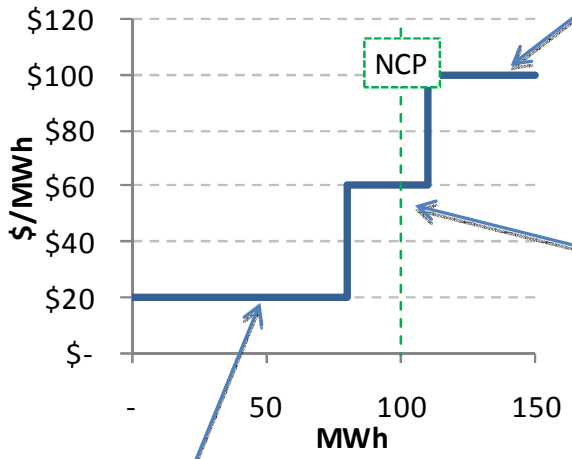
Balancing price formation

- Principles
- Practices
- Issues

Pricing Principles

- Ideally, balancing would be a contestable service
- Participants would be able to submit prices at which they are prepared to be dispatched above or below NCP
  - *e.g. consider a generator STEM style submission, with 100 MWh NCP*

3) 40 MWh @ $100/MWh
2) 30 MWh @ $60/MWh
1) 80 MWh @ $20/MWh



3) Prepared to be dispatched above NCP by more than 10 MWh if price >= $100/MWh

2) Prepared to be dispatched up to 10 MWh above NCP if price >= $60/MWh or up to 20 MWh below NCP if price <= $60/MWh

1) Happy to be dispatched below 80 MWh if price <= $20/MWh (i.e. would pay <= $20/MWh)

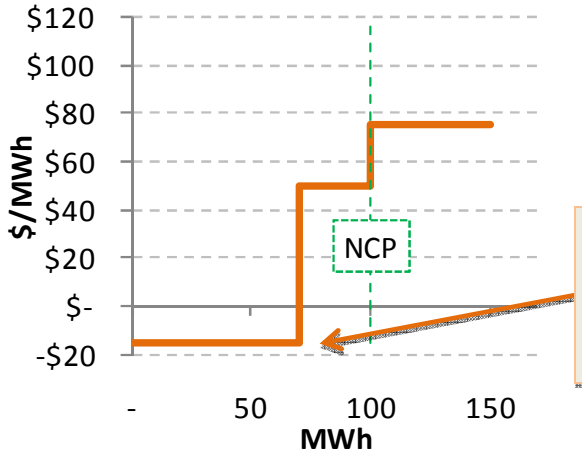
Pricing Principles - example

- The market would form balancing up and balancing down merit orders from all submissions
- Consider simplified two generator example:
- Assume Generator 1 submission and NCP as before

Generator 1	
MWh	$/MWh
40	$100
30	$60
80	$20
150	100 NCP

- And Generator 2 submission and NCP as follows:

Generator 2	
MWh	$/MWh
50	$75
30	$50
70	-$15
150	100 NCP

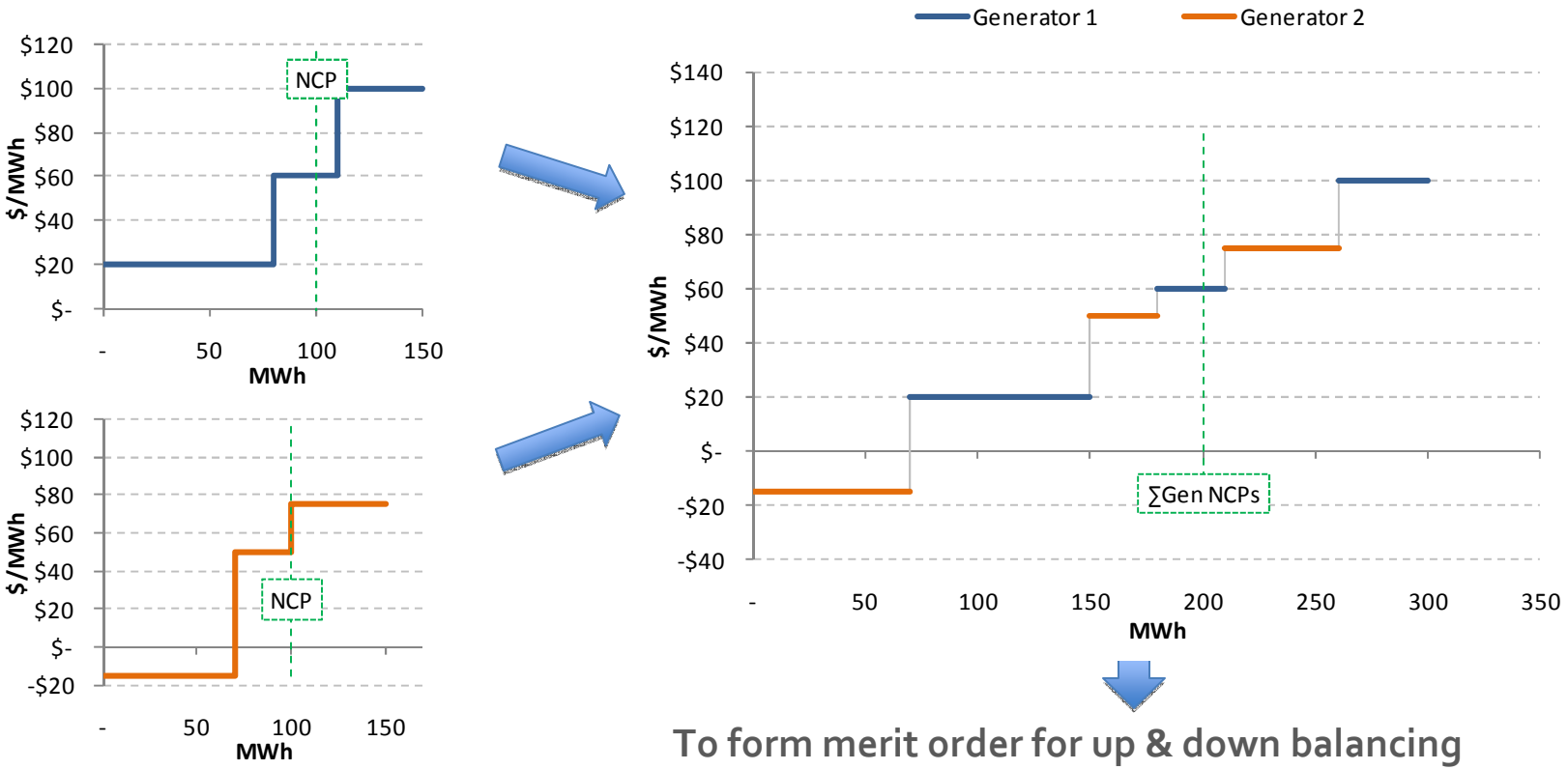


Prepared to pay "–*ve* "$15 per MWh or less and be dispatched by more than 30 MWh below NCP. i.e. would require *payment* of $15 per MWh or more

