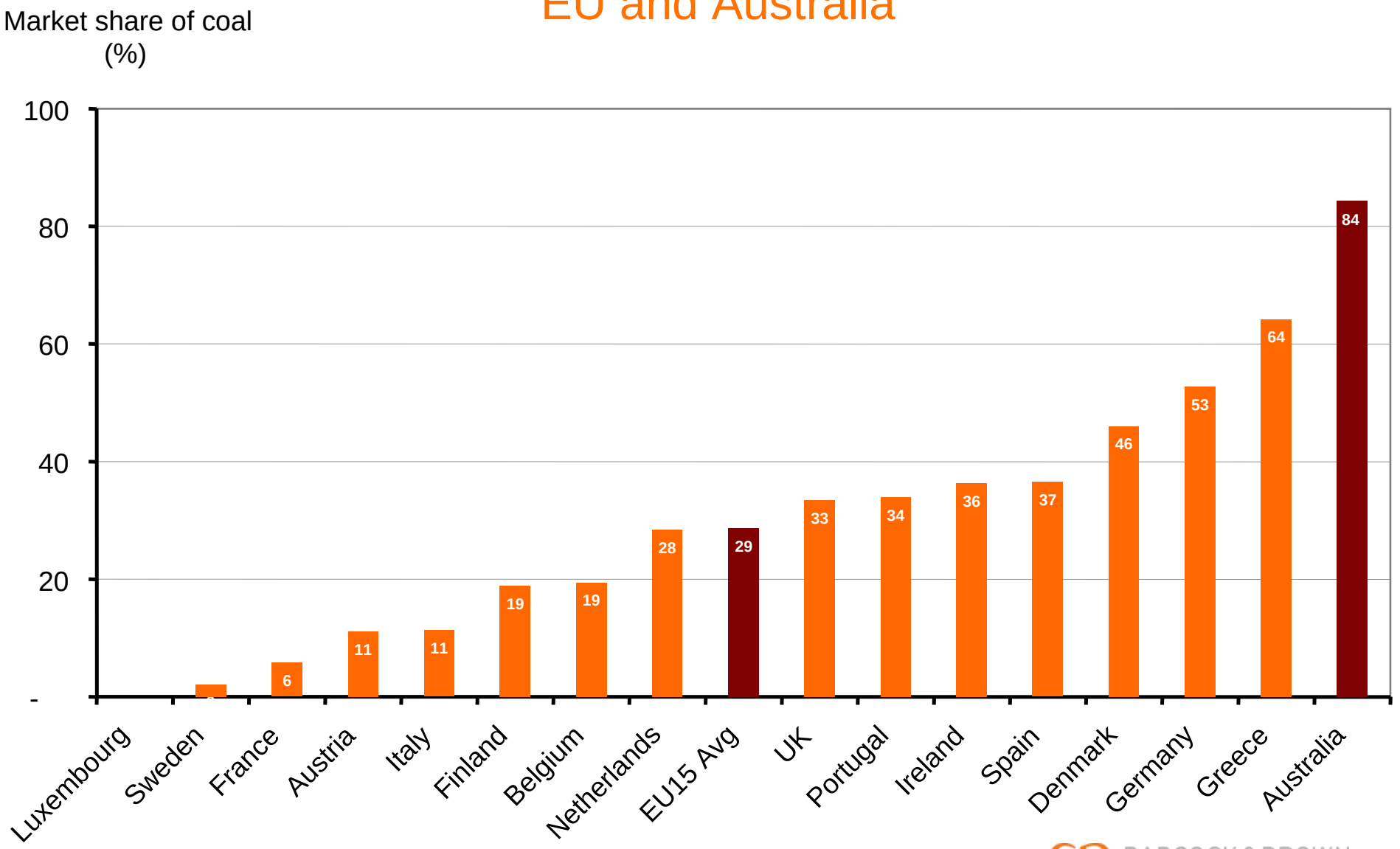
Permit Allocation Policy

- Whether permits are Grandfathered or Auctioned, the impact on electricity price will be identical, as Linares et al. (2006) noted

  > *...the only variable affected by the choice of the allocation method will be the earnings of the generating firms, and of course public revenues, given that, if perfect competition is assumed for the emissions market, the price of the permit and the amount emitted will not be affected…*

- It is the price of permits, not the allocation method, that will drive fundamental changes in investment patterns in power generation
- The reason for this is that under either method, emission permits will have an opportunity value. And as Sijm et al. (2005) noted, generators will at least attempt to pass on the full opportunity value:
  - The “add-on rate” (that is, the extent to which generators will add permits to their marginal cost of production) will theoretically be 100%
  - But producers cannot simply set power prices, as these are determined by a complex set of market forces, consequently…
  - The “work-on rate” (that is, the extent to which CO2 permit costs ultimately work-on to power prices) will be significantly lower
- Thus, Grandfathering vs Auctioning merely comes down to a wealth transfer issue
- So are windfall gains likely in Australia under Grandfathering?

