Updated Dynamic Refund Recommendation to MAC

October 2013

THE LANTAU GROUP
strategy & economic consulting

Dynamic Refund Regime Proposal

- Dynamic Refund Factors
  - Maintain Dynamic Refund Factor based on system conditions (not discussed further in this slide-set)

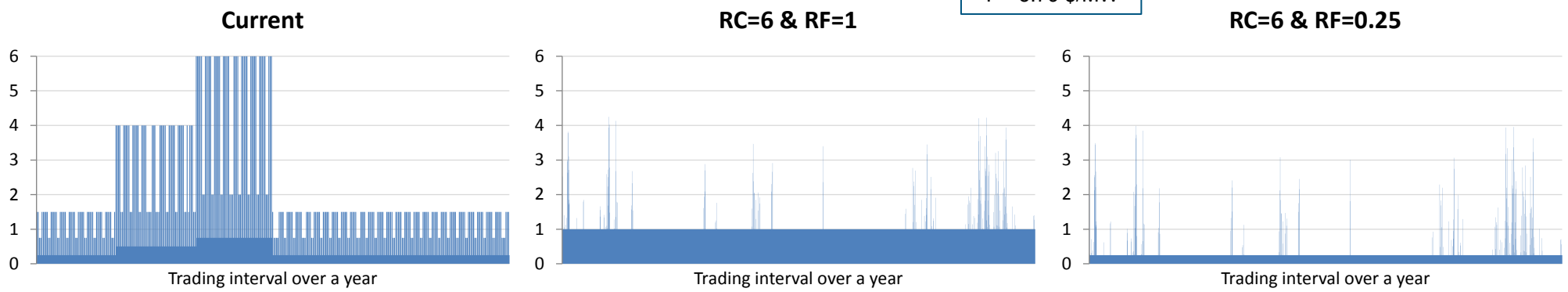
- Minimum Refund Factor
  - Modify previous recommendation – reducing minimum refund factor from 1.0 down to 0.25
    - Reduce level of arbitrary financial risk during periods where economic refund factor is below 1.0
  - Introduce rolling criteria to apportion access to refund factors below 1.0 to units based on their average availability (excluding PO) over the prior 90 day period
    - Addresses the leakage risk (capacity value for effective non-delivery due to late or extensive FO at 0.25)

- Refund Revenue Recycling
  - Retain recycling based on availability
  - Institute a prior-dispatch-based rebate eligibility criterion
    - Recognise that FO while running and starting up are material causal factors for FO
    - Increase materiality of rebate pool by limiting rebate eligibility to facilities dispatched in previous 30 days

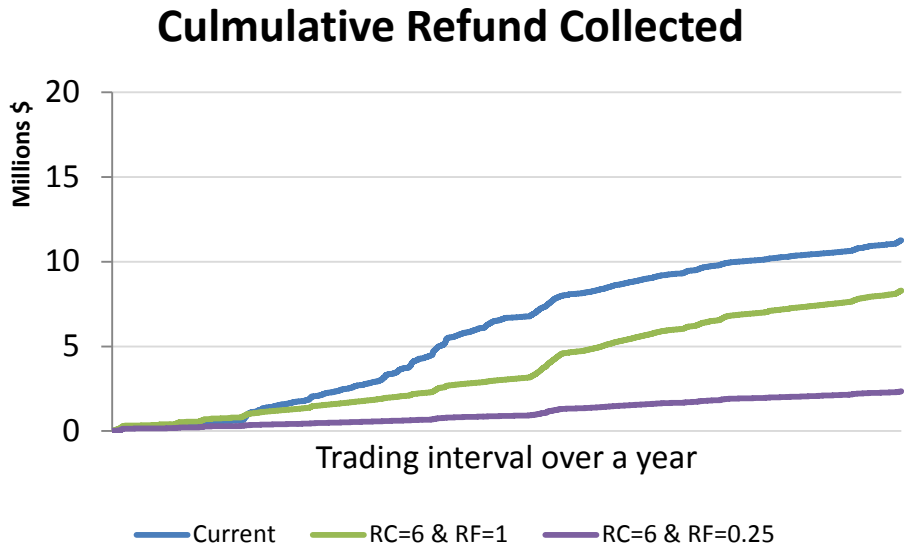
Minimum Refund Factor Analysis

Minimum Refund Factor Analysis (2009/10)

Y ≈ 5.79 $/MW

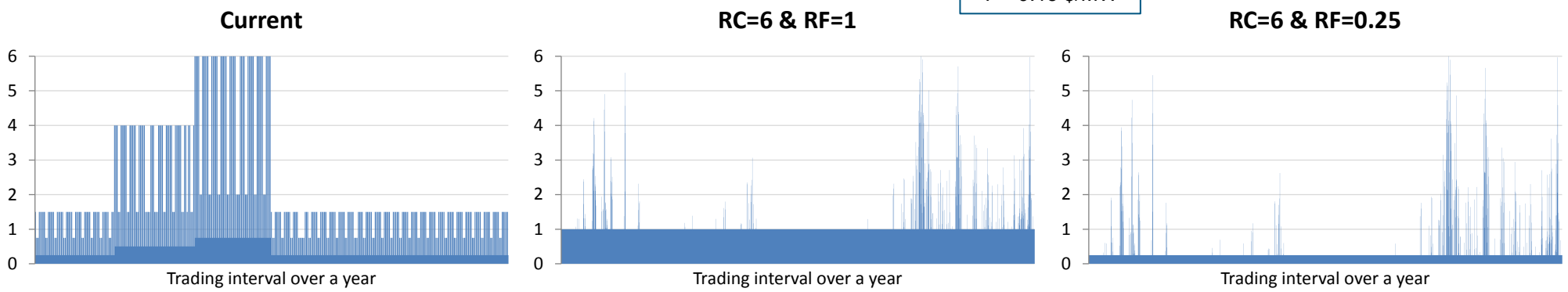


- Hits minimum level 96.3% of the year
- No change to exposure during key periods
- Does not hit higher RF levels

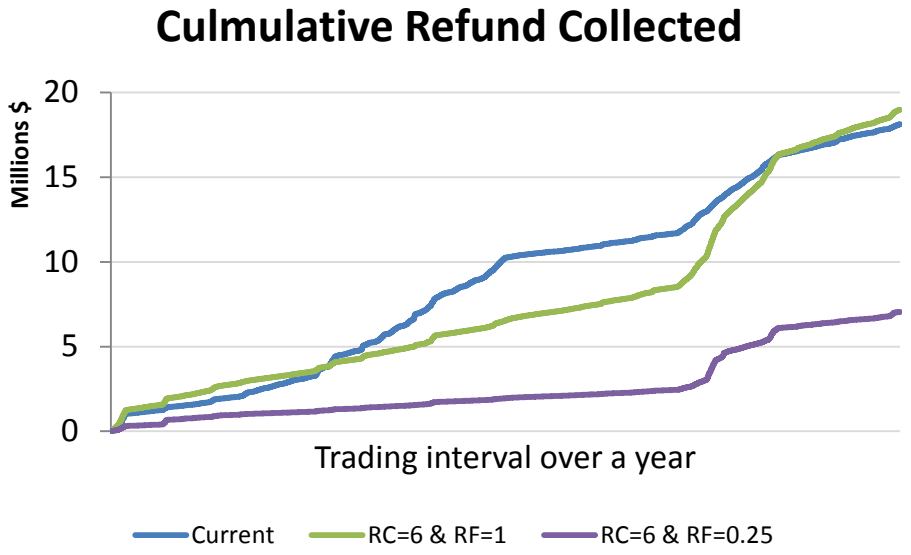


Minimum Refund Factor Analysis (2010/11)

Y ≈ 9.15 $/MW



- Hits minimum level 93.4% of the year
- No change to exposure during key periods
- Hits highest RF levels



Refund revenue is lower – making recycling more important

Capacity Year	2009/10	2010/11	2011/12
Capacity Credit (MW)	5079	5223	5442
MRCP (AUD/MW)	142,200	173,400	164,100
Current Regime			
RCP	108,459	144,235	131,805
Refund (million AUD)	6	10	11
Refund as % of total Capacity Credit at RCP	1.04%	1.32%	1.59%
Dynamic Refund Regime (with max refund factor 6 and floor 0.25)			
RCP	101,464	159,678	135,618
Refund (million AUD)	1	5	2
Refund as % of total Capacity Credit at RCP	0.27%	0.58%	0.29%

Note: WA Biomass and the HECTs were excluded from the analysis.

