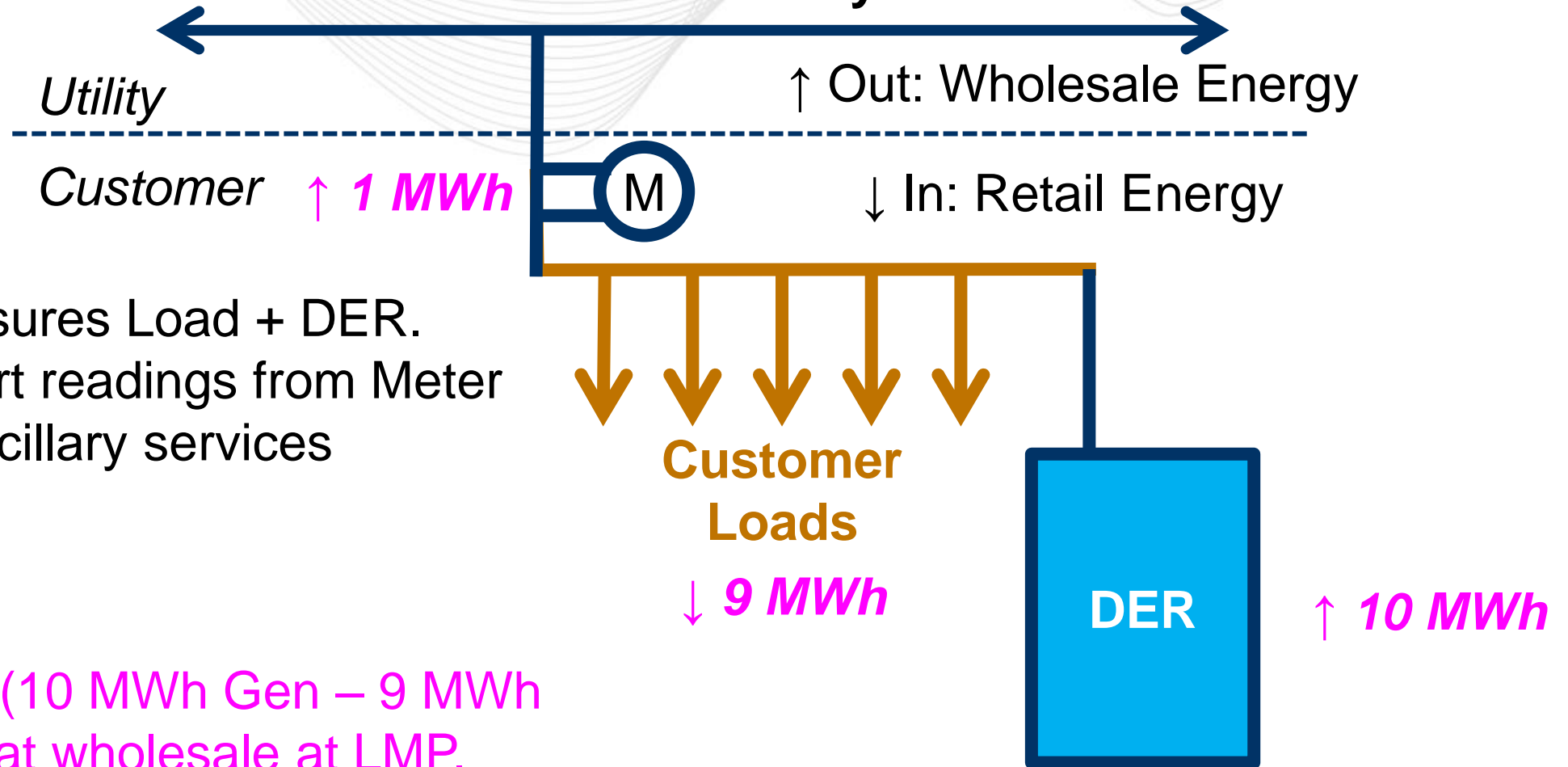




Ancillary Services Measurement for PJM Generators Behind a Customer Meter

Andrew Levitt
Applied Innovation
July 30 Distributed Energy
Resources Subcommittee