Coal-fired Generation: some big differences between the EU and Australia



Data Source: IEA, esaa

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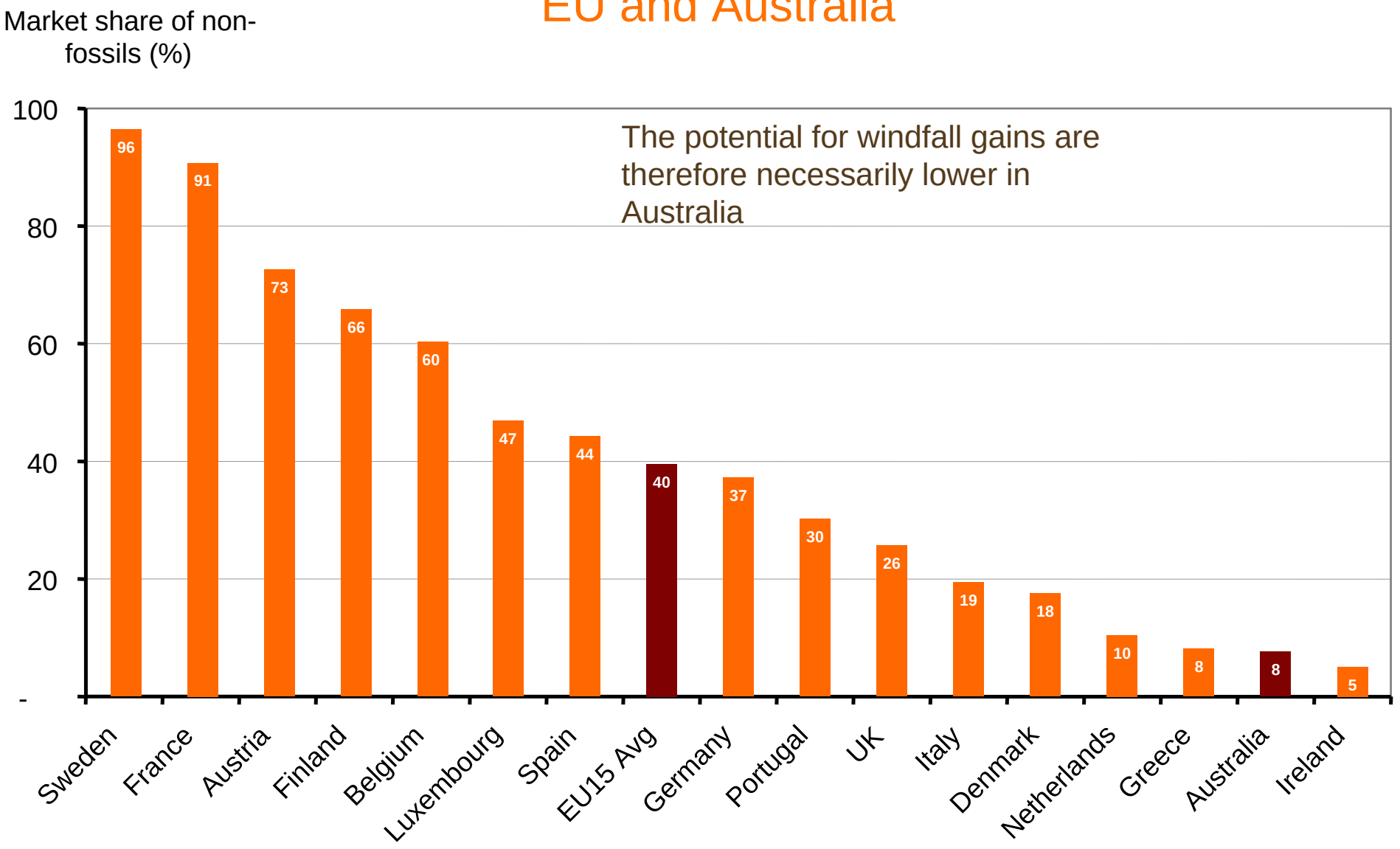
Non-fossil Generation: again, big differences between the EU and Australia



Data Source: IEA, esaa

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Grandfathering and the technology mix

- The mix of technologies will drive varying levels supra-normal profits under emissions trading, and in the EU, the large share of non-fossil power means that such gains will be extracted regardless
  - In Spain, the two dominant generators (combined market share 80%) hold 100% of the nuclear and hydro generation which accounts for 50% of energy. Supranormal profits will be earned under either Grandfathering or Auctioning (see Linares et al, 2006)
- In some cases, the use of historic data led to an over-allocation especially because some plant had already been ear-marked for closure. In Germany, 2005 allocations (382Mt) exceeded production (373Mt) (see Radov & Klevnas, 2007). In Australia, only 1 coal plant has been ear-marked for closure, in QLD
- The definition of 'windfall gains' as used in the EU needs to be examined carefully
  - In Germany, the Bundeskartellamt claimed that if *work-on rates* exceeded 25% then windfall gains existed because permits were allocated for free (see Radoc & Klevnas)
  - This defies economic logic and economic gravity. If the value of CO2 is not reflected in electricity prices, then electricity will be over-consumed (allocative inefficiency) and new technologies to deal with the problem will be locked out (dynamic inefficiency)
  - At the same time that CO2 pricing commenced, gas prices increased from €3.05 to €5.70/GJ. This would drive the cost of an NGCC plant from $65/MWh to $101/MWh – so where did the gain to coal generators come from?