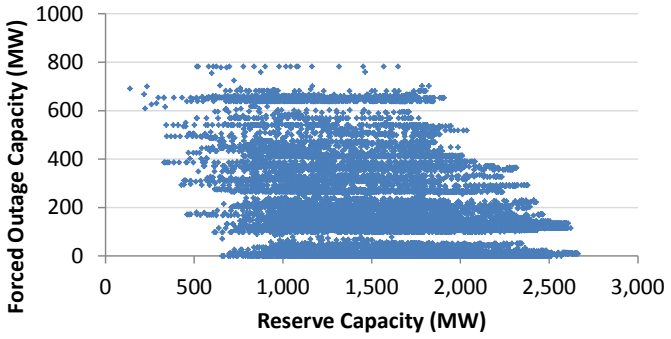
Refund Revenue Recycling

Refund Revenue Recycling

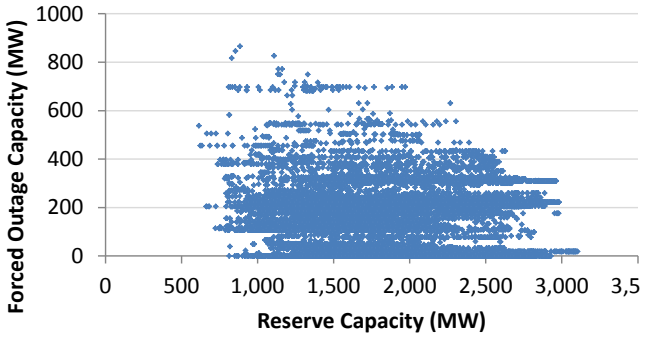
- Original Proposal
  - To recycle refund revenue to all available capacity
- Issues Arising
  - Weaker incentive due to broad application of rebate eligibility
  - Concern that refund exposure is driven more by dispatch than by existence (though not 100% by either)
- Approach
  - Review data further
  - Determine rebate eligibility based on having been dispatched in prior 30 days
- Provides opportunity for average or better capacity to cover refund exposure through rebates, while concentrating rebates on capacity that is actively presented to the market

Took a further look at the relationship between FO and reserve capacity

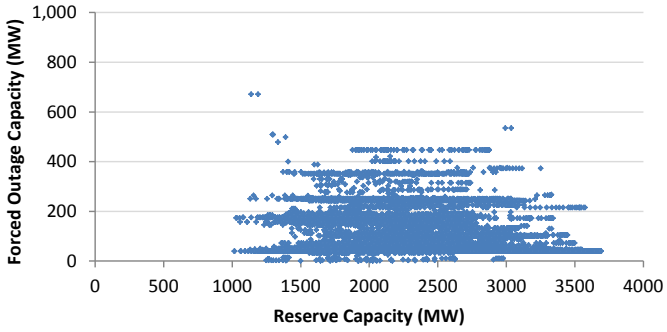
CY2007/08



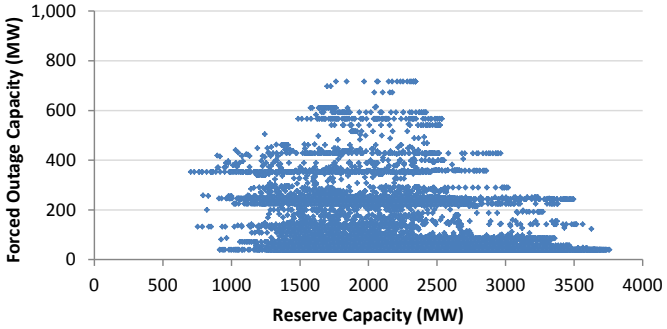
CY2008/09



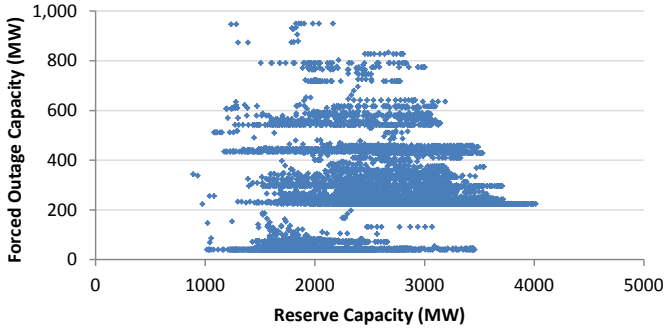
CY2009/10



CY2010/11



CY2011/12



Different causes apply at different times for different capacity in different years:

Baseload may start or cycle during low demand (high RM); while peakers may start during high demand (low reserve capacity)

Failure to start typically have /shorter FO

Note: no unit appears to have declared FO without having run at least sometime during the year

Considered broader FO experience across markets globally

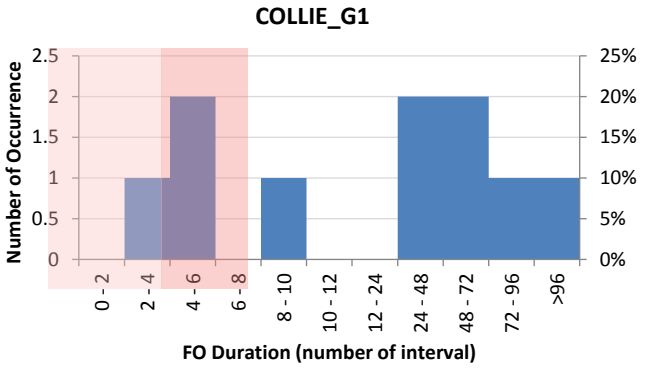
- Substantial variation in treatment of FO
  - Range of definitions
  - Ability to respond to “strong commercial drivers” is relevant
  - Ability to operate until at least the next low demand period or weekend
  - Some problems can be fixed quickly and may not be counted at all (or noticed)

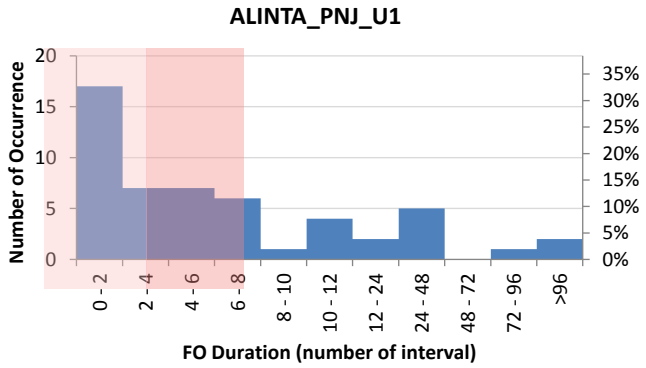
- Operational problems dominate
  - Fuel supply
  - Boiler issues
  - Turbine issues
  - Vibration
  - Leakage

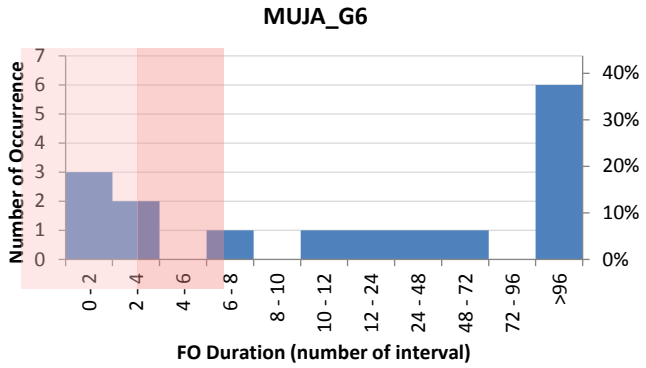
- Failure to start is the most common peaker problem:
  - In all units, FTS is typically shorter duration (1 to 4 hours)

Typical FO duration is relatively short (<4 or <8 TI)

