



Emissions trading designs, electricity prices and compensation

Trade Exposed Emissions Intensive Industry Summit

Danny Price, Managing Director, Frontier Economics

Overview and objectives

Emissions trading scheme is an important element of climate change policy

- ☪ The aim of an emissions trading scheme is to price a previously unpriced input/output
- ☪ An ETS is specifically design to discourage any activity that results in the production of greenhouse gases. Two key options:
 - discourage investment in *new* facilities and equipment that result in relatively high greenhouse gases
 - discourage use of *existing* facilities and equipment that result in relatively high greenhouse gases
- ☪ First option alone is likely to result in slow reduction in greenhouse gases. Second option will speed things up but will result in far more severe transitional effects.

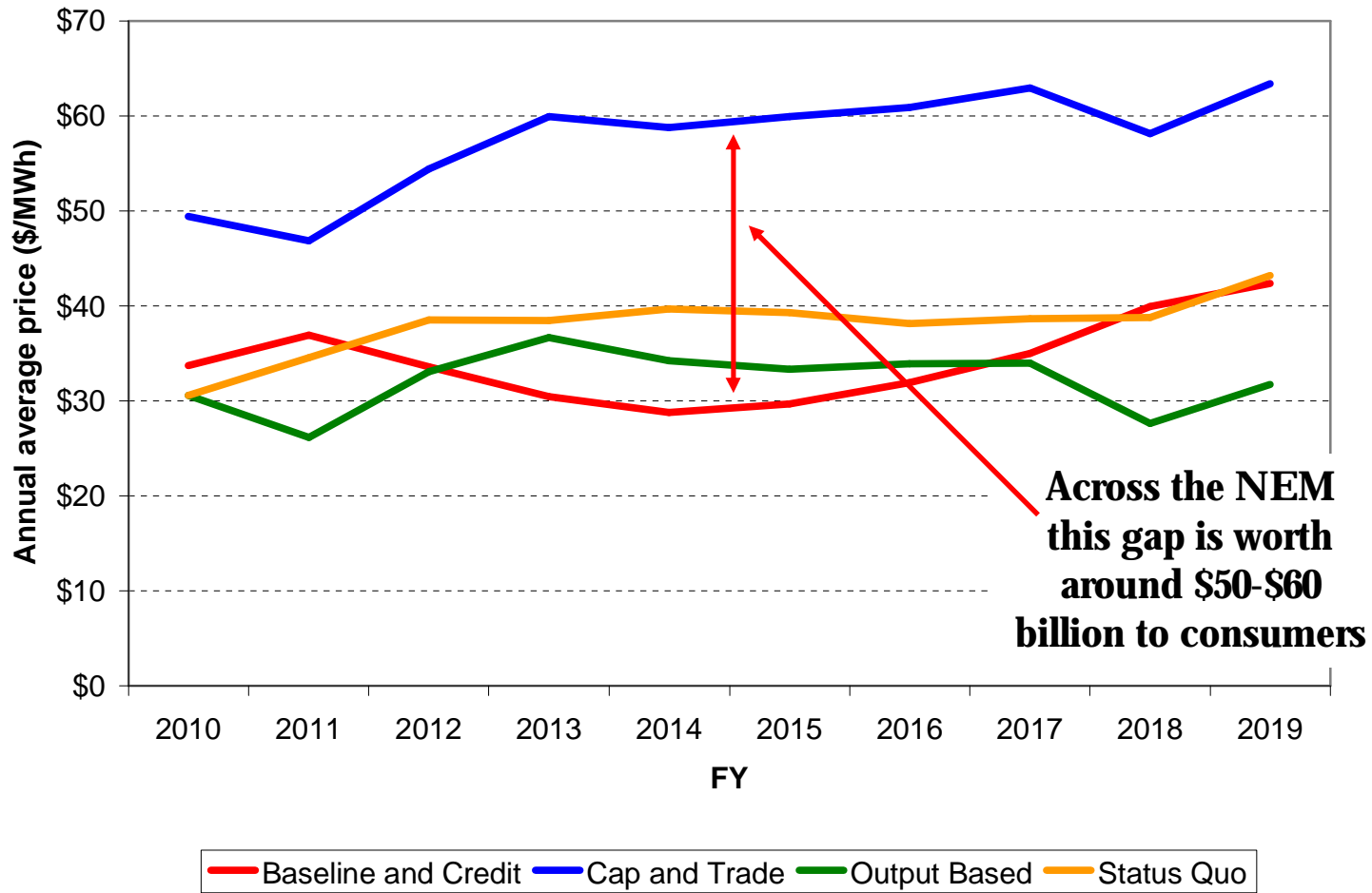
Broad ETS design options – carrots and sticks