imo Independent Market Operator

Pricing Principles – example

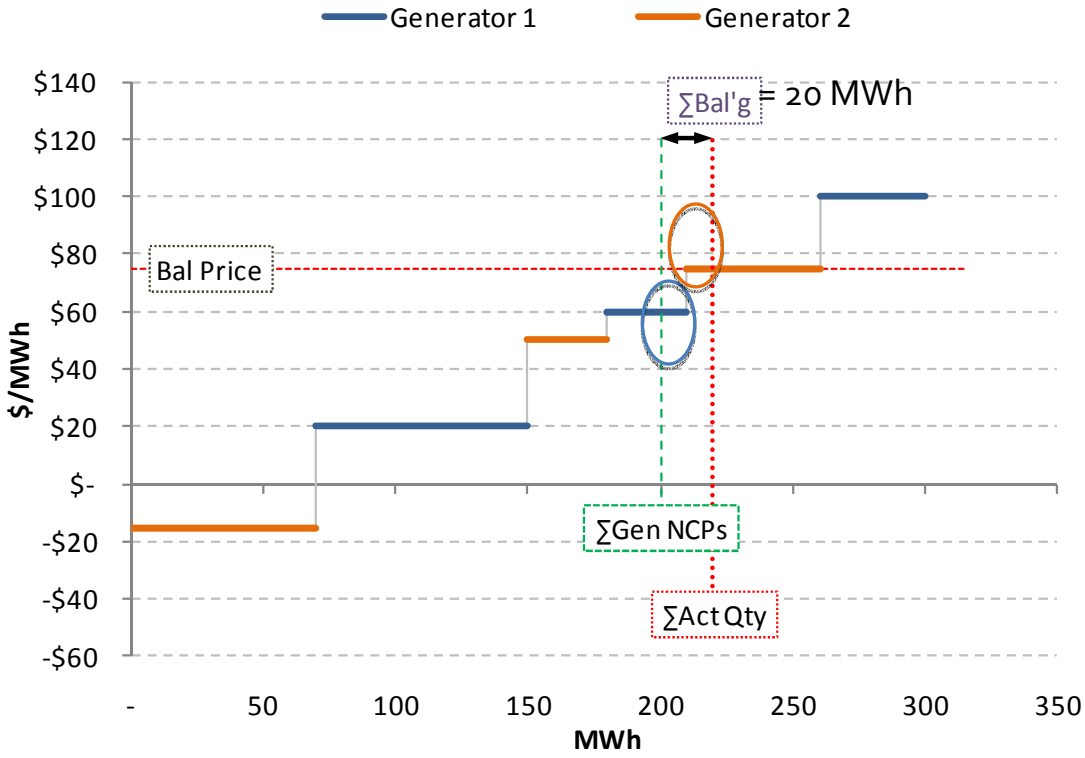
- Market would combine submissions



To form merit order for up & down balancing relative to NCPs

Pricing Principles – example

- Suppose balancing demand is +20 MWh
- SM would use balancing merit order to dispatch generator 1 up by 10 MWh and generator 2 up by 10 MWh
- Balancing price would be set at $75/MWh
  - Marginal price
  - Honours commitment wrt generator 2's offer
- Parties causing/ requiring balancing would face marginal $impacts

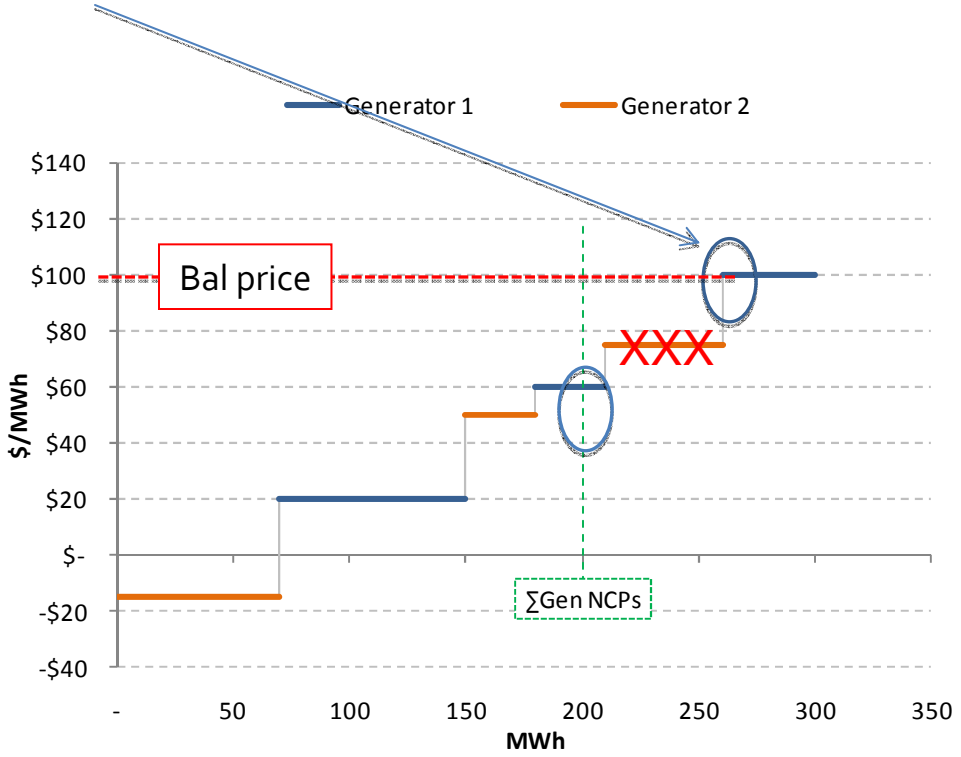


Pricing Principles

- Suppose generator 2 is unable to be dispatched for balancing
- SM would dispatch generator 1 an extra 10 MWh

- Balancing price would be $100 /MWh
  - Marginal offer
  - Honours commitment to generator 1 in accepting its offer