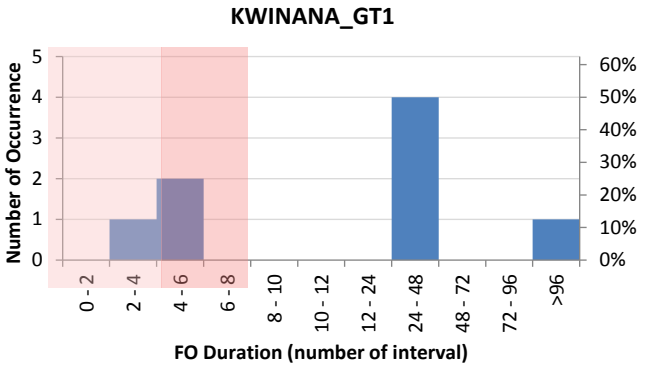
- "baseload"

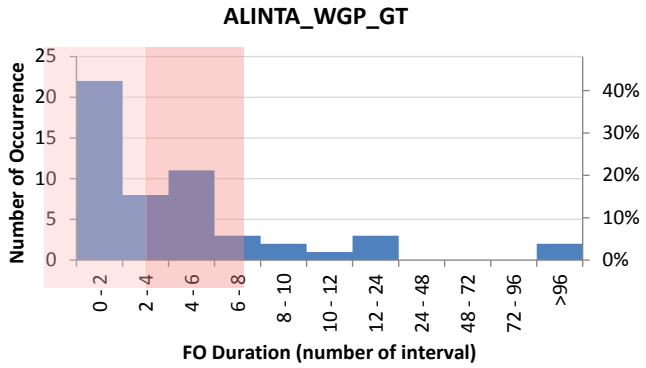


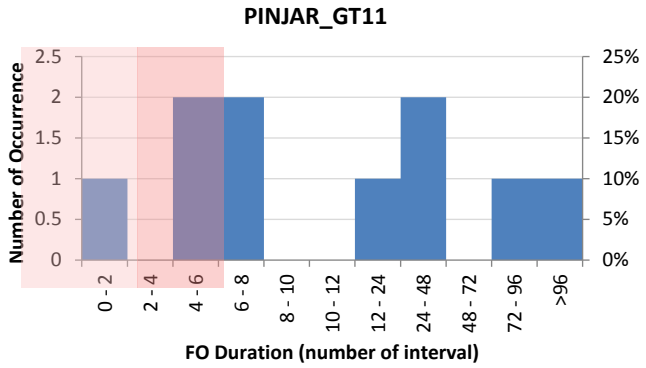




- "peaking"



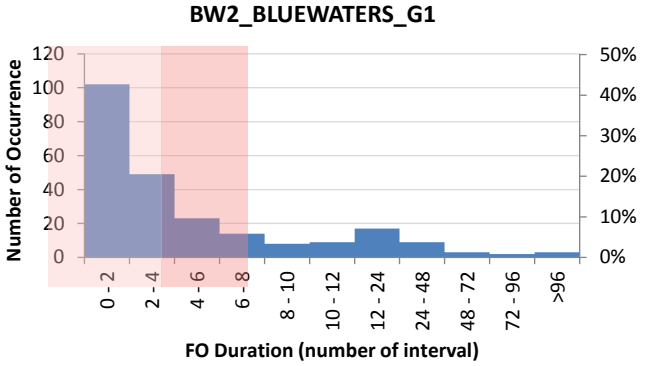


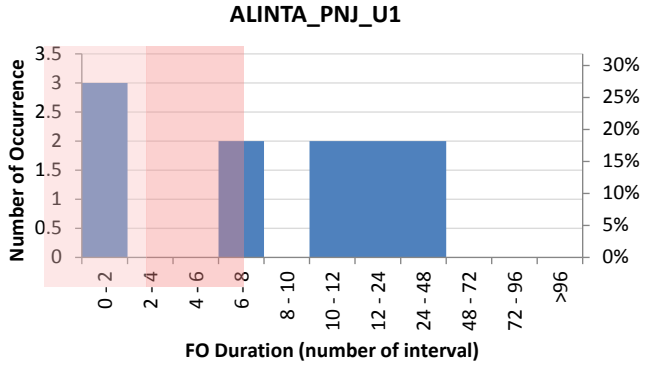


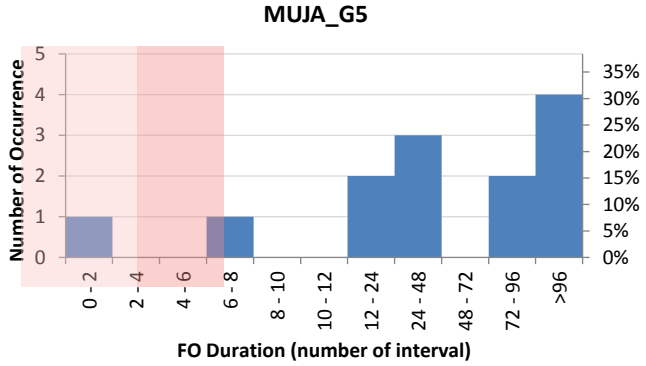
Short FO periods align with start-up issues as a predominant causal factor

Typical FO duration is relatively short (<4 or <8 TI)

- "baseload"







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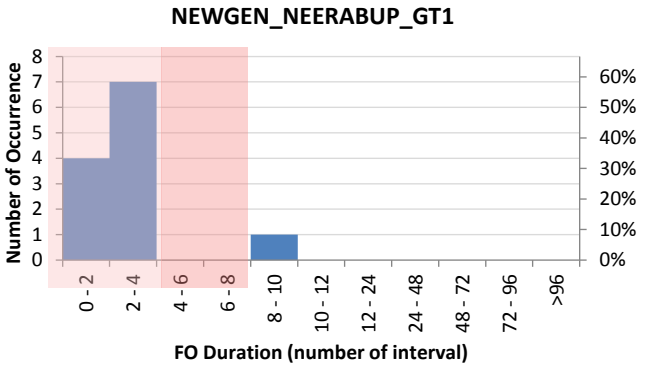
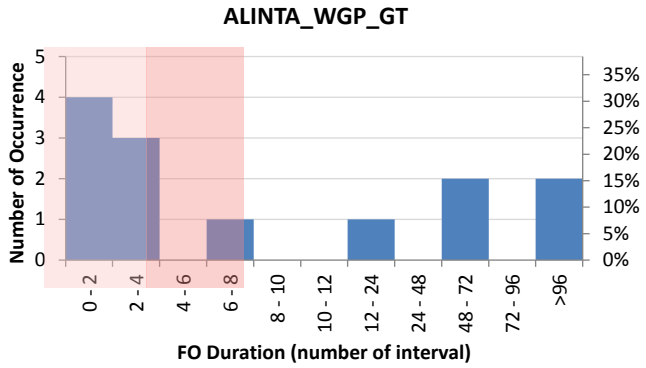
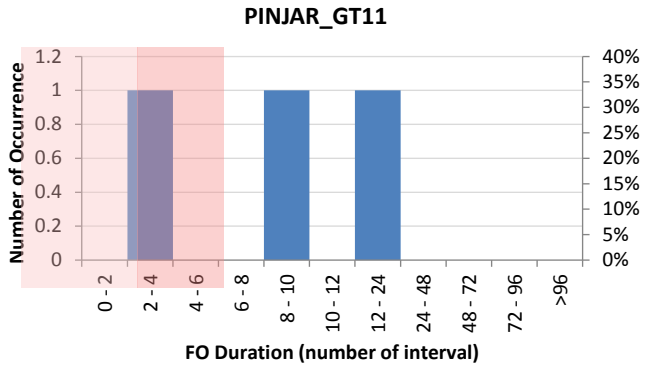