Cap and Trade - sticks	Output Based Allocation – carrots and sticks	Baseline and Credit - carrots
<p>Penalises high emissions</p> <p>Increases costs: similar in effect to a tax</p> <p>Obligation on emitters</p> <p>Allocations auctioned or grandfathered</p>	<p>Mix of penalty and reward</p> <p>Similar to tax on high emitters which funds a subsidy for low emitters</p> <p>Obligation on emitters</p> <p>Allocations related to output (eg 0.8tCO₂/MWh)</p>	<p>Rewards low emissions</p> <p>Reduces costs via a credit, similar to MRET (funded via retail levy)</p> <p>Obligation on retailer</p> <p>Allocations related to outperforming baseline</p>

Evaluation of options – work-in-progress

Aspects	Cap and Trade	OBA	Baseline and Credit
Achieving given level of abatement	✓ ✓	✓	✓
International trading	✓	✓	✓
Inter-sectoral trading/efficiencies - potential	✓ ✓	✓	✓
- transitional	✗	✓	✓
Wholesale electricity market price	✗ ✗	✓ ✓	✓ ✓
Carbon leakage	✗ ✗	✓ ✓	✓ ✓
Adjustment effects	✗ ✗	✓	✓ ✓
Public finance and governance effects			
- Potential distortions from spending decisions	✗ ✗	✓	✓
- Scheme administration			
Informational requirements	✗	✗	✗ ✗
Potential for rent seeking	✗ ✗	✗	✗

Price performance



Compensation – energy users

- ⌘ No compensation required if use Output-Based Allocation or Baseline and Credit instead of Cap-and-Trade because price effects in electricity market are avoided (still incur costs though)
- ⌘ Under Cap-and-Trade energy consumers will face significant price hikes
- ⌘ Under Cap-and-Trade
 - if don't compensate then will lose some current users and certainly will lose new investments (and this could result in a worsening of environmental outcomes)
 - even if current Government decides to compensate this is unlikely to satisfy investors as they will be concerned that the future value of their project will be dependent on ongoing political support

Compensation – should Government care?

Generators

- ☪ Most generators stand to lose significant value because increase in price does not offset their increase in costs of polluting
- ☪ The Government's policy can only be achieved by massive and ongoing investment
- ☪ It is not smart to financially destroy businesses that it needs to heavily invest to achieve its policy aims
- ☪ In the future the commercial value of new investments will be determined by rules and regulations that emerge from political processes that respond to highly uncertain information.
- ☪ Investors will expect that these rules and regulations will be changed over time and will be worried that these could strand their assets
- ☪ Government has choice of letting market look after this:
 - Investors will manage these risks by a variety of means including delaying investments to ensure that post entry prices are higher enough to compensate for extra risk and/or building (at extra costs) a set of options into their investments (scaleability, fuel switching capability, retrofitting for CCS, etc)
 - or by compensating asset owners for policy change asset stranding (precedent for this is the NEM)

Compensation – Enron again?