Add-on rates and work-on rates: the pass-through of CO2

- While one would expect the theoretical “add-on rate” to be 100%, in practice, generators cannot simply add 100% of the value to price due to various technical limitations (eg minimum loads) and contractual constraints (eg Take-or-Pay fuel)
- Research from the EU indicates the “add-on rate” is about 70% (McKinsey, 2005)
- The “work-on rate” will, by virtue of a plant mix, be lower again
  - Sijm et al (2005) stripped-out the shift in gas price (i.e. €3.05 to €5.70/GJ) and derived the “work-on rates” for Germany and the Netherlands – which provides the two extremes of the EU.
  - In Germany, the “peak work-on rate” was about 73% and off-peak about 46%, thus the base load work-on rate was below 60%
  - In the Netherlands the “peak work-on rate” was about 39% and off-peak about 55%, thus the base load work-on rate was below 50%
- Results for Australia in NETT (2006) indicated a work-on rate of 60-70%
- Modelling for this presentation in the case of Victoria was 78%, but dropped to less than 60% following the addition of a single NGCC plant (lower emission intensity)
  - But this is the industry average result. Some firms secure supra-normal profits (hydro, low emission gas). Marginal coal generators were as low as 58% initially and down to 42% following the addition of a single NGCC plant

Grandfathering and the time dimension of supra-normal profits

- The work-on rate will decline as new low emitting plant is added to the power system because it will spend an increasing amount of time setting clearing prices
  - Black coal plant: CO2 intensity of 0.9t, brown coal up to 1.5t, NGCC 0.36t
- It is disingenuous to argue that because an individual coal generator earns sura-normal profits in one reporting period that a scheme of Grandfathering is somehow flawed
  - Consider the marginal brown coal generator who under normal conditions expect to recover its returns over a 30 year period now finds itself with a remaining economic life of say 10 years
  - In order for stock and bond holders to remain otherwise equal, economic returns need to lift from 11% to 23%
  - Thus what may appear to be a supra-normal profit may be little more than an (inadequate) attempt to partially recover a near-term stranded asset
- Finally, at (say) $17.50/t for CO2, a 2000MW generator would need to raise $324M pa in finance to produce ongoing base power. To put this into perspective, $324M is 55% of the expected annual revenue or 10% of aggregate asset base of the generator

Entry constraints and CO2 price uncertainty

- In Australia, some in industry have argued that the lack of certainty around emissions trading is stifling investment
- In reality, the power sector has suffered little by this uncertainty so far – the following plant mix. While Australia is very tight "capacity", structural analysis of the supply-side indicates that the country remains "overweight" base load capacity
  - New capacity required in the near term is either intermediate or peak plant, and gas fired generation is the lowest cost and lowest emitting option for these duties
- But next decade, base plant additions will be required, and this is where CO2 price certainty becomes critical:

Private Cost

Generation technology	Short run marginal cost of production ($/MWh)	LRMC at 90% ACF ($/MWh)	emissions intensity (t/MWh)
Brown Coal	5.50	38.10	1.26
NGCC	25.50	45.40	0.36
Cost of capital	11.00%		