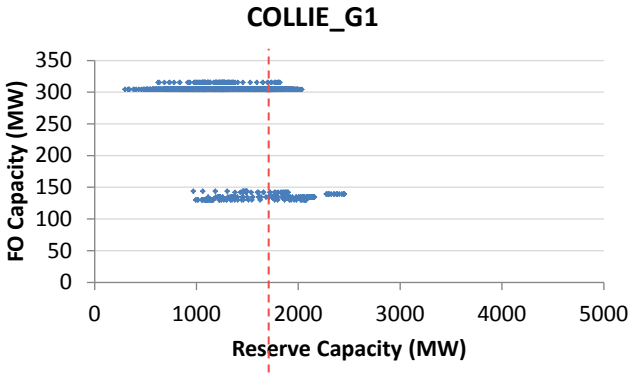


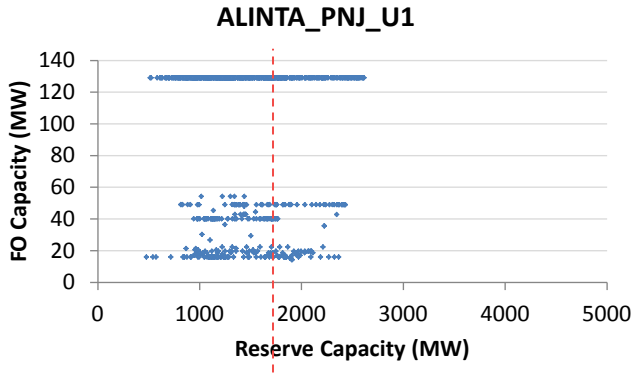


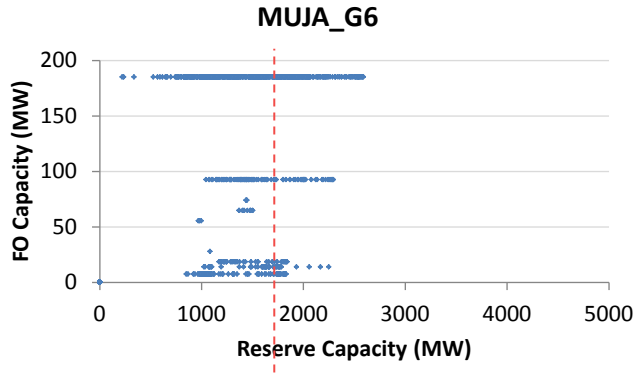
Short FO periods align with start-up issues as a predominant causal factor

Facility Level Analysis

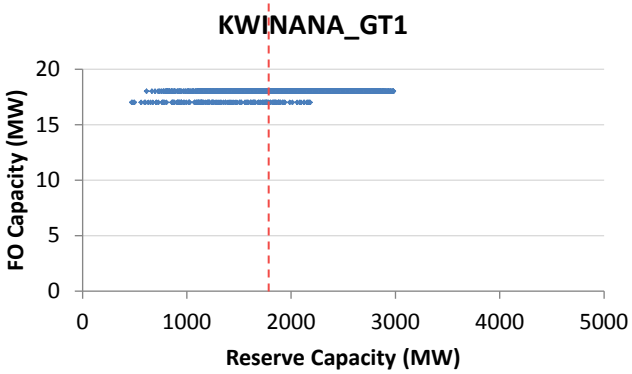
- Baseload:

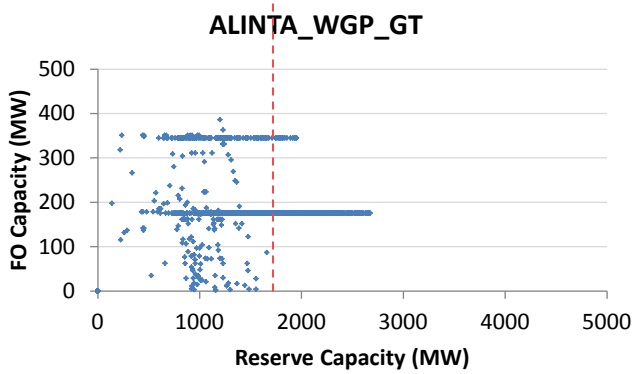


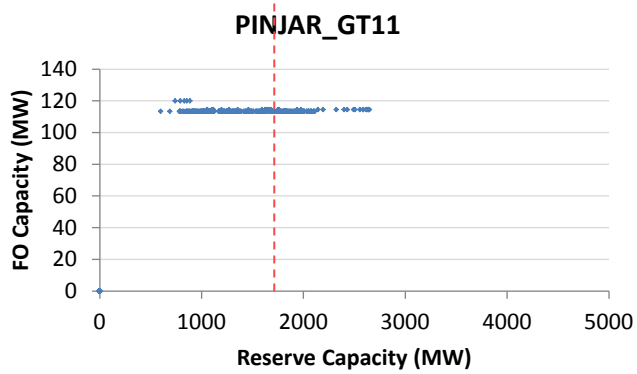




- Peaker:



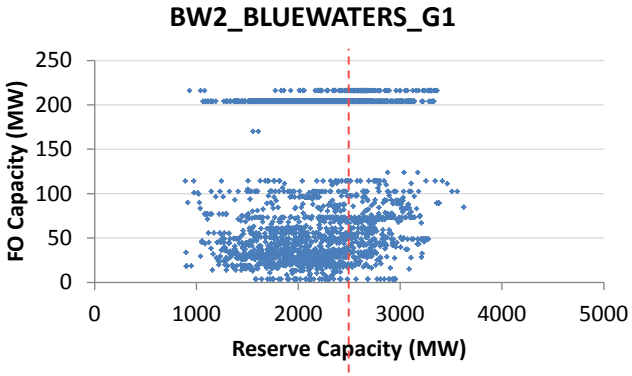


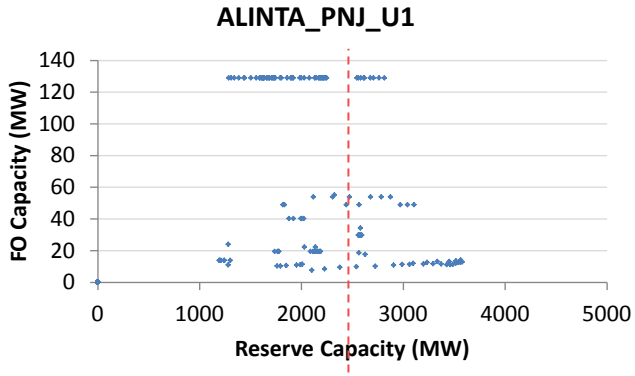


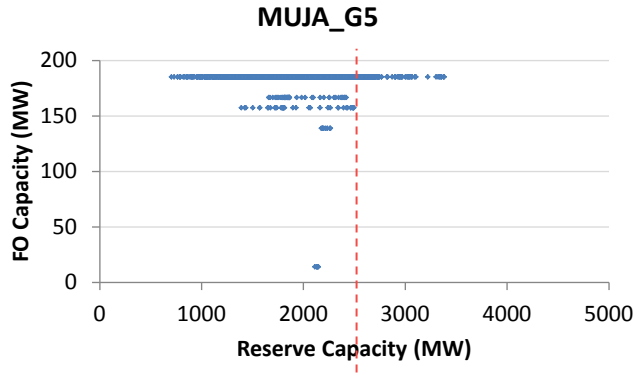
Baseload FO will generally be during running, ramping or startup – no matter what the excess status
Peakers tend to have more FO in lower FC periods
FO data for peakers implies running or starting-related FO

Facility Level Analysis

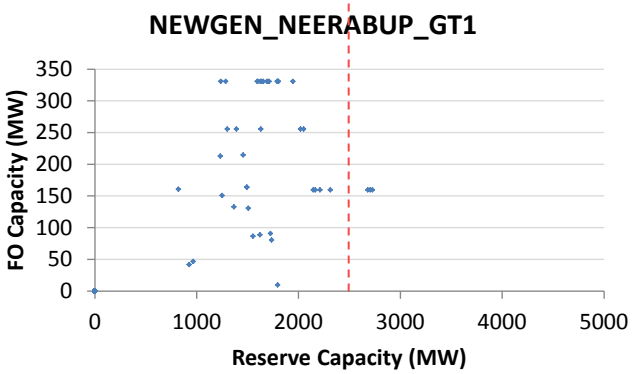
- Baseload:

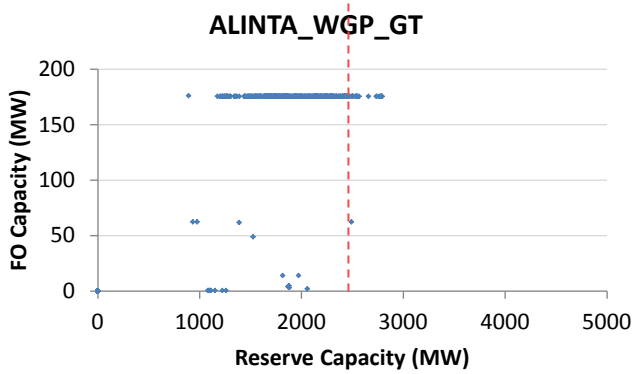


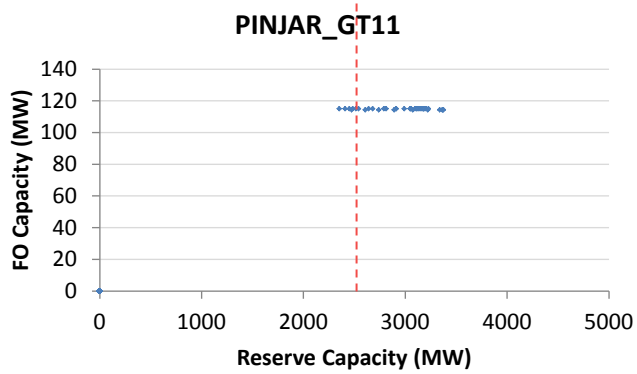




- Peaker:







Conclusion: modify the availability-based rebates to incorporate an eligibility criterion related to prior dispatch

Rebate Eligibility

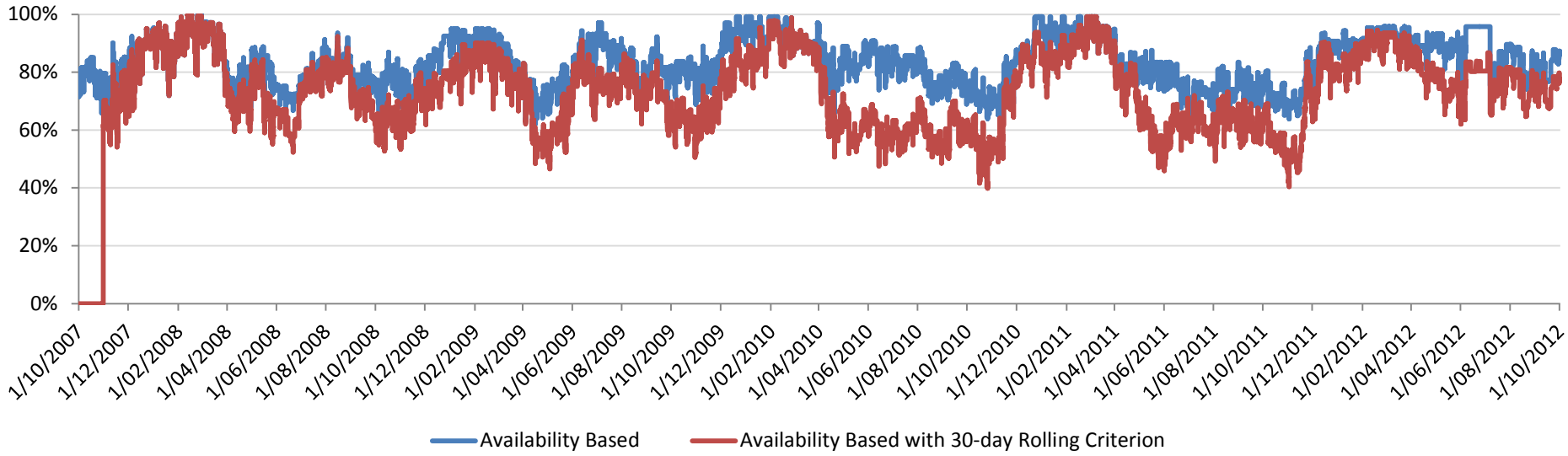
- Refund exposure can occur anytime, but is influenced by stress (starting, running, ramping etc.)
  - A high LF unit will generally be dispatched in all TI, and so will always have refund and rebate exposure
  - A low LF unit will have lower refund exposure due to lower operational demands

- A pure availability-based rebate allows low LF capacity to earn rebates to cover refund exposure – but introduces the problem that units with no operational exposure (and thus materially lower refund risk) also earn rebates

- A pure dispatch based rebate ignores fact that FO can extend over to periods a low LF unit would never have been dispatched (and thus rebates could not have been earned to cover risk)

- Proposal reflects these factors by establishing a rolling 30 day rebate eligibility window based from last dispatched TI
  - on average, a facility has to earn rebates for 15 trading intervals in order to recover 1 TI refund at the 0.25 factor level in CY 2010/11,
  - on average a facility has to earn rebates for 36 trading intervals in order to recover 1 TI refund at the 0.25 factor level in CY 2009/10.

Comparison of Capacity Eligible for Rebate (% of System Capacity Credit)



- Dispatch-triggered, availability-based rebate criteria reduces the amount of capacity eligible for rebate, compared to Pure Availability criteria, enhancing the rebate incentive effect, particularly in years with higher excess reserve capacity

Adjusted minimum RF for prior period FO experience

- Given a minimum refund factor of 0.25, it remains possible that a unit could earn capacity credits despite contributing no capacity value over an extended period

- Proposed modification to *minimum* refund factor
  - 0.25 applies if a unit has no FO in prior 90 days
  - 1.0 applies if a unit has been on FO the entire prior 90 days
  - Linear interpolation in between

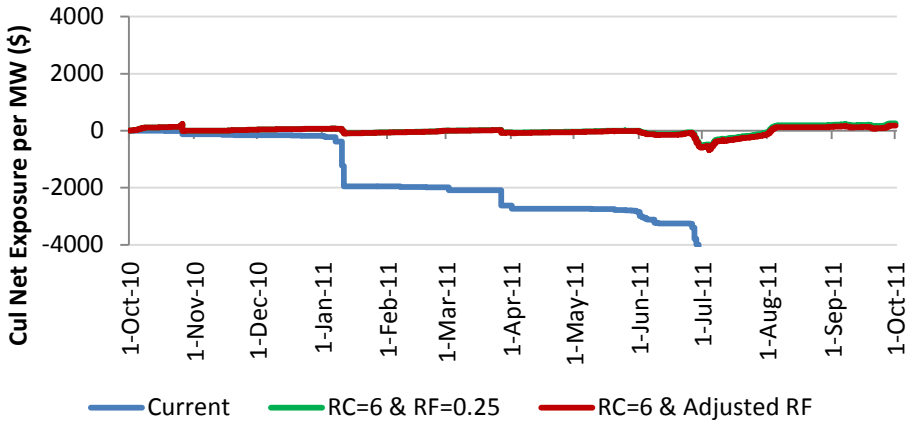
- The impact concentrates on units with exceptional situations – such as delayed market entry

- Otherwise, it enhances incentive to return to operational status with a more reliable unit
  - (as FO experience after return to operations is penalised somewhat more)

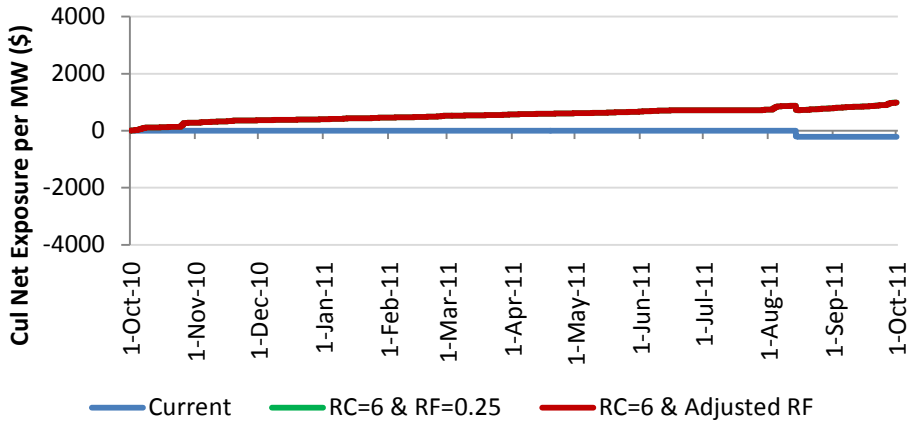
- Under virtually all cases the impact is small but aligns with correct incentives