- ⌘ The most important reason to ensure producers are compensated for loss of value is if the Government doesn't the market will experience a Enron like meltdown
- ⌘ A crucial element to the orderly operation of all energy markets is contracting
 - secures revenues against large fixed costs
 - gives greater certainty in a world of highly variable spot purchase costs
- ⌘ The value of counterparty assets underpin the security of these contracts
- ⌘ Undermine the value of the assets and this will trigger credit exposure reviews right across the market. This will trigger debt reviews across the market and this will immediately affect liquidity for new projects – the projects that the Government needs to achieve its policy aims
- ⌘ Compensation is essential to avoid this outcome. The market simply cannot bear such a shock at a time when it needs an unprecedented level of investment to maintain supply security



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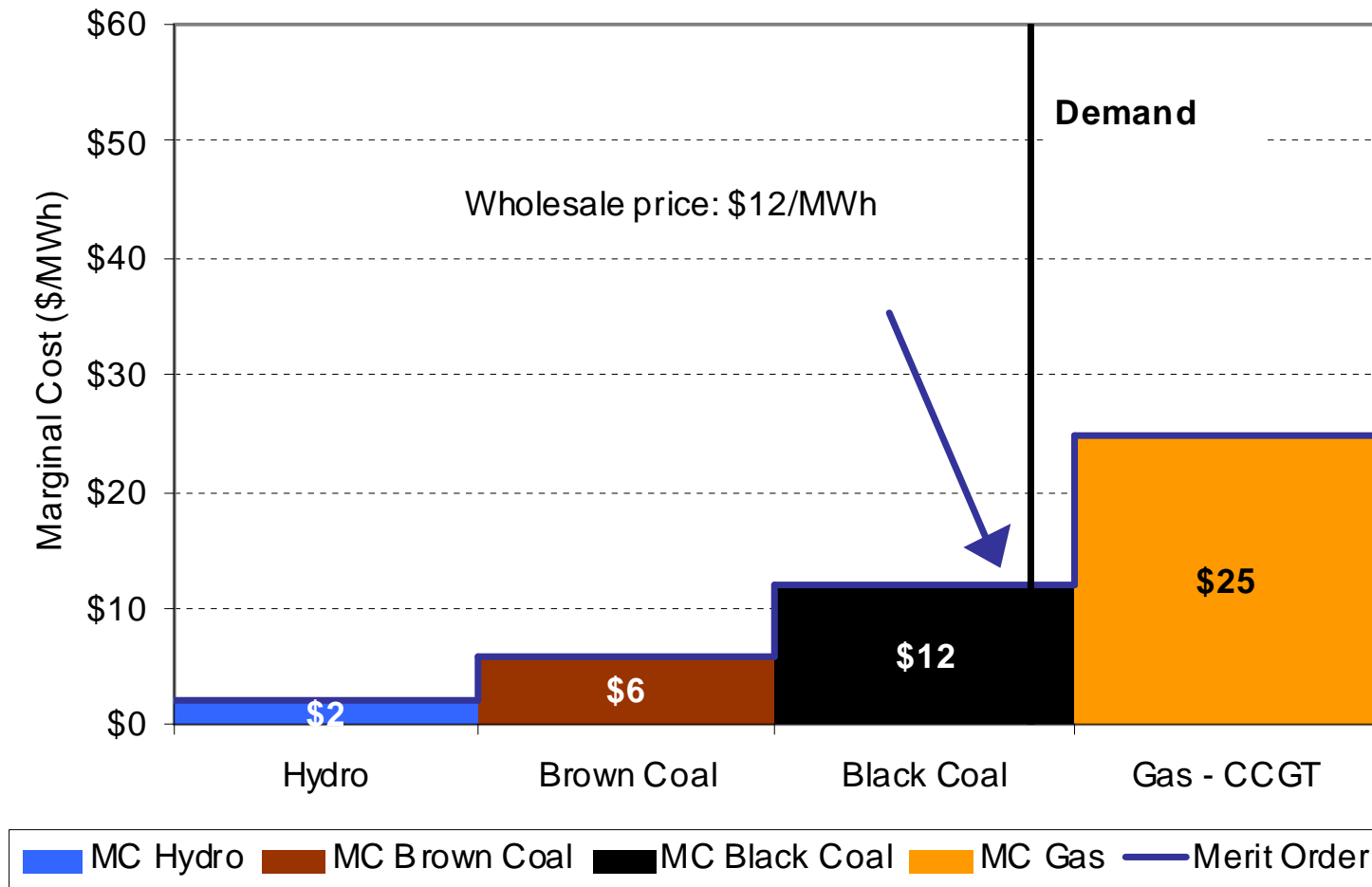
Additional slides on scheme alternatives