Social Cost at $25/t

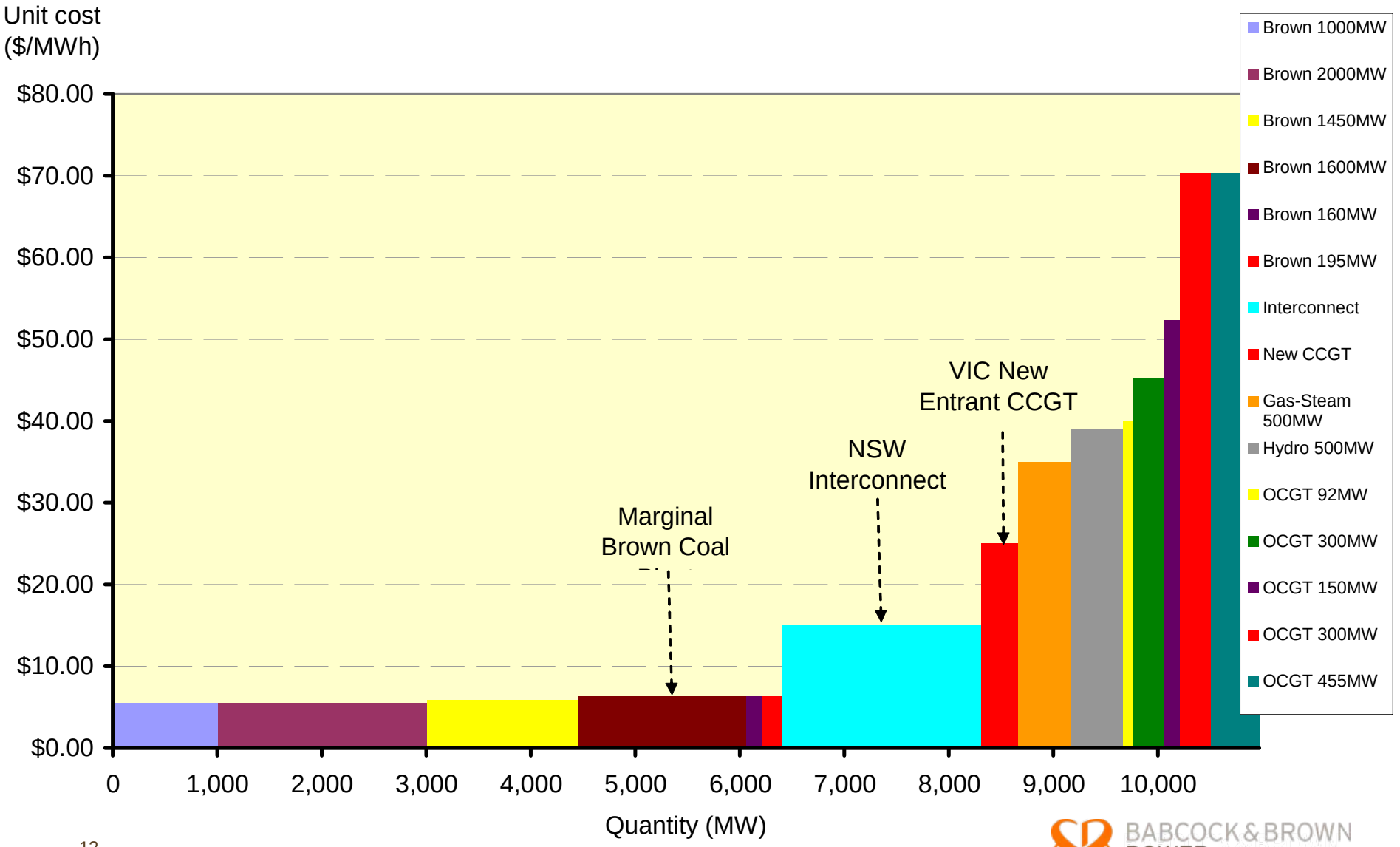
Generation technology	Short run marginal cost of production ($/MWh)	LRMC at 90% ACF ($/MWh)	CO_2 emissions intensity (t/MWh)
Brown Coal	37.00	69.60	1.26
NGCC	34.60	54.50	0.36
Cost of capital	11.00%		

Data Source: Simshauser & Doan (2007)

Case Study - Victoria

- Key assumptions underlying subsequent modelling…
  - 2006 historical load used
  - NEMESYS Model used to dynamically model the Victorian power pool, half-hourly equilibria derived along with generator economic profits/losses
  - Three primary scenarios: Base Case Scenario, Tipping-Point Scenario & Wounded-Bull Scenario
  - In CO2 scenarios, permits are assumed to be 100% auctioned, and the clearing price is assumed to be at the “Tipping-Point” of $17.50/t – that is, the differential between the marginal running cost of brown coal and the marginal running cost of an efficient new entrant NGCC plant
  - Supply-side looks as follows:

Aggregate Supply Curve for Victoria (Private Cost Basis)



Data Source: Simshauser & Doan (2007)