Status Quo for “Net Excess” PJM Generator Utility

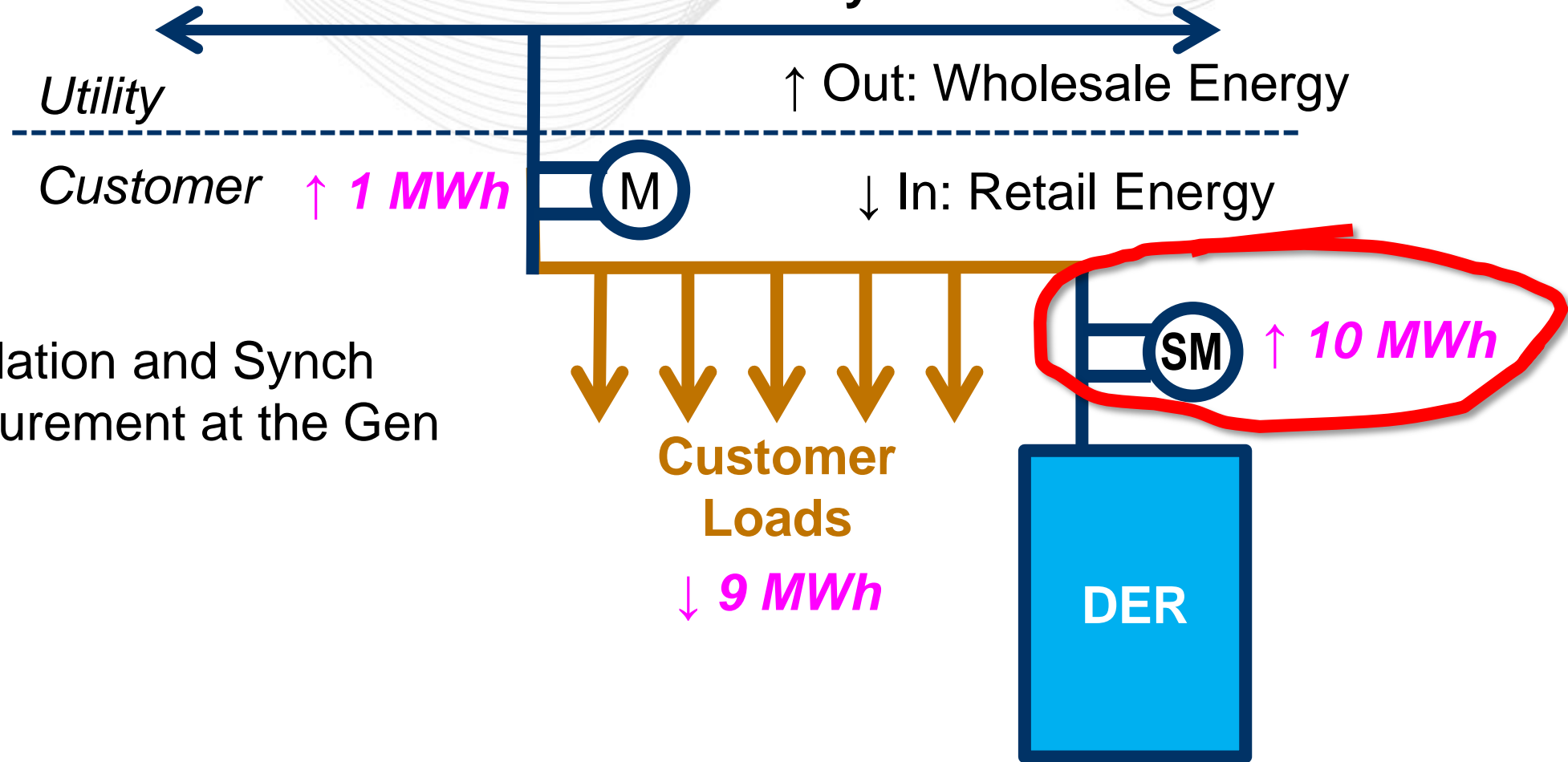


- Meter “M” measures Load + DER.
- Real-time export readings from Meter “M” used for ancillary services measurement.

Example:

- 1 MWh excess (10 MWh Gen – 9 MWh load) is settled at wholesale at LMP.