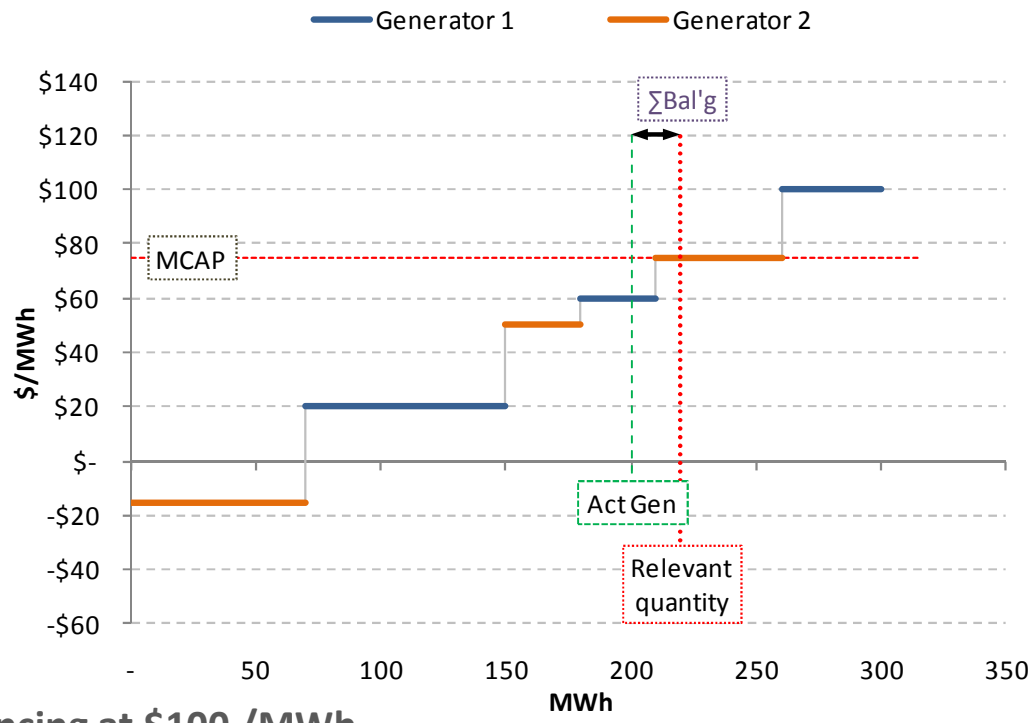
    (But $25/MWh higher than if generator 2 had been available for dispatch)
- Now consider what happens in the WEM



WEM Pricing Practice

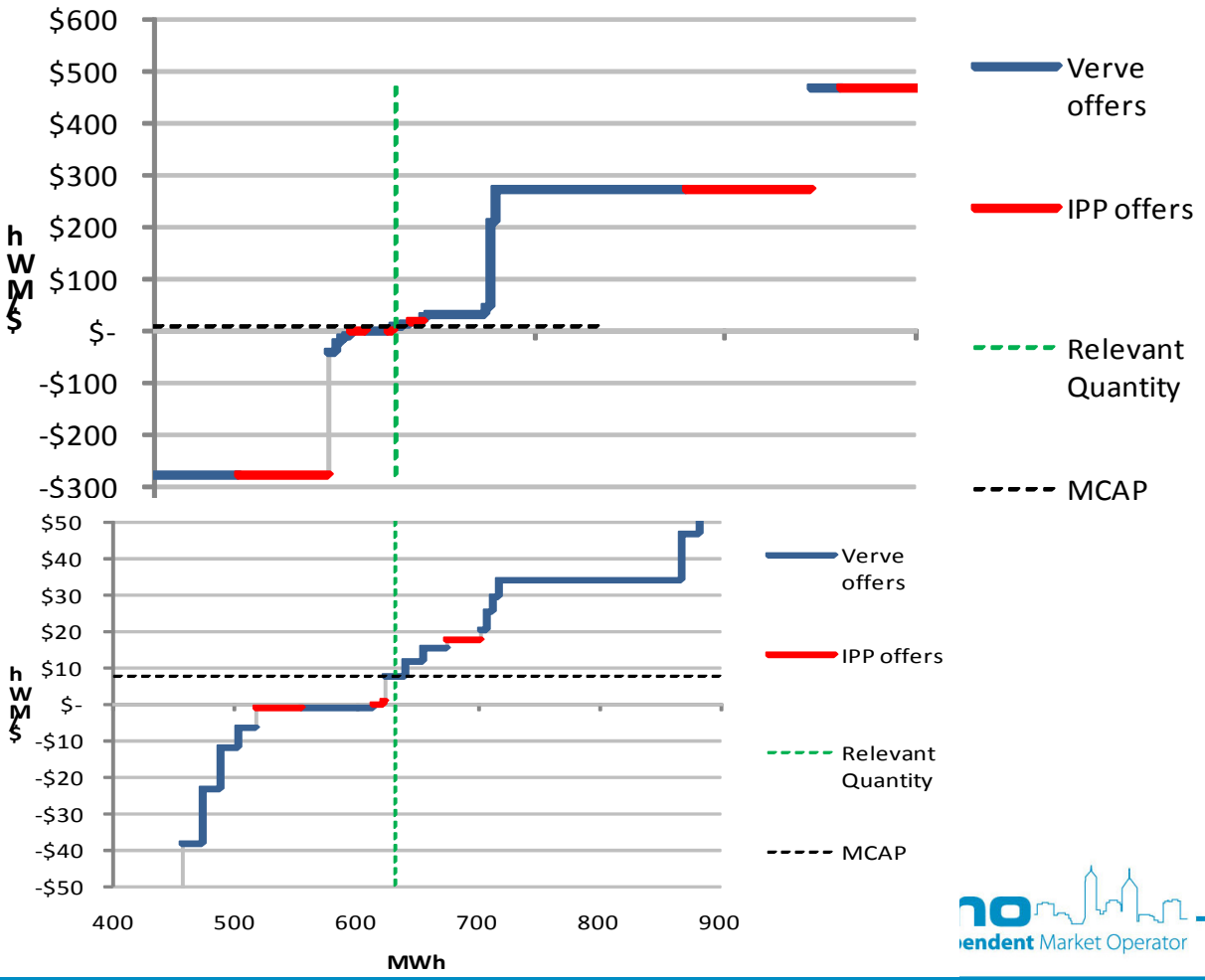
- MCAP curve is formed from all STEM submissions (as for our simple example)
- But only generator 1 is dispatched for balancing
- MCAP is set by the intersection of the "Relevant Quantity" and MCAP price curve