Understanding scheme mechanics

A stylized example based on electricity generation

Plant	SRMC (\$/MWh)	Emissions Intensity (tCO₂/MWh)
Hydro	2	0
Brown Coal	6	1.2
Black Coal	12	0.9
Gas – CCGT	25	0.5

Understanding scheme mechanics (cont)



Cap and Trade

Basics

- ☪ Government sets absolute emissions cap and allocates permits
 - Auction or Free allocation
 - In either case, *allocation is independent of output*
 - Effects on electricity price are the same (“opportunity cost pricing”)
- ☪ In electricity sector, abatement achieved via change in the merit order: high emissions generating plant supplanted by low emissions ones

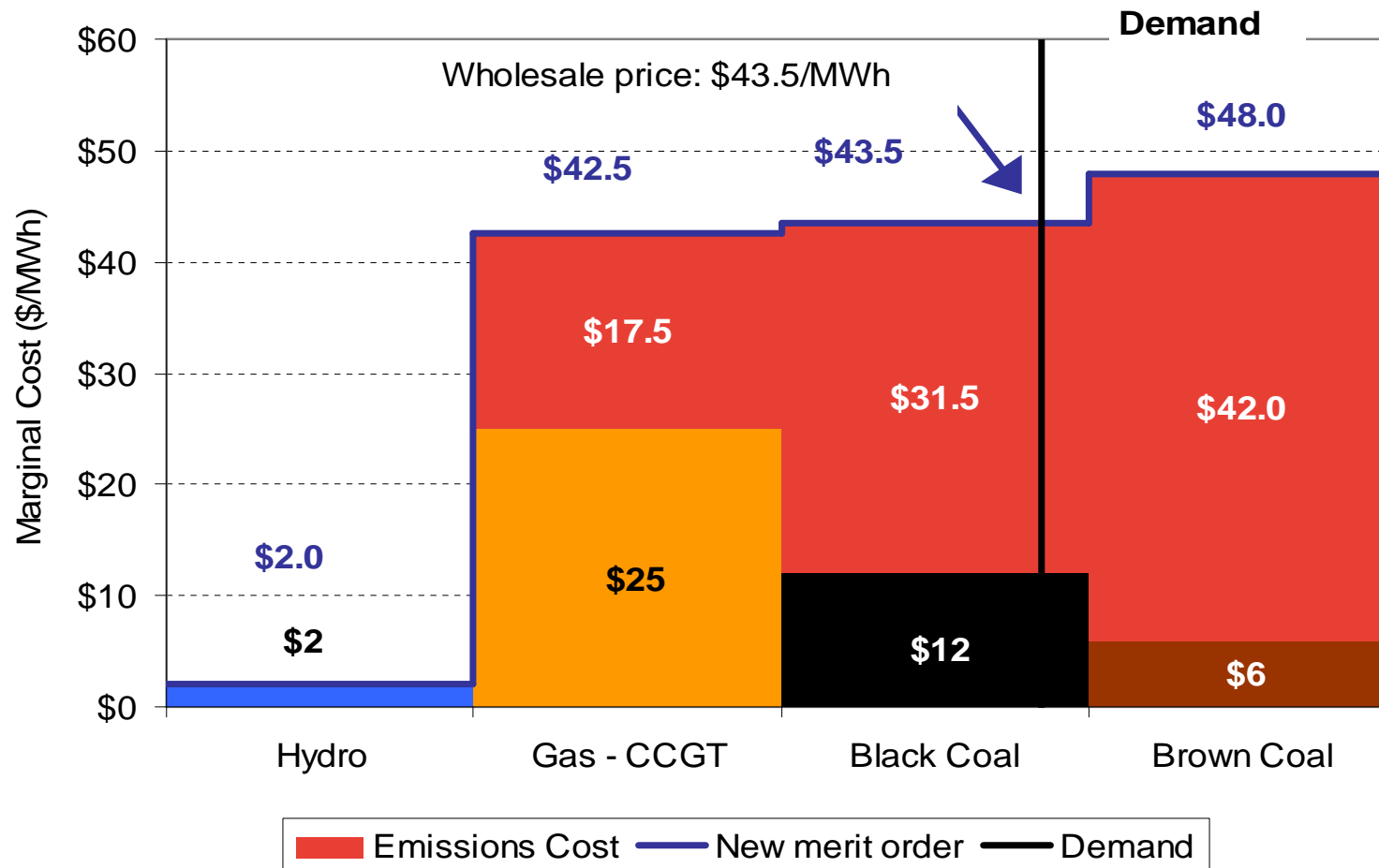
Consider worked example

- ☪ Assume carbon permit price of \$35/t CO₂
- ☪ What effect on merit order?
 - Consider relative changes to generator marginal costs as a result of this price
 - Carbon cost is the emissions intensity multiplied by the carbon price; adds to SRMC

Cap and Trade - Example

Plant	SRMC (\$/MWh)	Emissions Intensity (tCO2/MWh)	Carbon Cost (\$/MWh)	New SRMC (\$/MWh)
Hydro	2	0	0	2
Brown Coal	6	1.2	42	48
Black Coal	12	0.9	31.5	43.5
Gas – CCGT	25	0.5	17.5	42.5

Cap and Trade – Merit order



Output Based Allocation

Fundamental difference from C&T is that allocation is a function of output

- ☪ Government sets a baseline emissions intensity target
 - Can be set to achieve same emissions cap for anticipated output
 - EG, baseline intensity set at 0.8 tonnes of CO₂ per MWh
- ☪ Generators still liable for actual emissions, which differ by generator
- ☪ Generators receive the same allocation per MWh of output
 - Effectively a production subsidy, which is equal for all generators
- ☪ *Changes the “opportunity cost pricing” effect:*
 - *under C&T generators can sell permits allocated but not used*
 - *under OBA, allocation is dependent on output*
- ☪ Net subsidy/ tax effect depends on a generator’s emissions intensity
 - If above baseline, it will have to buy permits for the difference
 - If below the baseline, it can sell permits equivalent to the difference