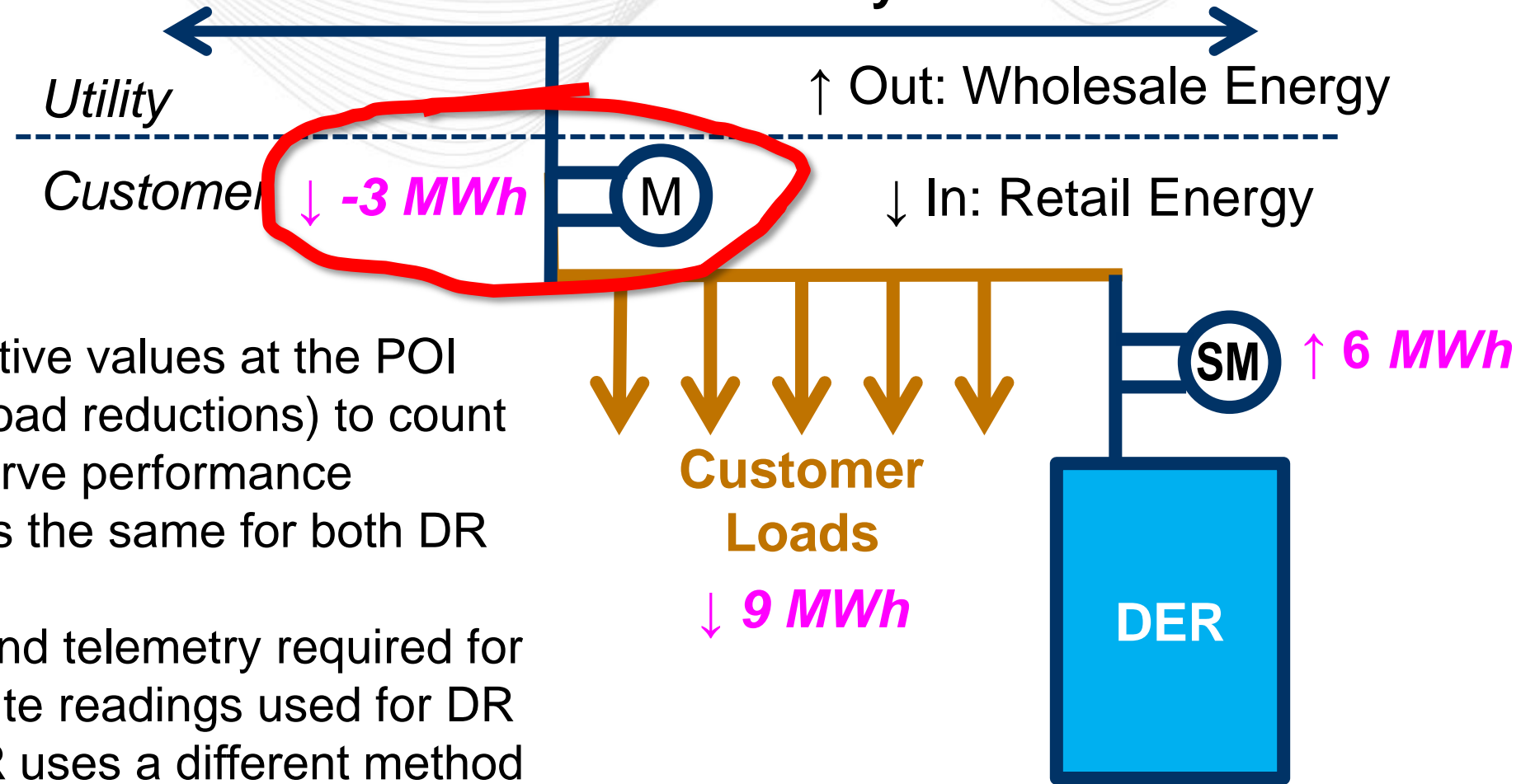
Existing PJM Proposal for “Net Excess” PJM Generator Utility



- Optional Regulation and Synch Reserve measurement at the Gen submeter