- Assume generator 2 is 20 MWh below NCP/ resource plan (i.e. at 80 MWh)
- SM would dispatch generator 1 up by 20 MWh (to 120 MWh) to balance system
- Relevant Qty is (nominally) total generation less resource plan dev'ns
  - i.e. 220 MWh (200 MWh actual generation + 20 MWh deviation)
- Generator's 2 STEM offer price sets MCAP at $75/MWh (& caused deviation)
- But generator 1 provided additional balancing at $100 /MWh



WEM Pricing Practice

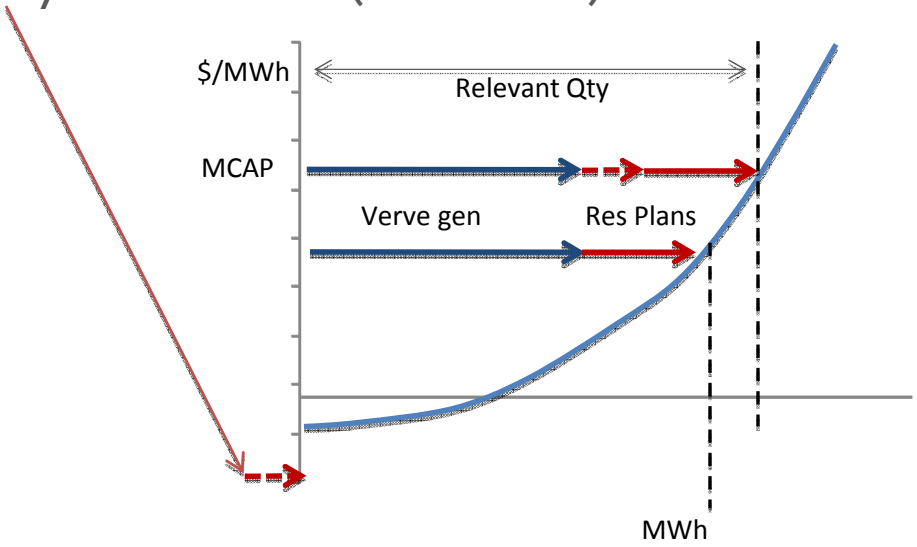
- Can impact on balancing up or down – e.g. holding price up



WEM Pricing Practice

Other problems

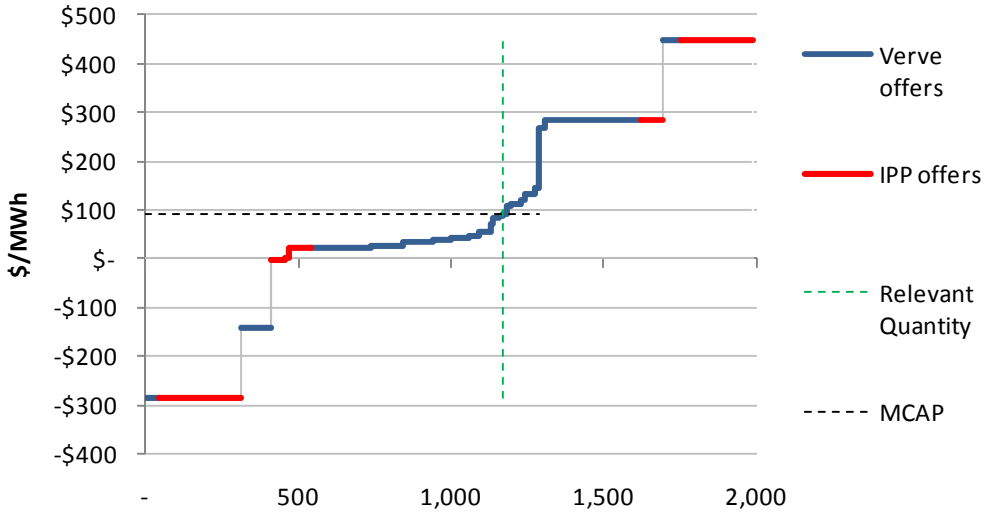
- Relevant quantity = Resource Plans + Verve NCP + Verve balancing *(see attachment)*
- MCAP curve formed from STEM submissions
- Inconsistencies between relevant quantity formation and MCAP curve formation can also cause problems
- e.g. if capacity that was not in (or cleared in) STEM submissions appears in resource plans