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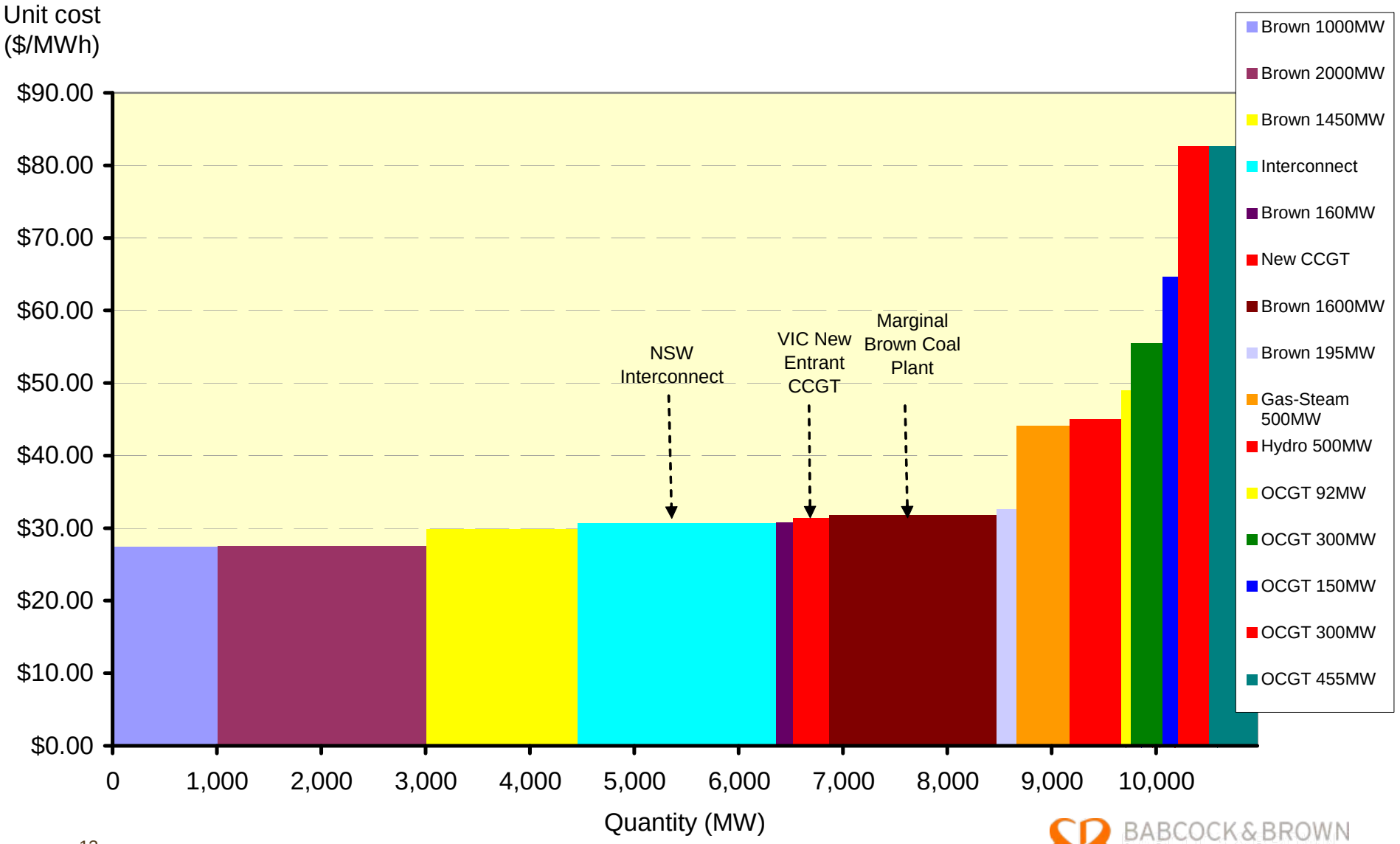
Aggregate Supply Curve for Victoria (Social Cost at $17.50/t)



Data Source: Simshauser & Doan (2007)

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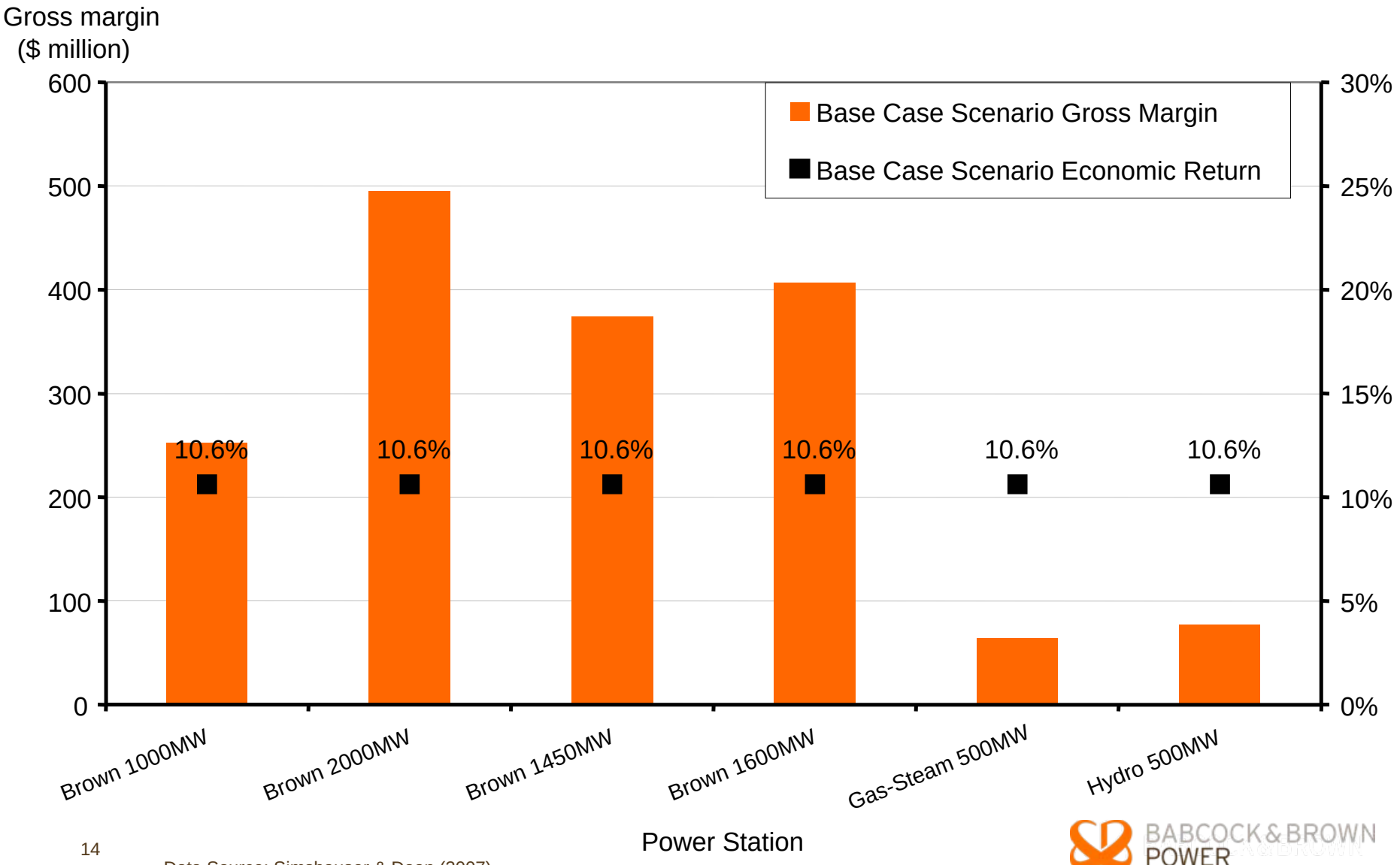
Base Case Scenario: Spot Price $34.10/MWh