Design Component 1c Option B --&-- Design Component 2c Option A

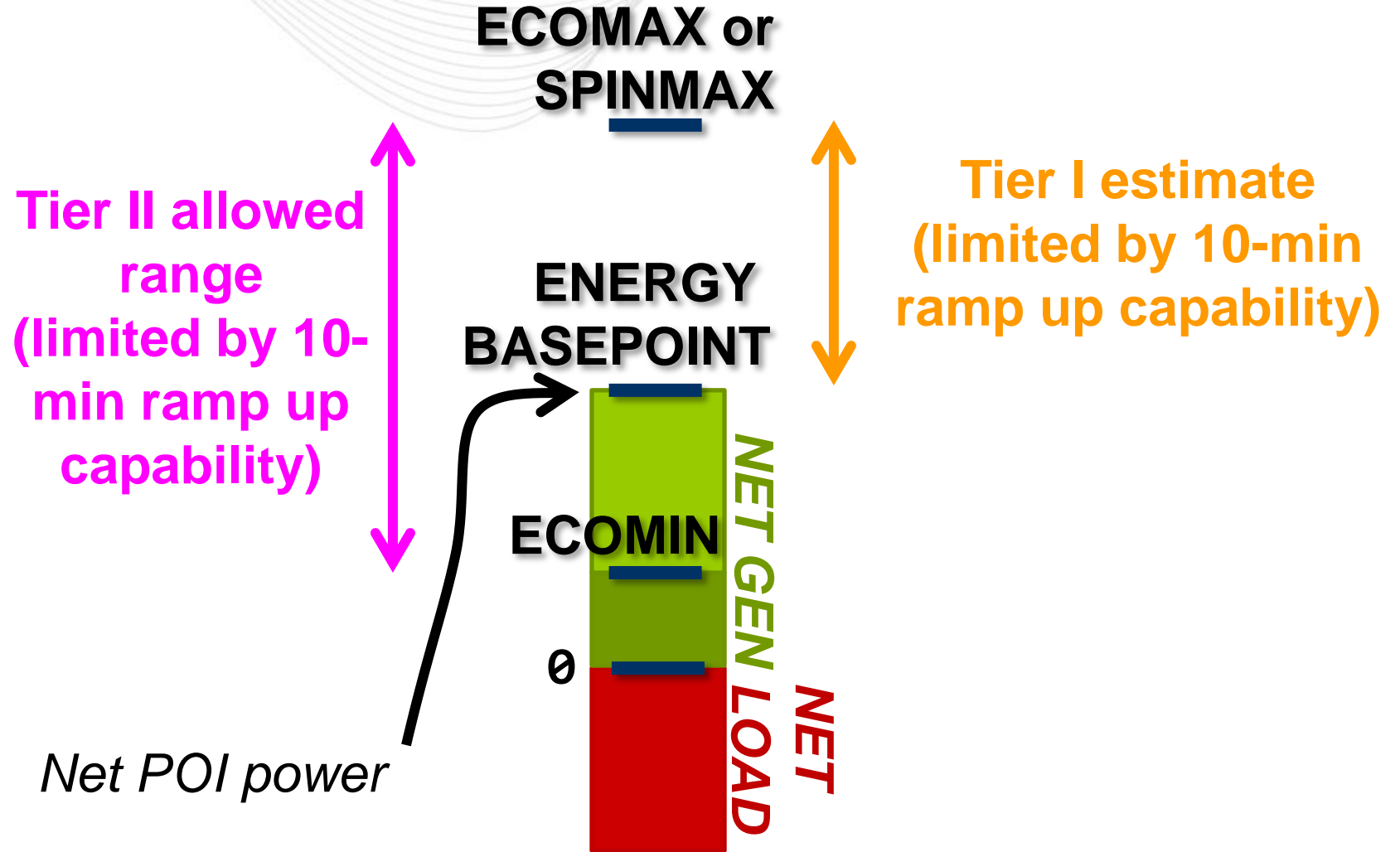
Other Proposal for “Net Excess” PJM Generator Utility