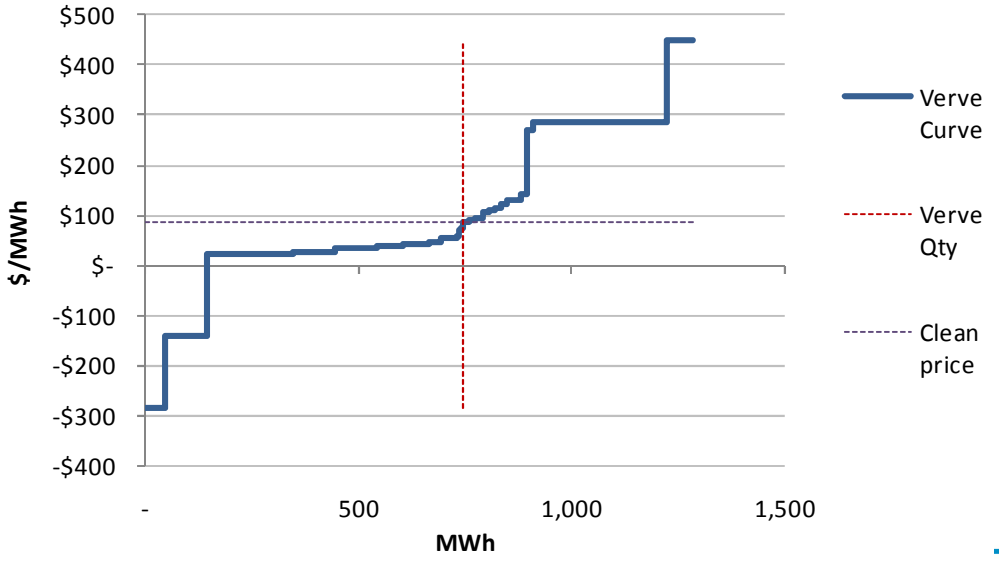


WEM Pricing Practice – some examples

- MCAP can be above or below Verve price
- e.g. 7 Sep 09, 4:30 pm

MCAP	$	92.82	per MWh
Clean Price	$	84.53	per MWh
Verve Balancing		64.89	MWh (Bal up)
Verve @MCAP	$	6,023	payment to Verve
Verve @ Clean	$	5,485	Payment to Verve
	$	538	Over payment





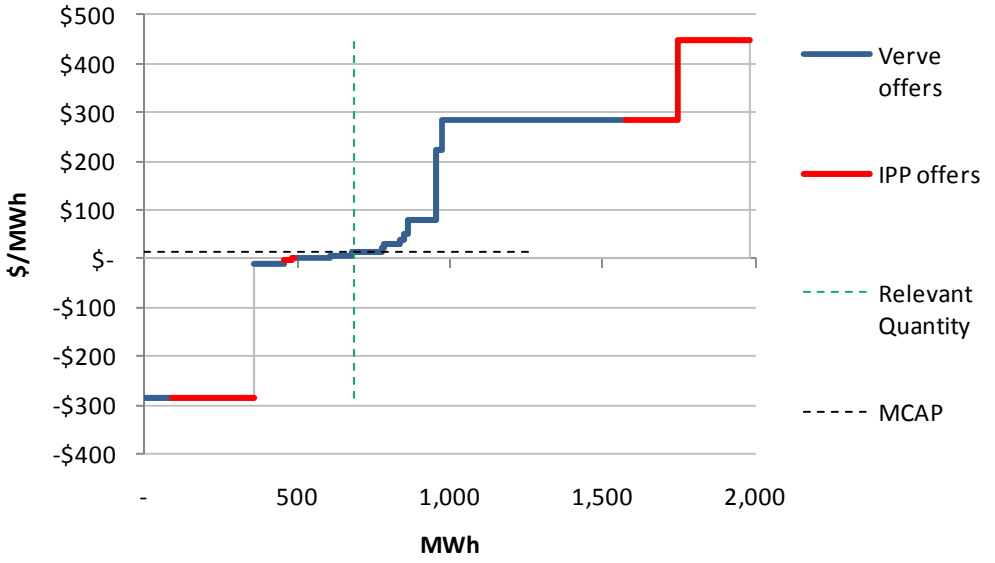
- Parties requiring/ causing balancing fa higher price ($8.29 DDAP/UDAP aside