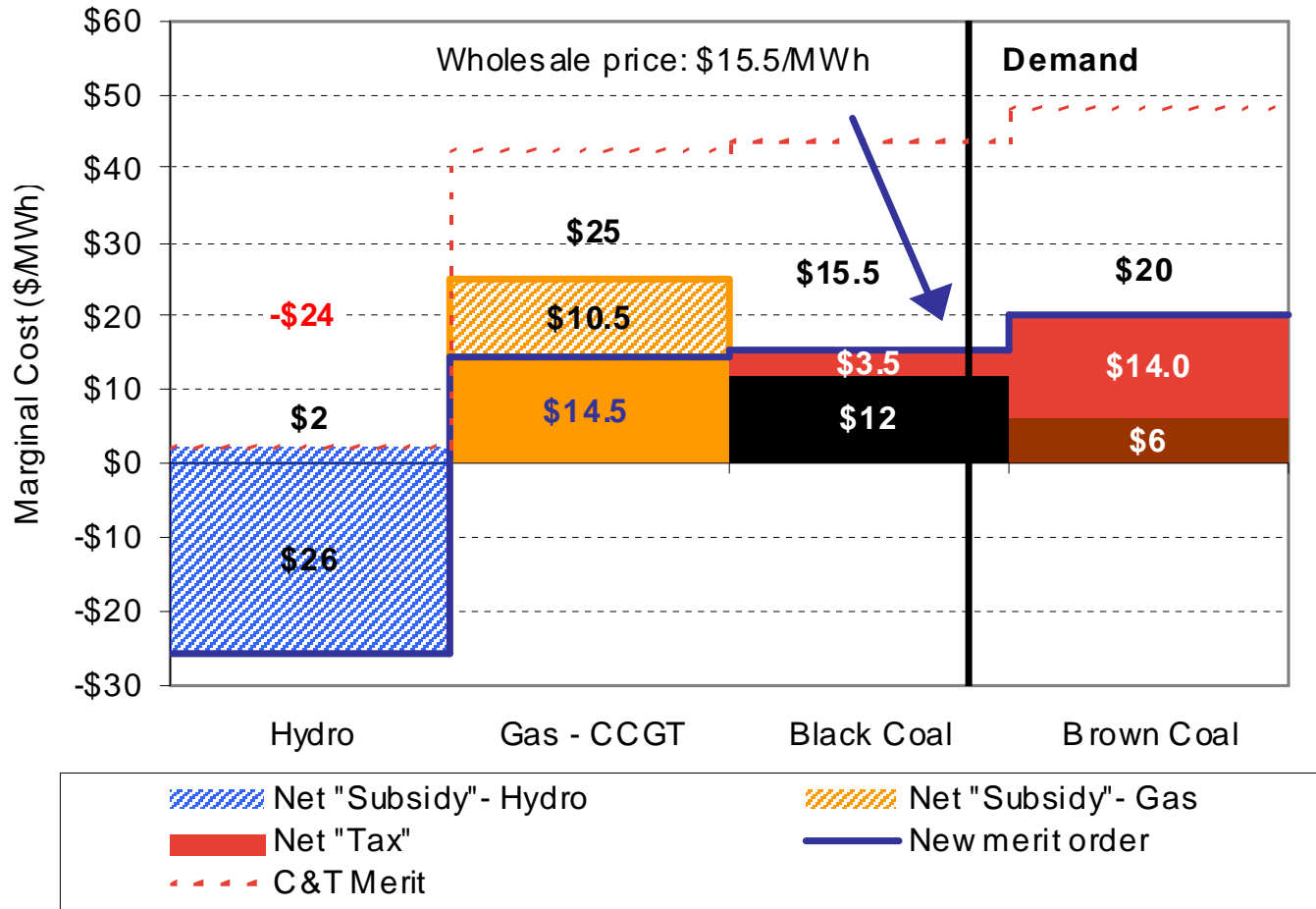
Output Based Allocation - Example

Baseline intensity of 0.8tCO₂/MWh

- ⌘ Assuming inelastic demand (or demand-side abatement)...
 - will result in the same total emissions (and abatement)..
 - will result in a carbon price of \$35/tCO₂

Plant	SRMC (\$/MWh)	Emissions Intensity (tCO ₂ /MWh)	Permits sold (bought) per MWh	Net marginal revenue (cost) of carbon (\$/MWh)	New SRMC (\$/MWh)
Hydro	2	0	0.8	28.0	(26)
Brown Coal	6	1.2	(0.4)	(14.0)	20
Black Coal	12	0.9	(0.1)	(3.5)	15.5
Gas – CCGT	25	0.5	0.3	10.5	14.5

Output Based Allocation – Merit Order



Baseline and credit

Basic principles

- ⌘ Set emissions intensity baseline
- ⌘ Producers below the baseline receive a credit equal to the difference between emissions intensity and baseline (as with OBA)
 - Eligibility may be dependent on “additionality” i.e. whether the abatement would have occurred anyway
 - Rules out existing hydro
- ⌘ Producers above the baseline are not liable (cf OBA)
- ⌘ Obligation to surrender permits imposed on **retailers** (not generators cf OBA)
 - Levy on retail price to fund subsidy/credits