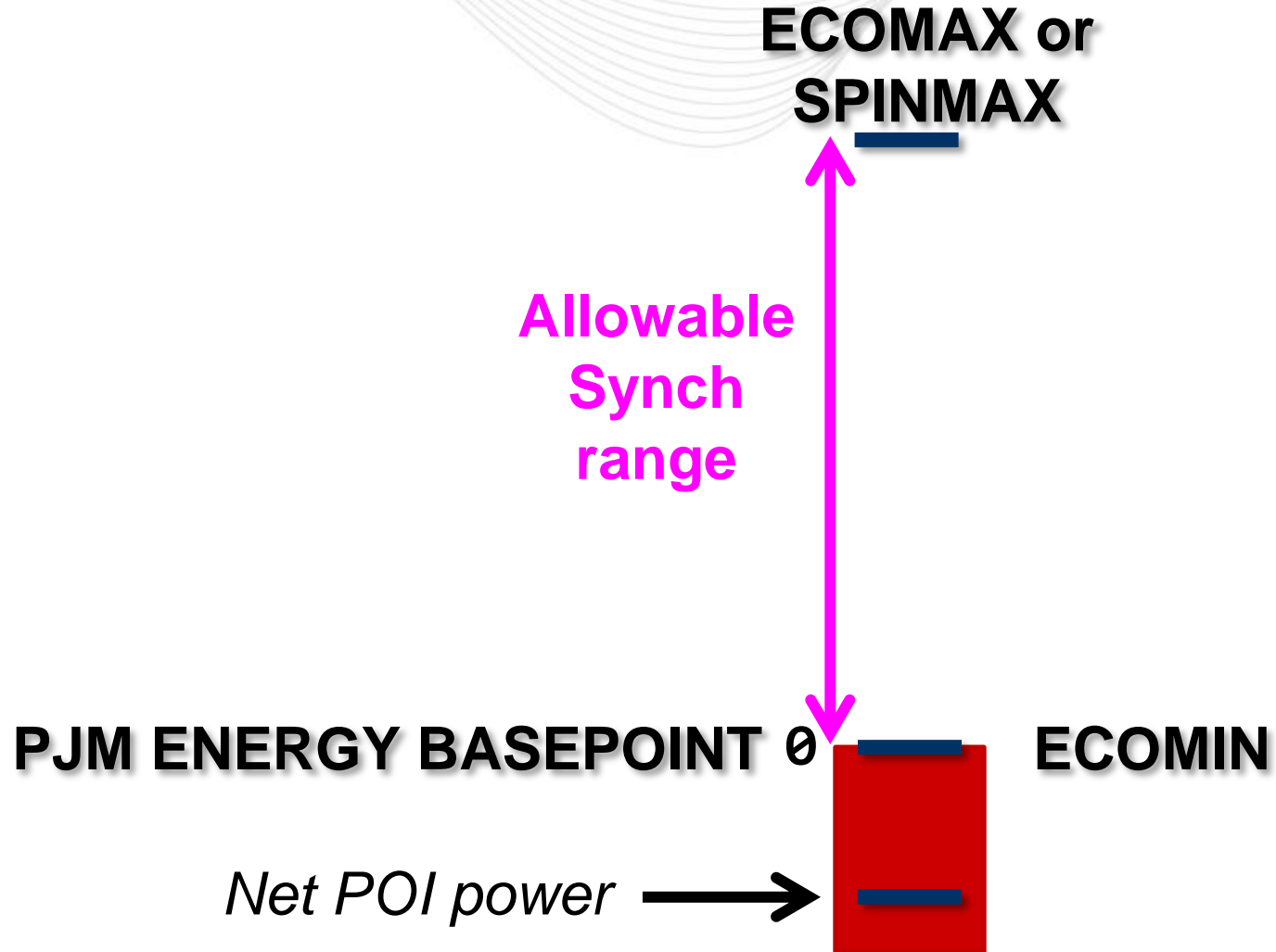
- Option to allow negative values at the POI (including load and load reductions) to count towards Synch Reserve performance
- Note SR “baseline” is the same for both DR and Gen
 - Except 10-second telemetry required for Gen, vs. 1-minute readings used for DR
 - “Batch load” DR uses a different method altogether.