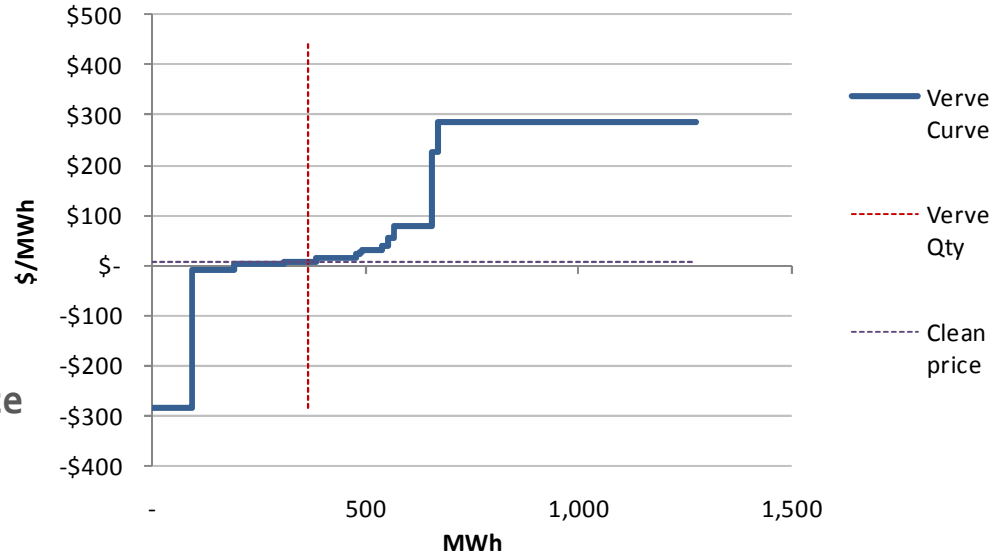
Independent Market Operator

WEM Pricing Practice – some examples

- 7 Sep 09, 3 am

MCAP	$	15.43	per MWh
Clean Price	$	6.63	per MWh
Verve Balancing	-	66.03	MWh (Bal down)
Verve @MCAP	-$	1,019	payment by Verve
Verve @ Clean	-$	438	payment by Verve
	-$	581	Underpayment

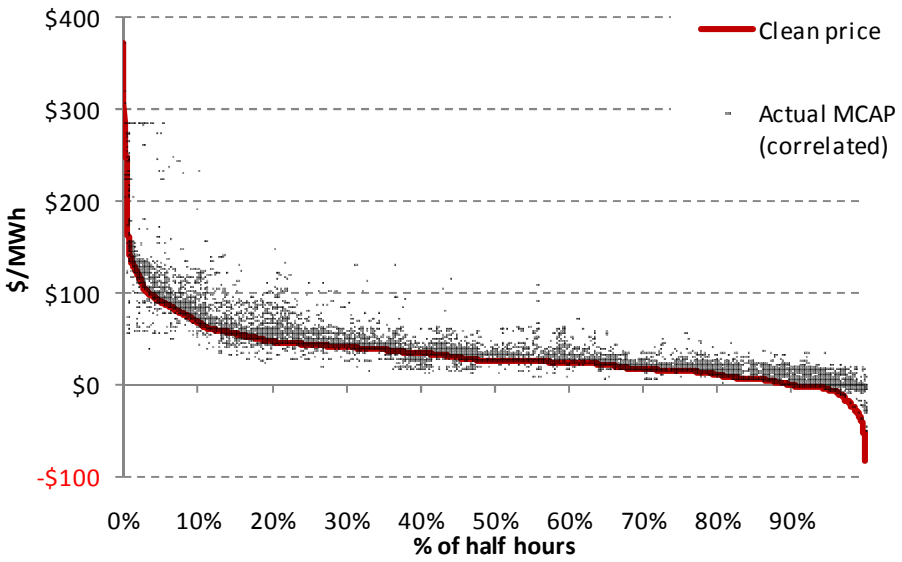




- Parties requiring/ causing balancing face higher price ($8.80 DDAP/UDAP aside)