Data Source: Simshauser & Doan (2007)

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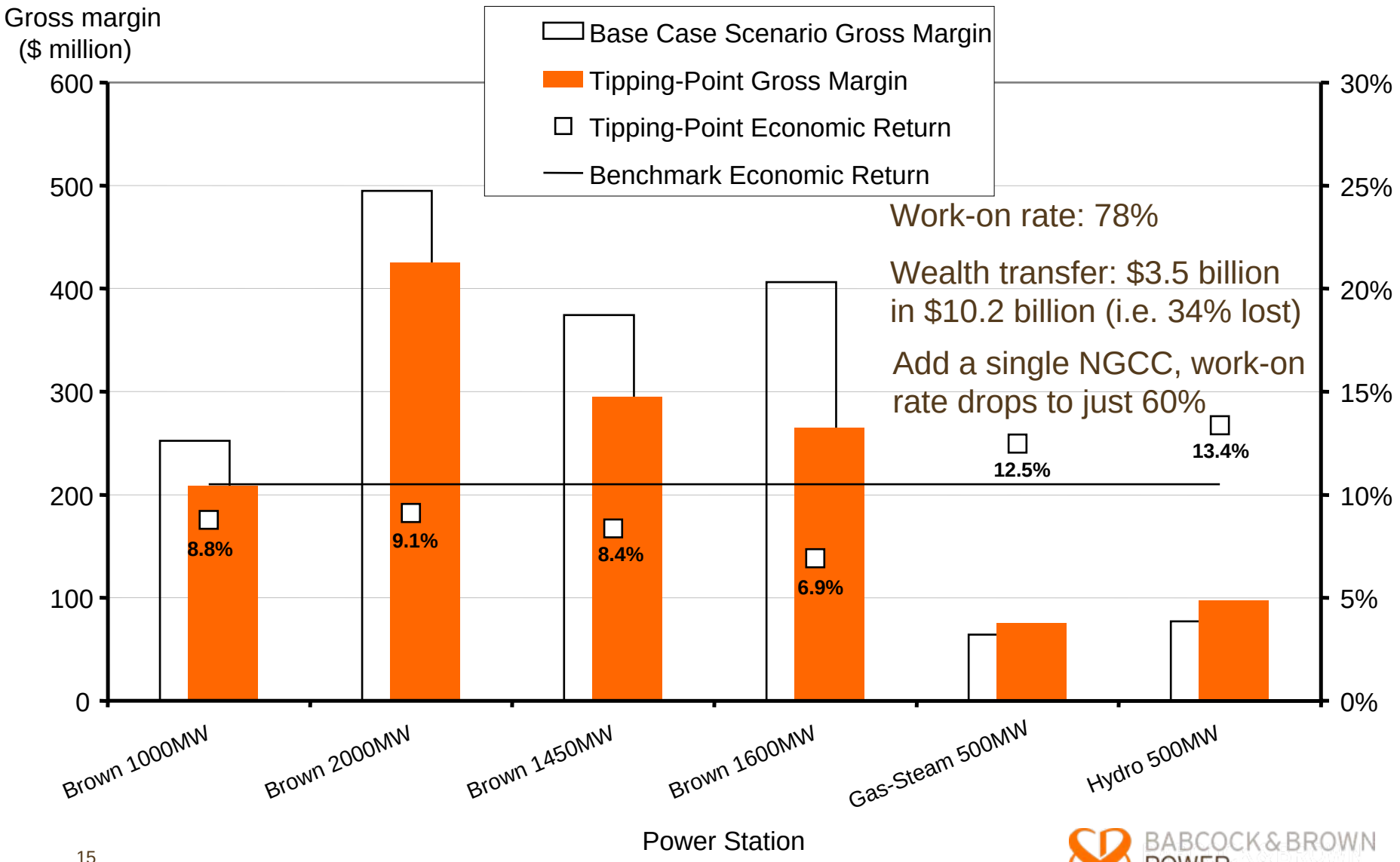
Tipping-Point Scenario: Spot Price $52/MWh