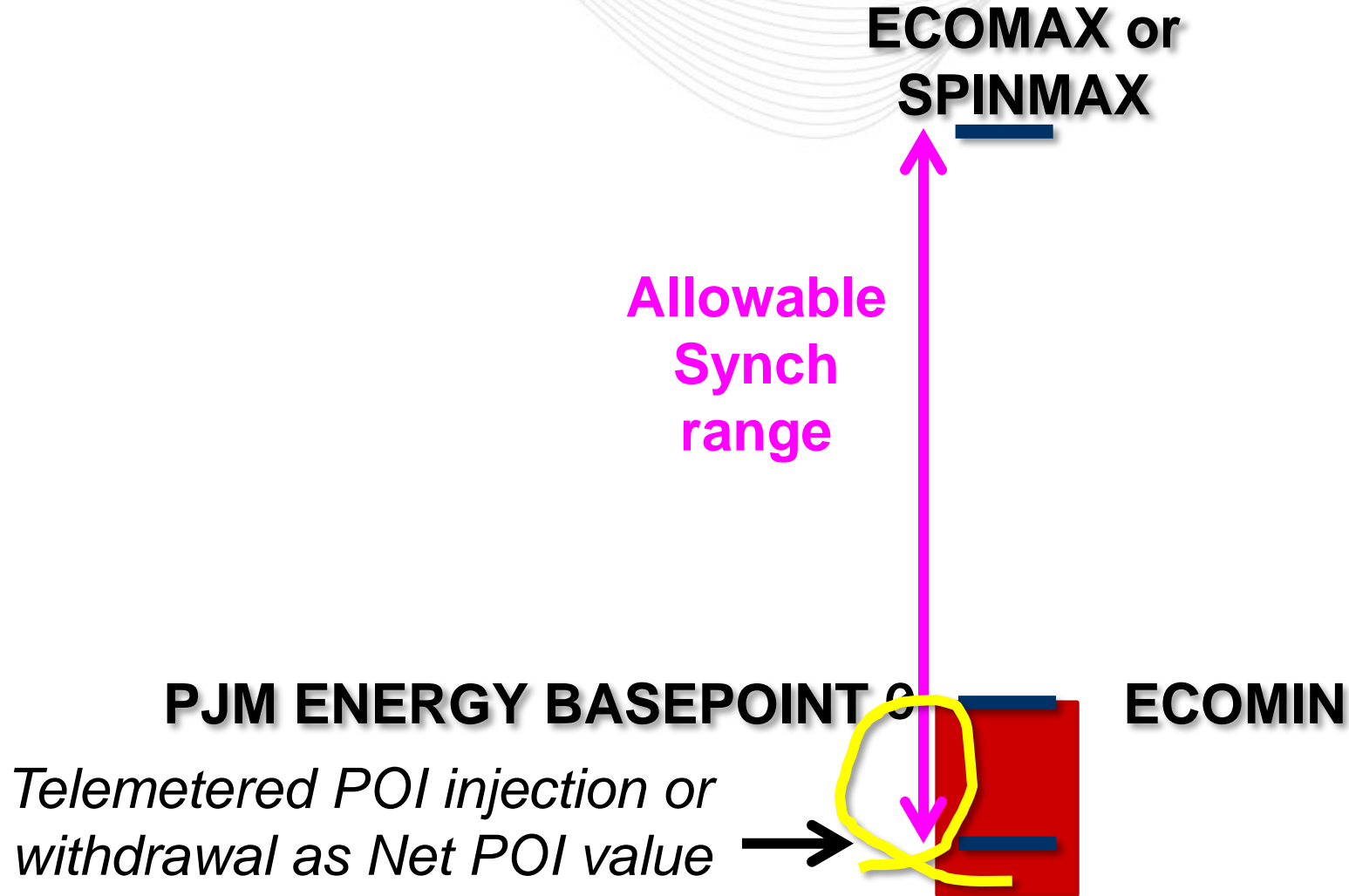
Design Component 1c Option A

Synch Reserve Status Quo (Design Components 1a & 1b)