WEM Pricing Practice – Implications

- Year ending 31 March 2010



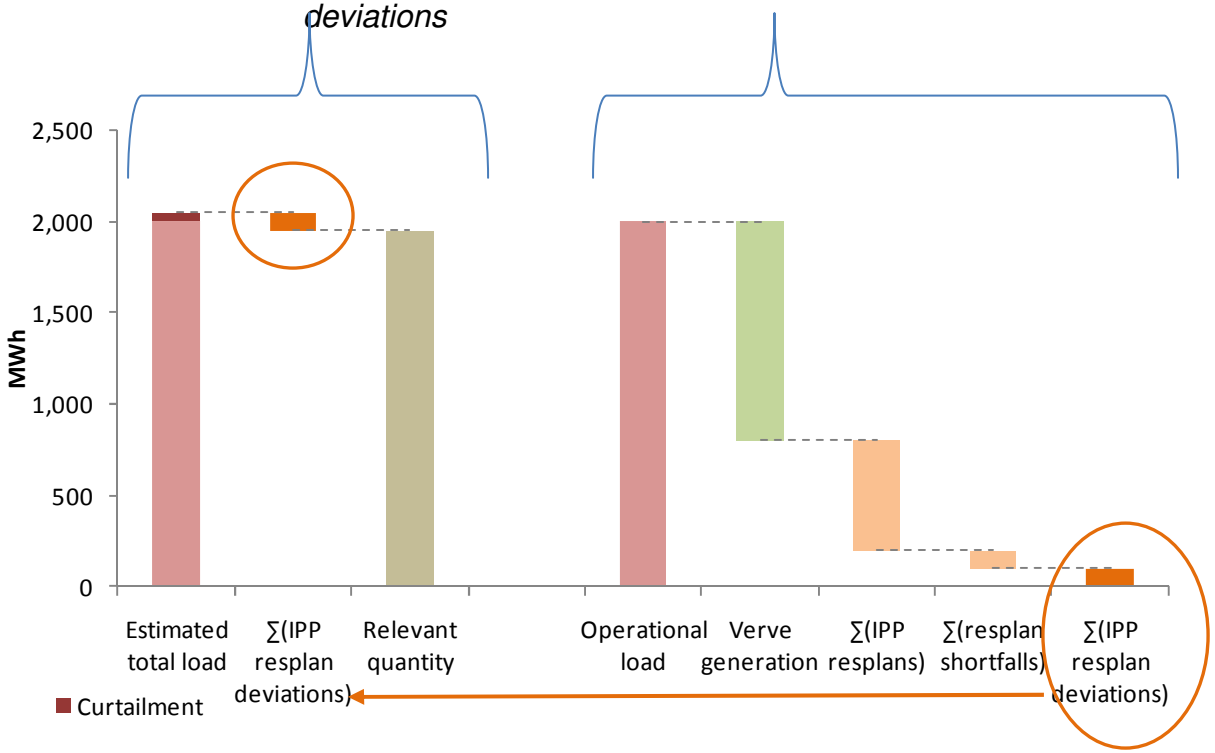
	No of half hours	% half hours
MCAP Lower	760	4.3%
MCAP Same	8563	48.9%
MCAP High	8197	46.8%

- Price formation inconsistent with requirement for Verve to bid at srmc
  - i.e balancing price often above srmc
- Distorts market pricing signals – e.g. masks overnight low load problems/ value of flexibility
- Parties requiring balancing do not see marginal cost impacts (further distorted by DDAP/UDAP)

Explanatory Notes on Relevant Quantity (The Rules)

Relevant quantity = operational load
+ estimated curtailment
- ∑*resource plan deviations*

∑ *Resource plan deviations*** = operational load *(i.e. ∑ loss adjusted generation)*
- Verve generation
- ∑resource plans
- ∑resource plan shortfalls



**Strictly speaking the ∑ *Resource plan deviations* term is not just deviations from submitted resource plans. It includes generation that did not submit resource plans as well (e.g. wind).

If Verve generation increases (decreases), the relevant quantity increases (decreases):
e.g. Due to reduction (increase) in wind generation, increase (reduction) in demand and/or IPPs below (above) resource plans

Relevant Quantity – Simplified algebra

For simplicity, assume no demand curtailment and no resource plan shortfalls

Relevant Quantity = Operational load – (Operational load - Verve Generation - ∑Resource Plans)

= [Verve Generation] + ∑Resource Plans

= [Verve NCP + Balancing] + ∑Resource Plans