Cumulative Net Exposure of Baseload Facilities (per MW)

BW2_BLUEWATERS_G1 (PO = 9.3% ; FO = 2.6% ; LF = 81.6%)



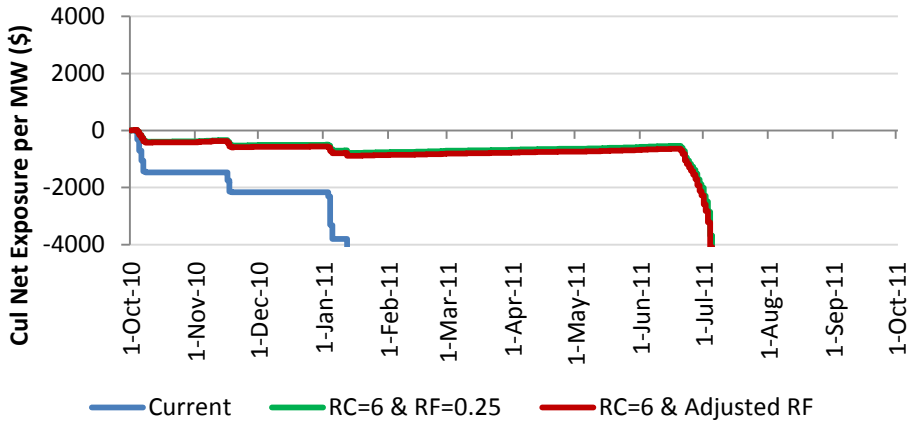
ALINTA_PNJ_U1 (PO = 15.8% ; FO = 0.3% ; LF = 76.8%)



- ALINTA_PNJ_U1 has low FO rate and average PO rate and so get rebate over time.
- Although BW2_BLUEWATERS_G1 has above-average FO rate, it has high load factor. Rebate is greater than the penalty on FO.
- MUJA has high FO rate and low LF. As a result, its net exposure is negative always.

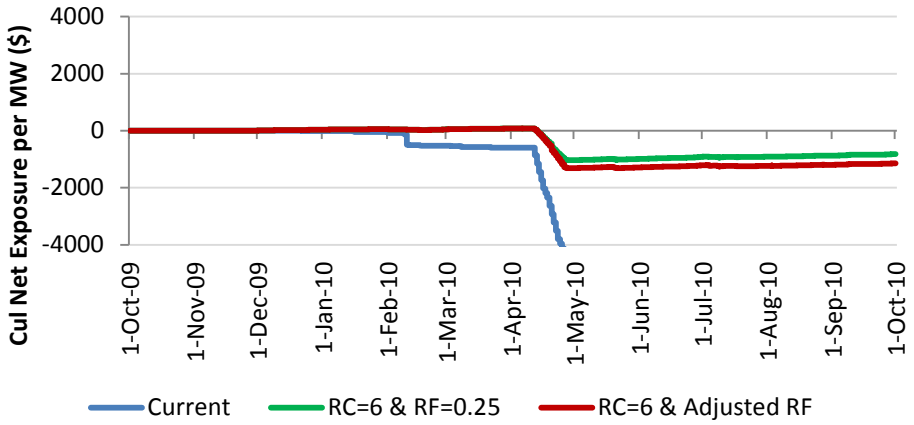
Note: System average PO and FO rates are 15.4% and 2.0% respectively

MUJA_G5 (PO = 18.7% ; FO = 15.8% ; LF = 45.8%)

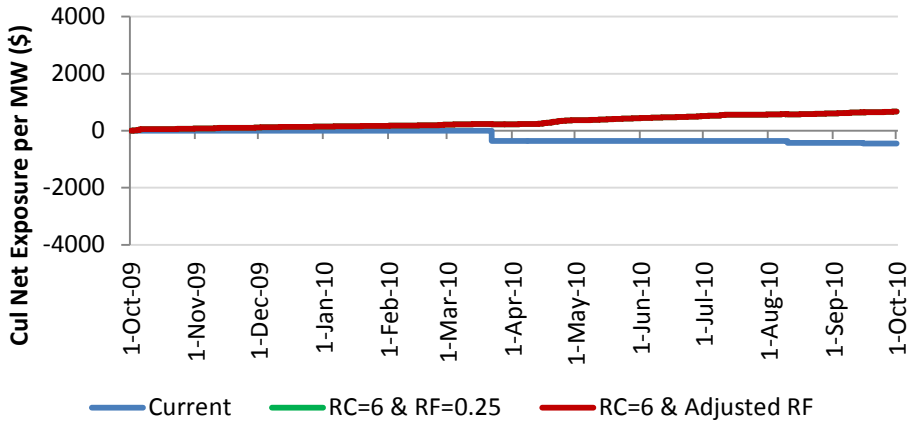


Cumulative Net Exposure of Baseload Facilities (per MW)

BW2_BLUEWATERS_G1 (PO = 2.6% ; FO = 4.7% ; LF = 91.1%)



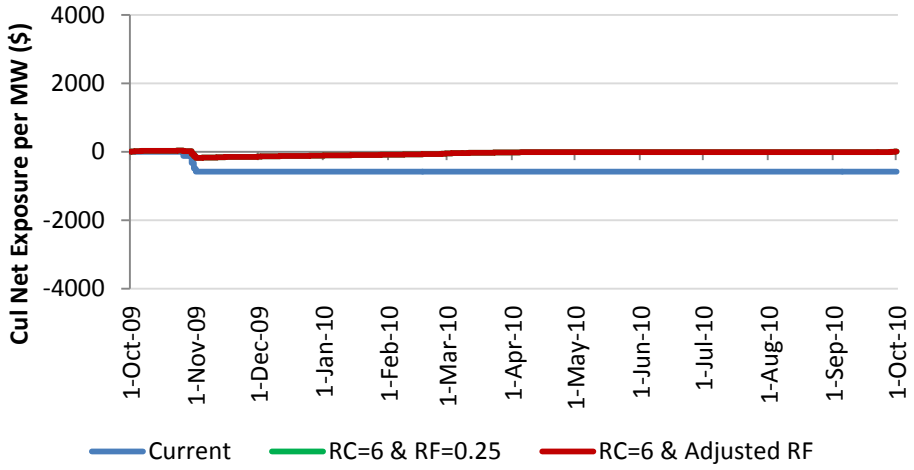
ALINTA_PNJ_U1 (PO = 4.1% ; FO = 0.1% ; LF = 94.7%)



- ALINTA_PNJ_U1 has a low FO rate, low PO rate and high LF, which results in positive net exposure.
- BW2_BLUEWATERS_G1 has much higher FO rate relative to system average, and so pays out refund.
- MUJA has very high PO rate and is not subject to both refund and rebate for a prolonged period and so, its exposure is rather neutral.

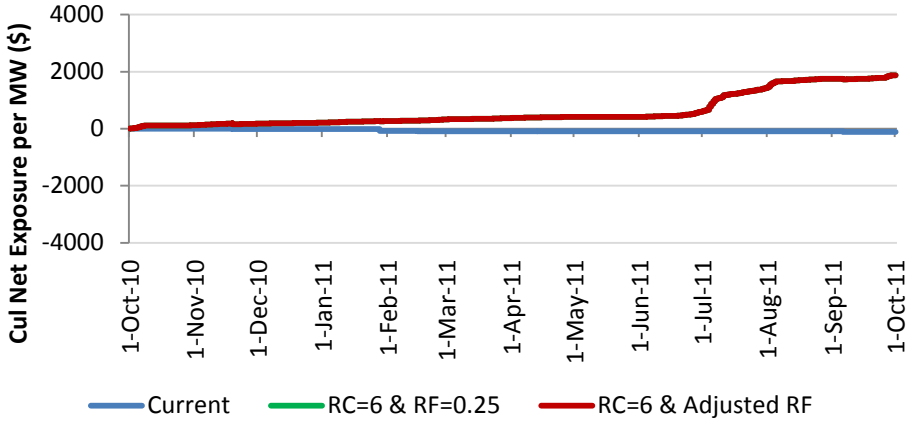
Note: System average PO and FO rates are 13.0% and 1.5% respectively