Data Source: Simshauser & Doan (2007)

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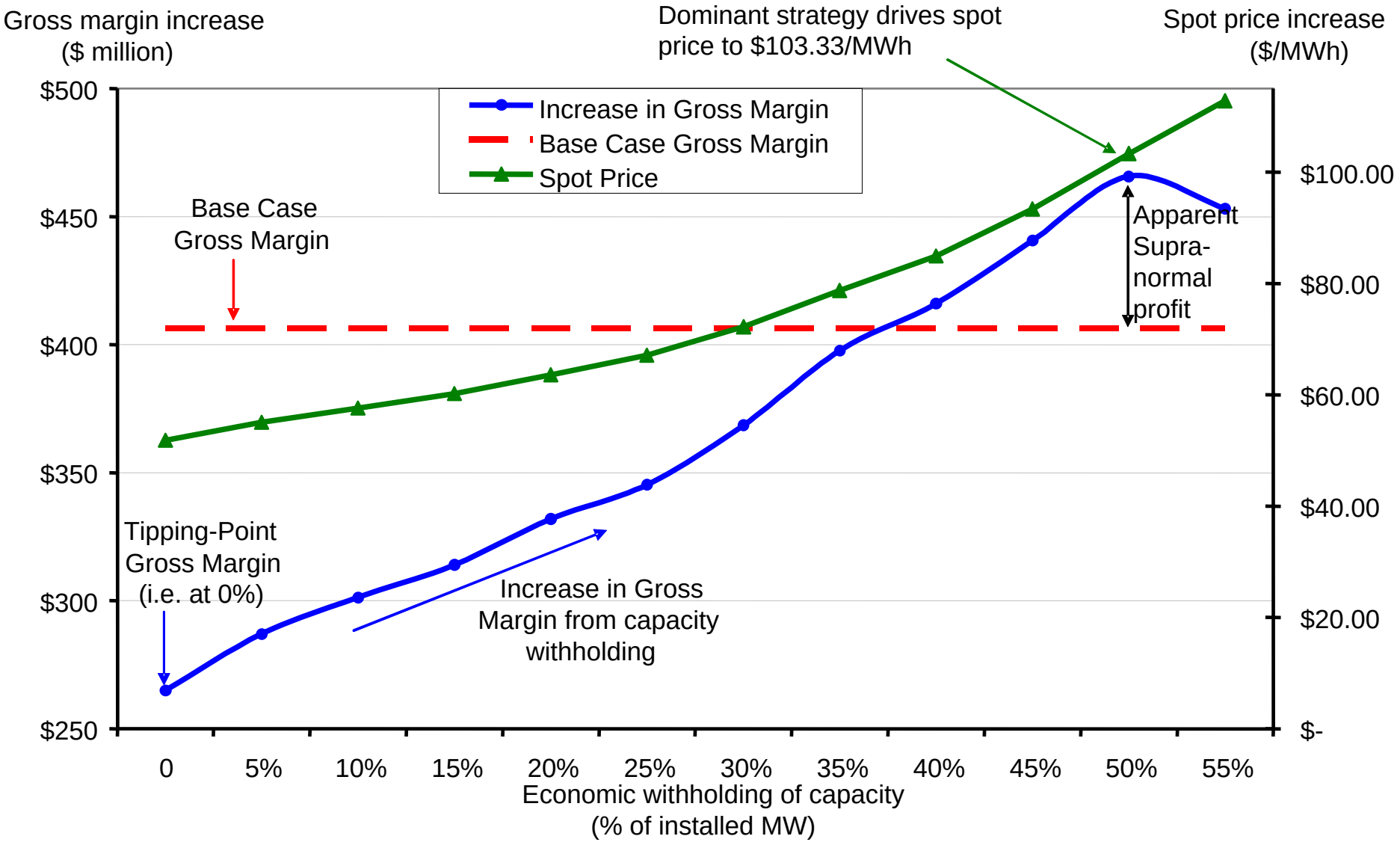
The Wounded-Bull Scenario