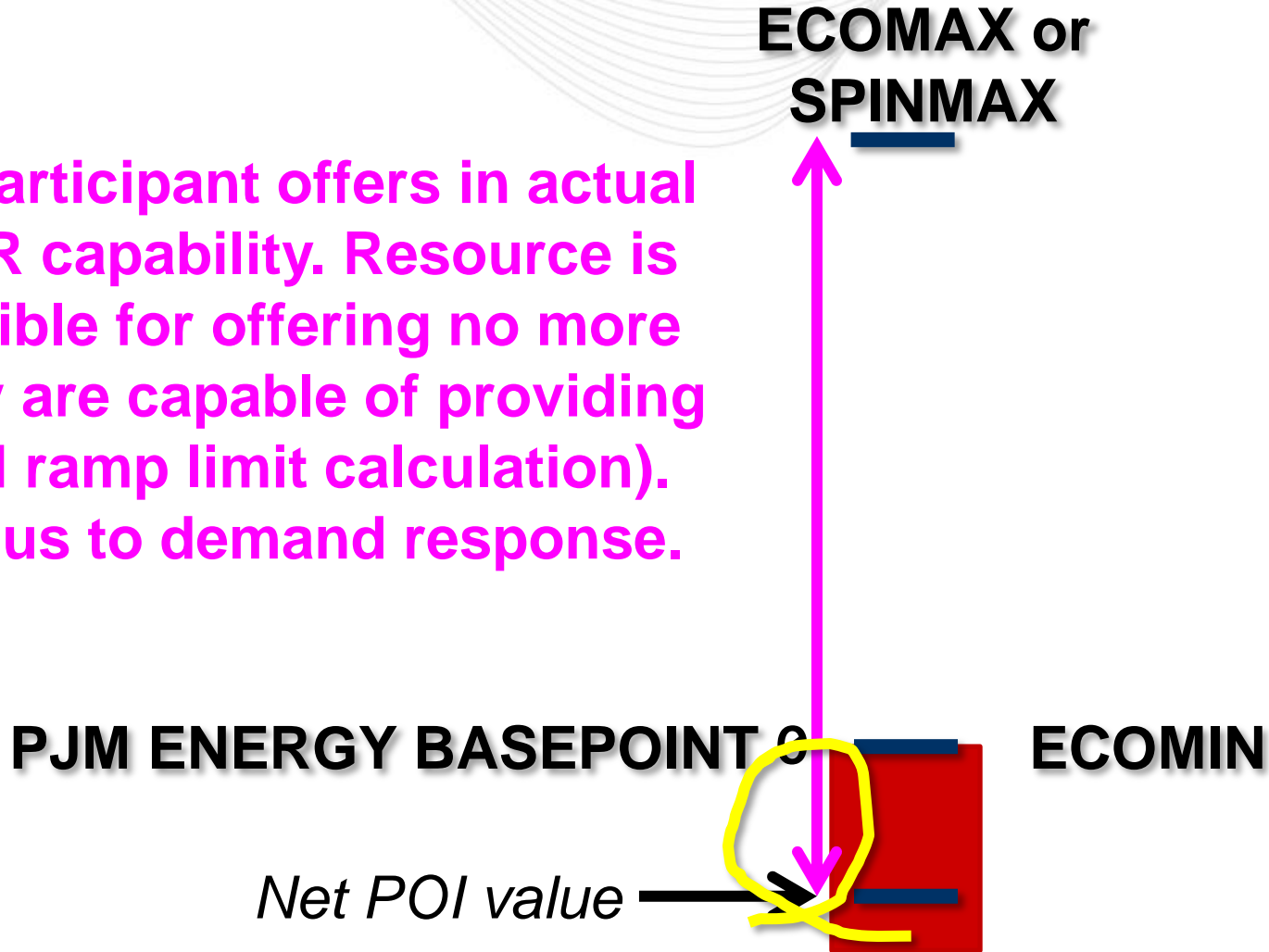


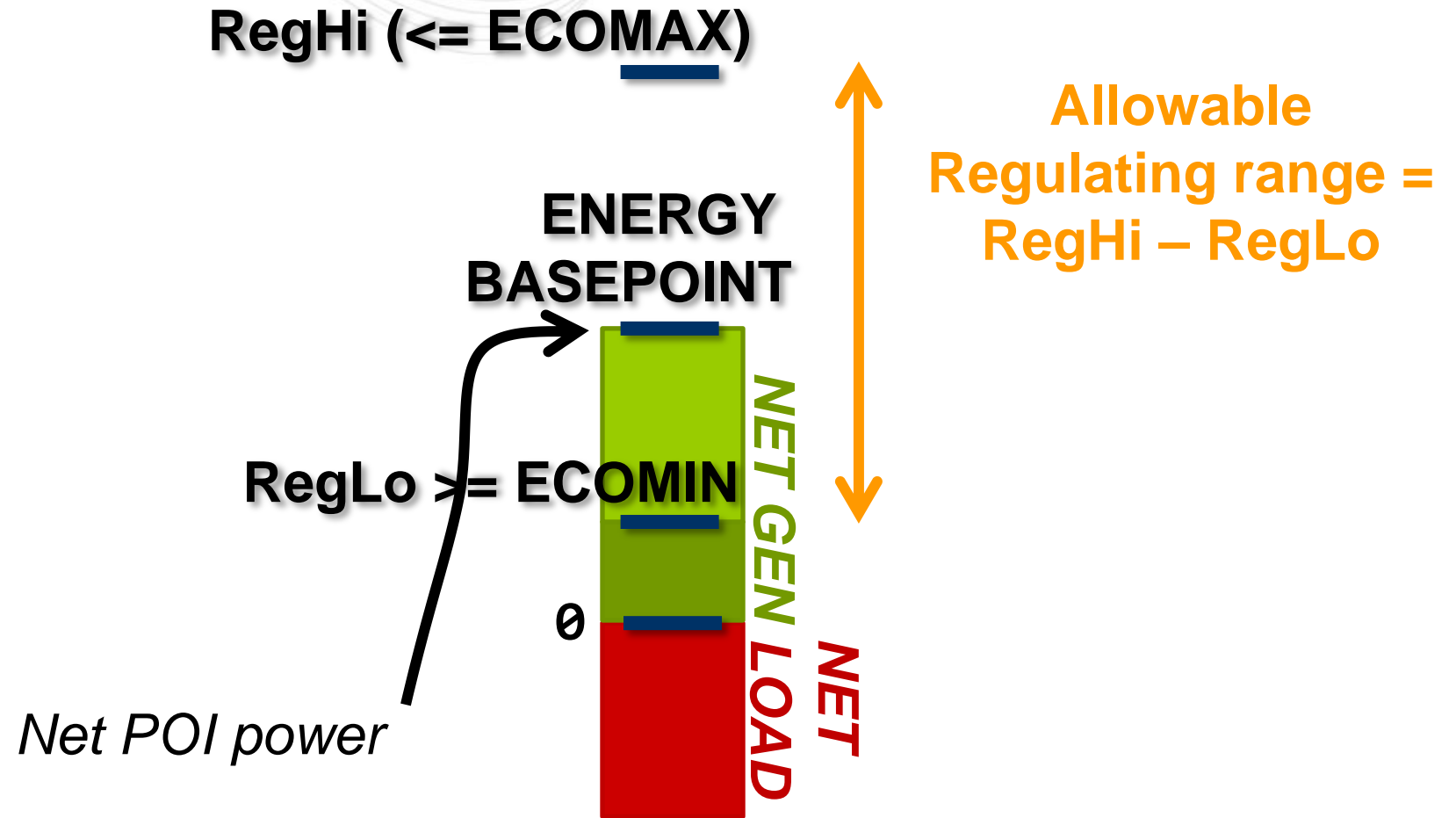
Synch Reserve Status Quo (Design Components 1a & 1b)