MUJA_G5 (PO = 48.9% ; FO = 0.7% ; LF = 28.0%)

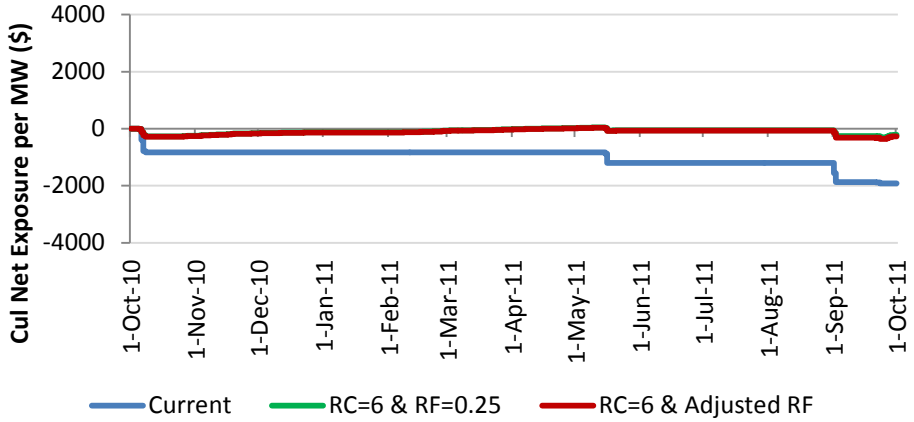


Cumulative Net Exposure of Peaking Facilities (per MW)

NEWGEN_NEERABUP_GT1 (PO = 6.2% ; FO = 0.0% ; LF = 4.0%)



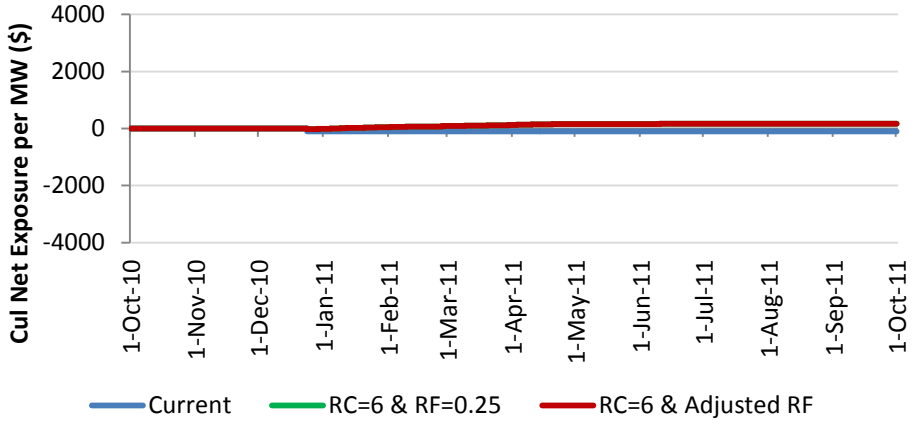
ALINTA_WGP_GT (PO = 1.9% ; FO = 1.4% ; LF = 0.6%)



- Although ALINTA_WGP_GT has below-average FO rate, net pay-out exposure depends on when FO occurs
- NEWGEN_NEERABUP_GT1 has excellent performance and is rewarded from the refund recycling.
- Although PINJAR_GT11 also has a low FO rate, it is on PO for a long time and not eligible for recycling during those periods.

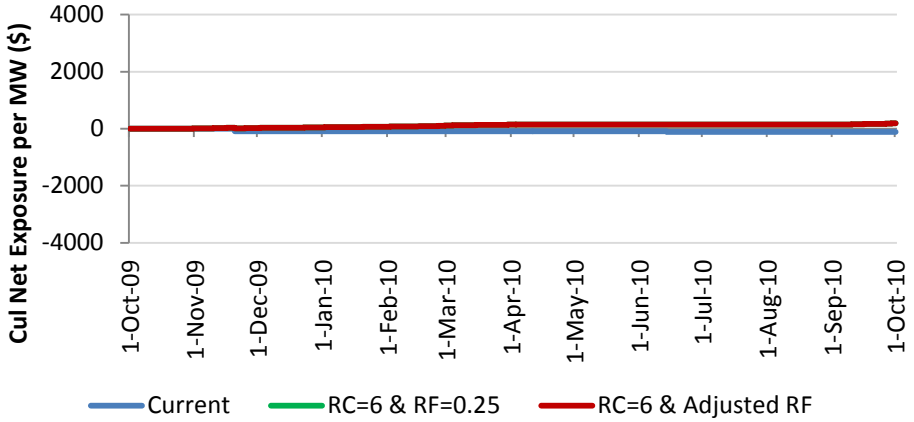
Note: System average PO and FO rates are 15.4% and 2.0% respectively

PINJAR_GT11 (PO = 53.0% ; FO = 0.1% ; LF = 0.6%)

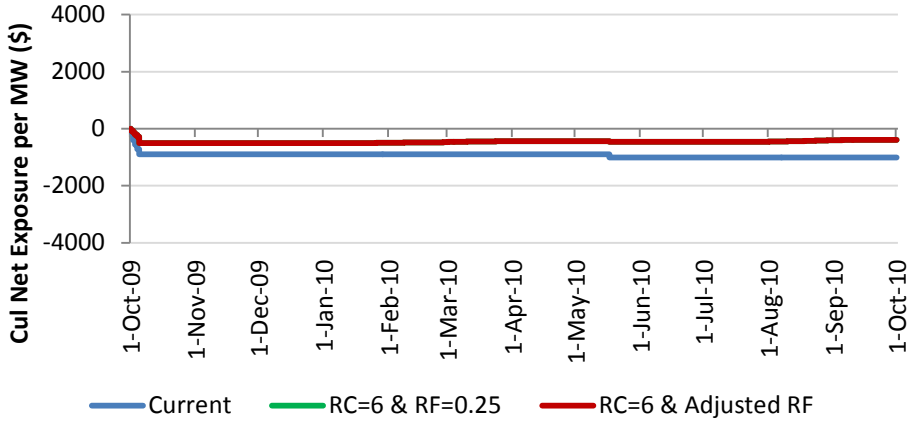


Cumulative Net Exposure of Peaking Facilities (per MW)

NEWGEN_NEERABUP_GT1 (PO = 3.5% ; FO = 0.1% ; LF = 0.8%)



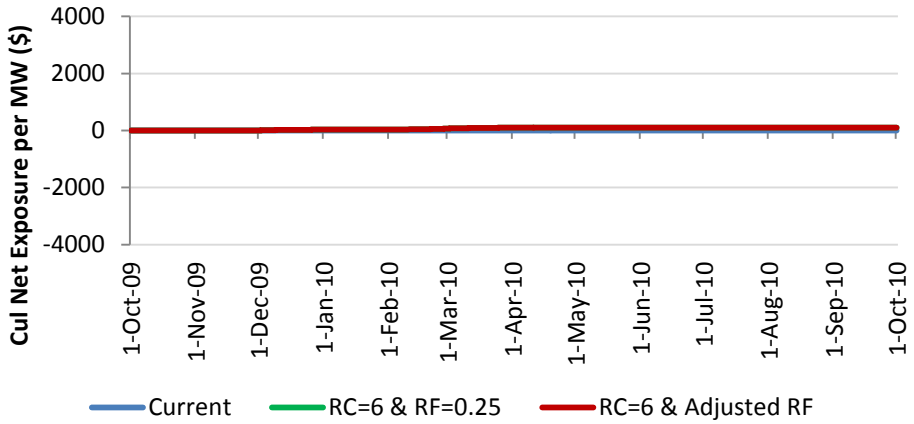
ALINTA_WGP_GT (PO = 0.6% ; FO = 1.2% ; LF = 0.1%)



- ALINTA_WGP_GT has higher FO rate than LF, which likely results in negative net exposure.
- NEWGEN_NEERABUP_GT1 has excellent performance (very low FO rate and relatively high LF) and is rewarded in the proposed regime.
- Although PINJAR_GT11 has a low FO rate, it has high PO rate, so its exposure is neutral.