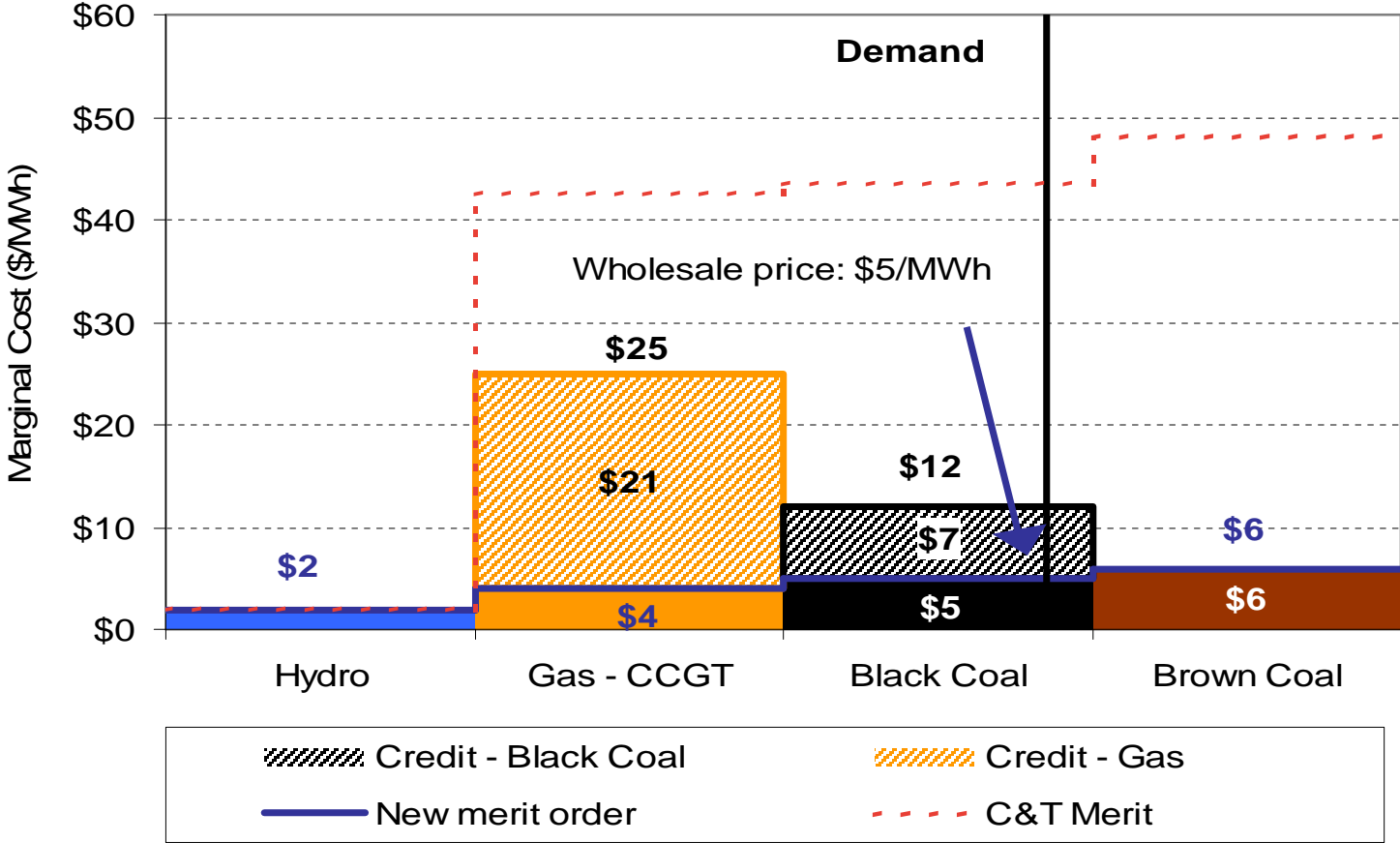
Baseline and Credit

Worked example

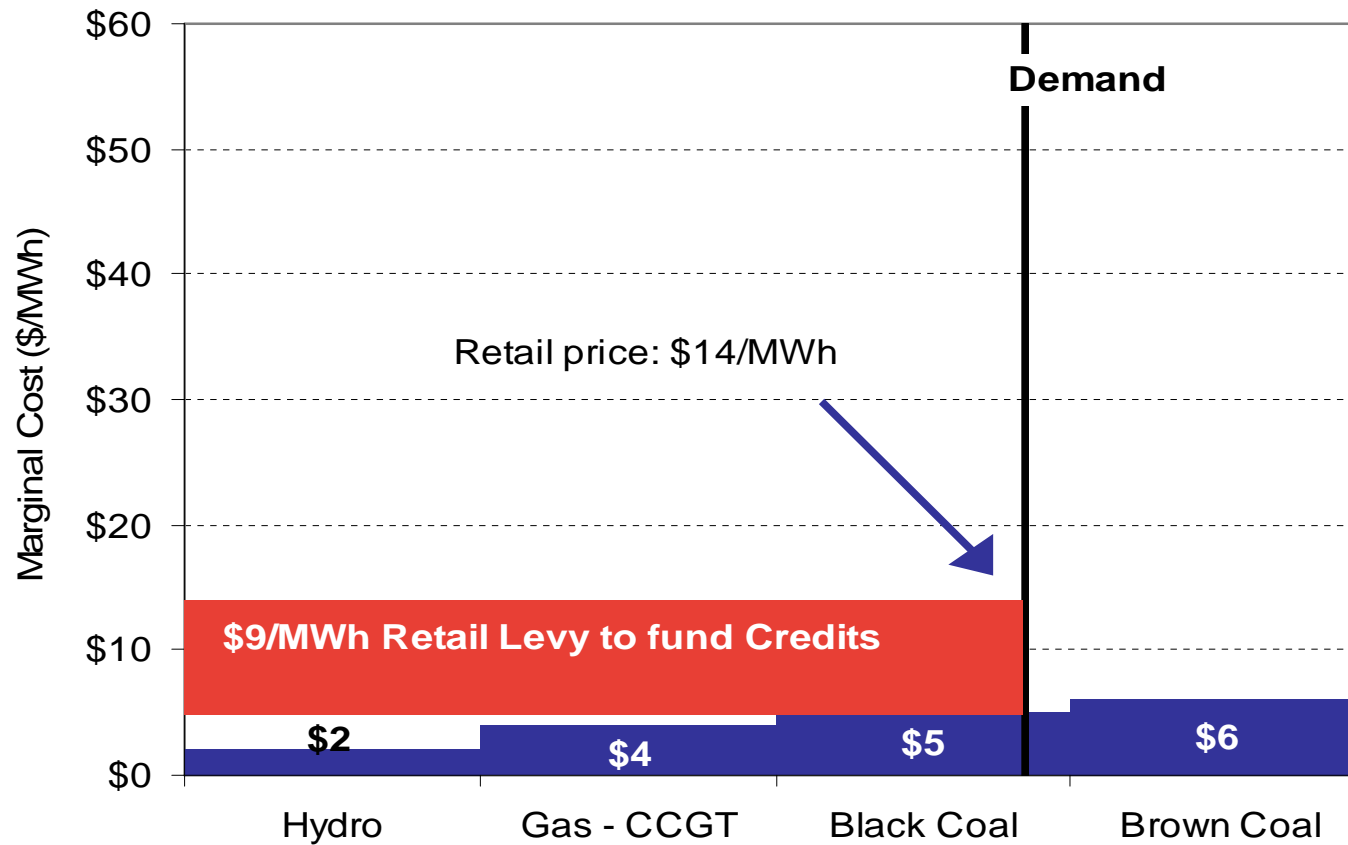
- ⌘ Assumed baseline intensity of 1.1 tCO₂/MWh
- ⌘ Assumed carbon price of \$35/tCO₂

Plant	SRMC (\$/MWh)	Emissions Intensity (tCO ₂ /MWh)	Permits created per MWh	Marginal revenue from permits (\$/MWh)	New SRMC (\$/MWh)
Hydro	2	0	-	-	2
Brown Coal	6	1.2	-	-	6
Black Coal	12	0.9	0.2	7	5
Gas – CCGT	25	0.5	0.6	21	4

Baseline and credit – Merit Order



Baseline and credit – Merit order



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MELBOURNE | SYDNEY | BRISBANE | LONDON | COLOGNE | BRUSSELS | MADRID
Frontier Economics Pty Ltd, 395 Collins Street, Melbourne 3000
Tel. +61 (0)3 9620 4488 Fax. +61 (0)3 9620 4499 www.frontier-economics.com