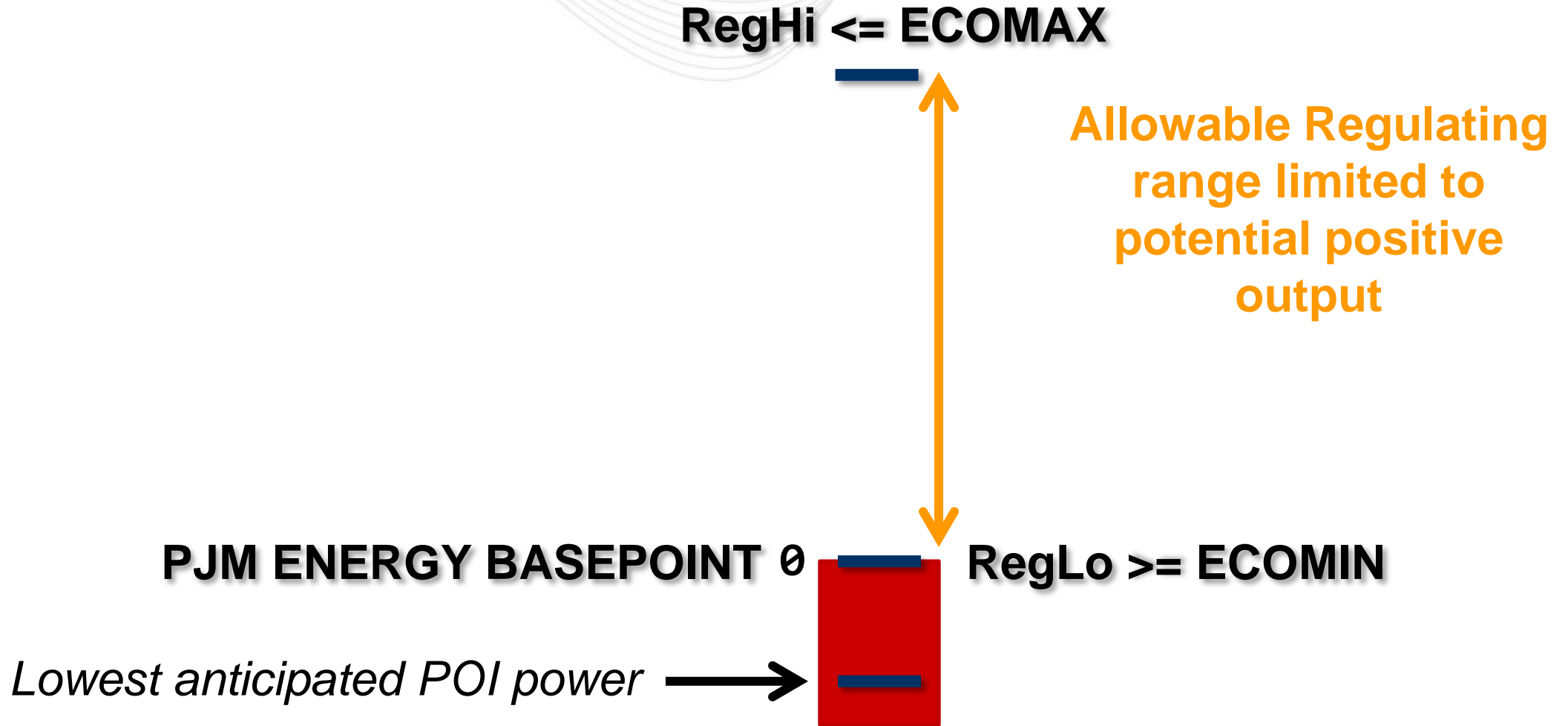


Market participant offers in actual Tier II SR capability. Resource is responsible for offering no more than they are capable of providing (no PJM ramp limit calculation). Analogous to demand response.





Reg Status Quo (Design Component 2a)



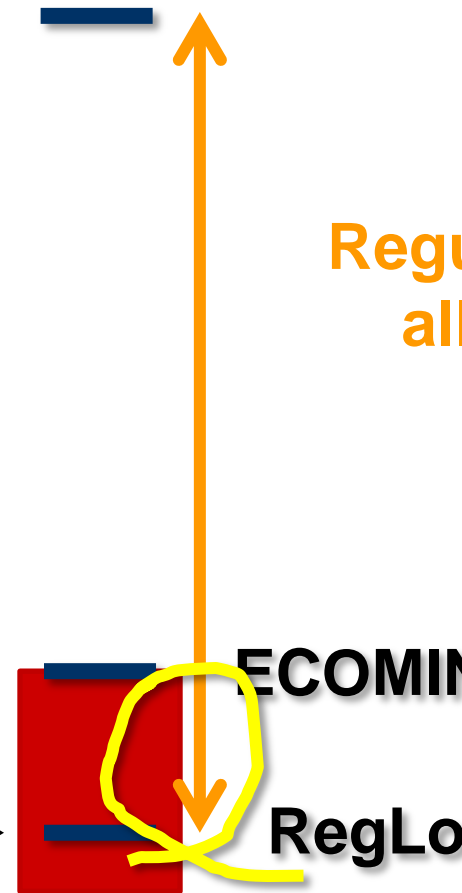
Reg Option A (Design Component 2a)

RegHi \leq ECOMAX

**Regulating range if
allow RegLo <
ECOMIN**

PJM ENERGY BASEPOINT 0 **ECOMIN**

Lowest anticipated POI power \longrightarrow





Possible Future Rules – Negative Values for SR Performance

Example with 10 MW nameplate generator (notice load curtailment as well)

	Design component 1b			Design component 1c		
	Pre-event	Opt. A offer method	Opt. B offer method	In-event	1c Opt. X: POI Performance	1c Opt. Y: Submeter Performance
Gross load	9 MW		Can cut 1 MW load	8 MW		
Gross gen	6 MW		Can increase 4 MW gen	10 MW		+10 minus +6
Net at POI	-3 MW (load)	Telemetry: -3 MW		+ 2 MW (gen)	+2 minus (-3)	
Gen headroom	4 MW			0 MW		
PJM ECOMAX	1 MW	1 MW		2 MW		
PJM ECOMIN	0 MW			0 MW		
PJM Output	0 MW			2 MW		
On/off status	on			on		
SR offer qty		4 MW	5 MW			
SR measurement					5 MW	4 MW



Possible Future Rules – Negative Values for SR Performance

Example with 10 MW nameplate generator (notice load curtailment as well)

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Gen headroom	4 MW			0 MW		
PJM ECOMAX	1 MW	1 MW		2 MW		
PJM ECOMIN	0 MW			0 MW		
PJM Output	0 MW			2 MW		
On/off status	on			on		
SR offer qty		4 MW	5 MW			
SR measurement					5 MW	4 MW

	<i>Design Component</i>	<i>Status Quo</i>	<i>Option A</i>	<i>Option B</i>	<i>Option C</i>
4.1	Submeter ownership	Third party ownership of POI meters allowed for PJM generators.	Third party submeter allowed as per Demand Response status quo for Regulation submeter	Third party submeter allowed as per Generation status quo for POI meters	EDC submeter allowed as per Generation status quo for POI meters
4.2	Submeter communications	PJMNet ICCP or Jetstream DNP3 depending on size. Via marketer or TO as Market Operations Center.			
4.3	Submeter set-up Process	N/A	Similar to Regulation performance testing		

- Option A: Optional for any PJM generator co-located with non-station-power load and settled for energy on net output.
- Option B: Mandatory for any PJM generator co-located with non-station-power load and settled for energy on net output.