Note: System average PO and FO rates are 13.0% and 1.5% respectively

PINJAR_GT11 (PO = 67.3% ; FO = 0.0% ; LF = 0.4%)



Rebate Eligibility Pool

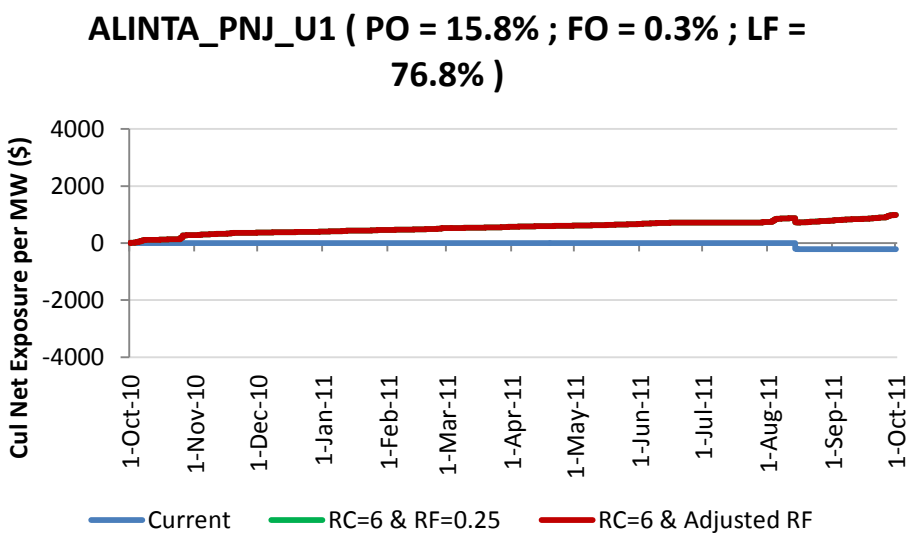
- Eligibility for rebates based on having been dispatched for any TI in the preceding 30 days
- Can choose to compete for dispatch to earn rebates
- Capacity that is dispatched earns rebates for the next thirty days
- In a normal year, with little excess reserve capacity, most units will be dispatched over the course of the year and thus can benefit from some rebate benefits to offset refund risk
- Successful compliance of semi-annual IMO operating tests will automatically let the capacity to earn rebate for two months.

End

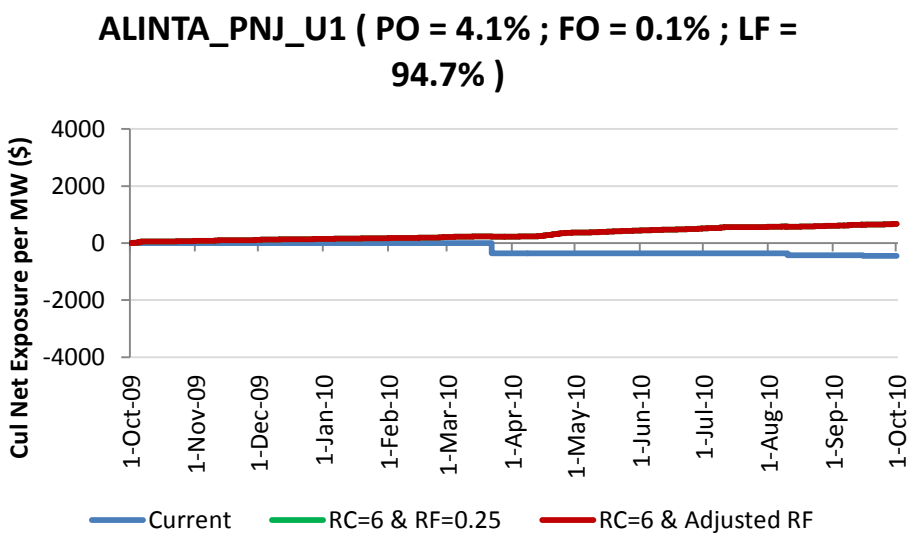
Other Key Points

- The dynamic reserve capacity price also aligns with value
  - Although ALINTA_PNJ_U1 has better overall performance in CY 2009/10 than CY 2010/11, the cumulative net exposure is higher in the latter CY. This is because in CY2010/11 (1) average refund factor is higher, (2) amount of capacity in the rebate pool is lower, (3) unit rebate is higher.

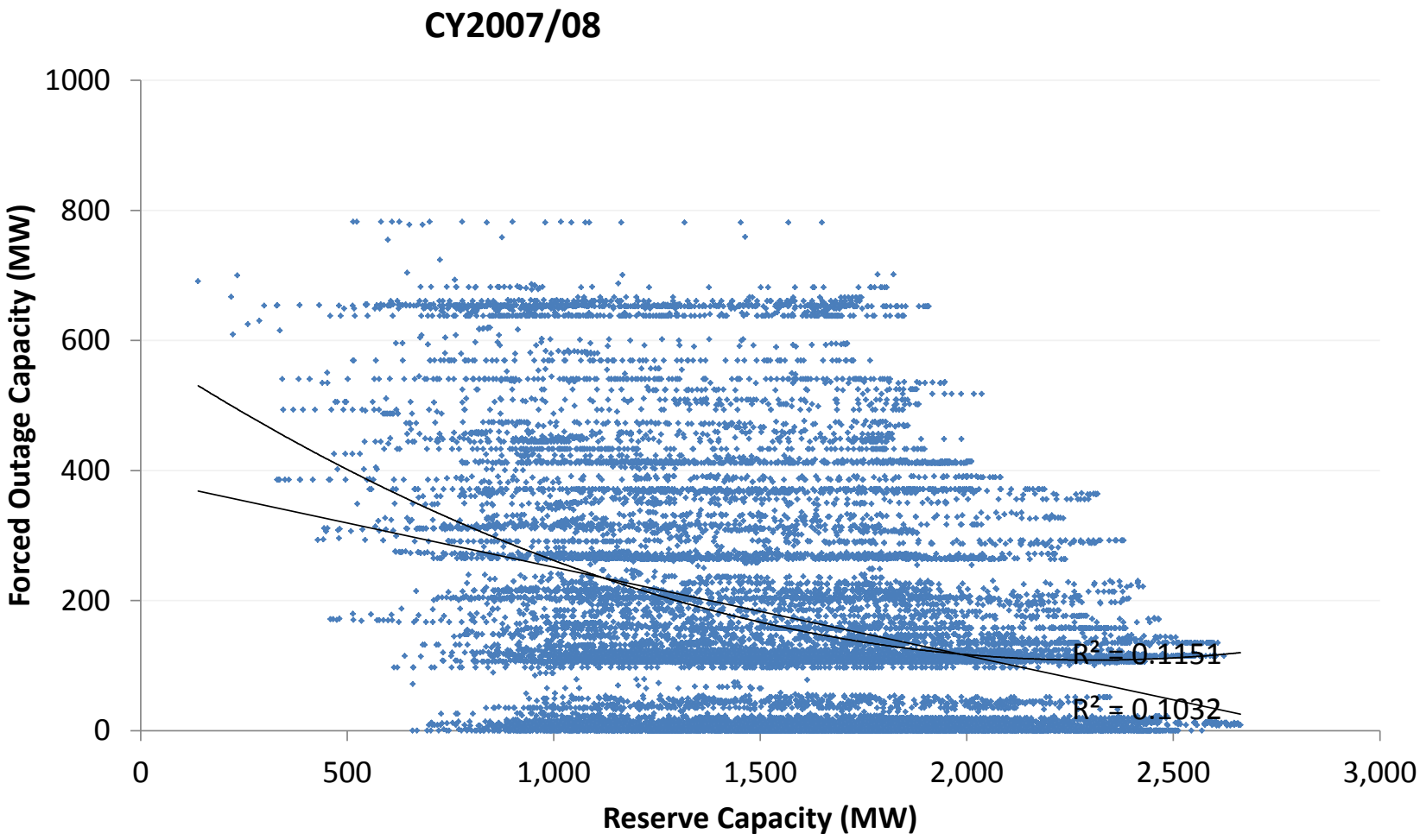
CY2010/11



CY2009/10



Some tendency evident when reserve capacity is lower



Availability-based Rebate with 30 Rolling Day Criterion