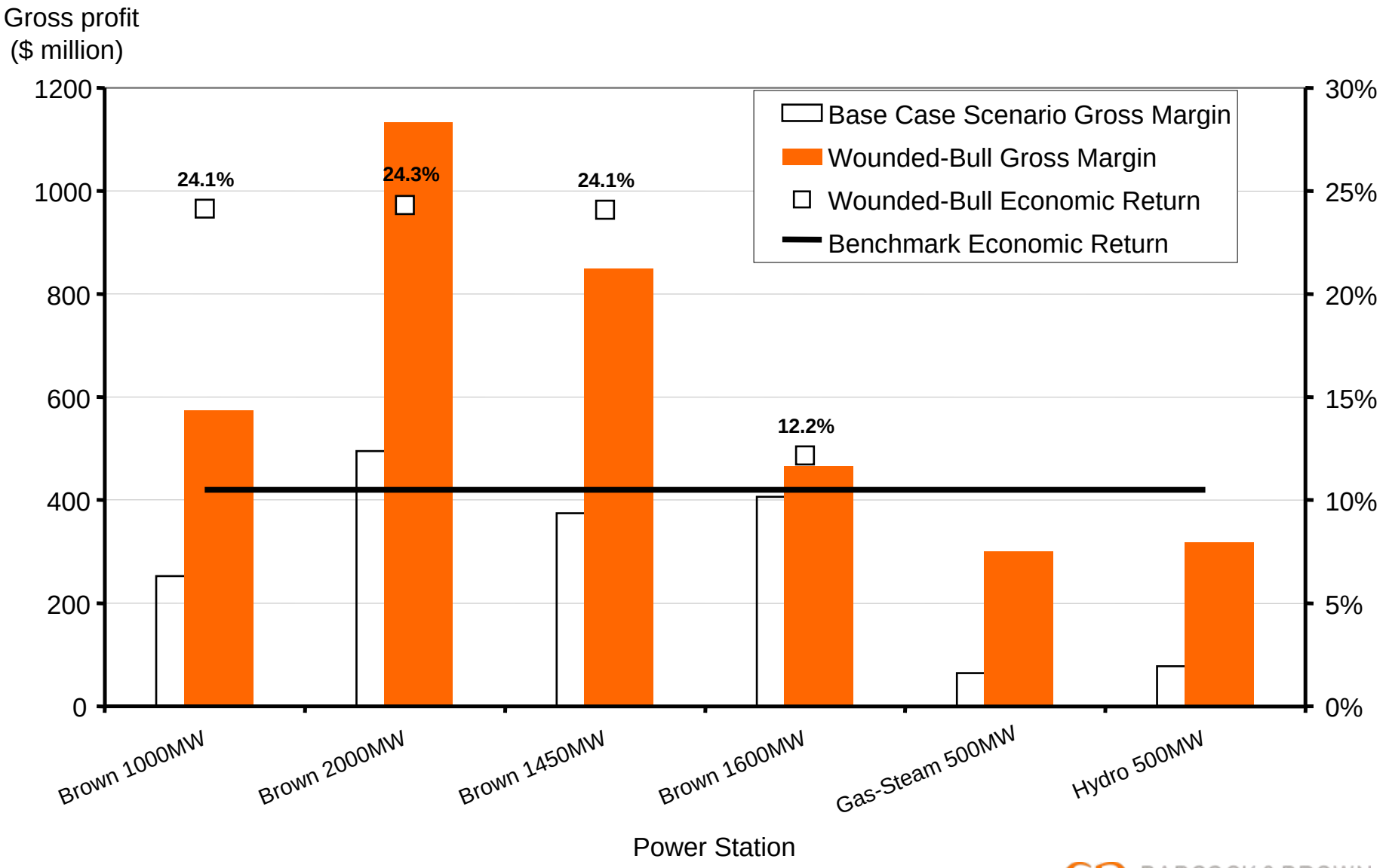
- Very clearly, with almost all of their value transferred, the “marginal” coal generators are likely to become *Wounded-Bulls* under an “all auctioned” scenario
- Given the $52/MWh clearing price, NGCC plant can enter profitably at $51.75/MWh and therefore undercut the marginal coal producers
- Marginal coal producer returns drop from about 7% to less than 4%. This is critical because at this point the firm will default on financial covenants, so…
- The dominant and therefore rational strategy of the marginal coal producer is to unwind hedges and withhold generating capacity to raise clearing prices
- Modelling results from the study indicate that wholesale electricity prices rise from $34, to $52, to $103/MWh (a 300% increase)
- The marginal generator thus attempts to recover its otherwise stranded asset
- Ironically, all remaining generators extract supra-normal profits – more than would have been the case had all permits been allocated (in some respects resembles the current water-constrained environment)

Wounded-Bull Scenario: a final period exit strategy



Data Source: Simshauser & Doan (2007)

Wounded-Bull Scenario: a final period exit strategy



Data Source: Simshauser & Doan (2007)

Conclusion

- For an industry that is naturally long GHG, emissions trading is a logical policy option and has the support from most in the power generation industry provided allocation policy deals with asset values
- Over the next 40 years, Australia's thermal plant stock will need a complete turnover, but the current class of coal technologies need a transitional glide path, and right now, 85% of power comes from coal
- This invariably means a careful policy of Grandfathered emission permits to ensure ongoing system security and electricity price stability over this lengthy transitional period
- As one of the bigger developers of new gas-fired generators, BBP sees no problem with incumbent coal generators being 'ushered' into the GHG world
- No generator wants to see the sustained price spikes through continuous economic withholding of capacity, but in the absence of Grandfathering, such an outcome is probably inevitable
- The longer term welfare implications of a *Wounded-Bull Scenario* (i.e. on consumer pricing and consequential impacts on economic growth) far out-weight even an overly generous allocation system to incumbent coal generators