

Start Cost Alternate Proposal

Cost Development
Subcommittee

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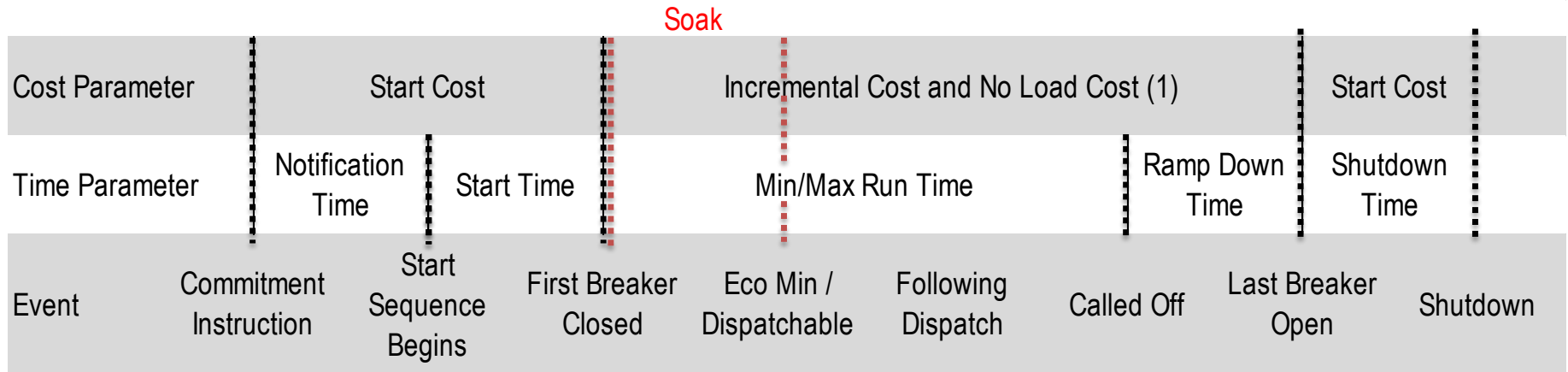
Monitoring Analytics

MMU Alternate Proposal Summary

- **Include soak cost in the start cost of units with soak process (boilers/HRSG/steam turbines).**
 - **Define start cost from notification to dispatchable.**
 - **Revenues from net generation will be calculated based on the current station service rate.**
- **Start cost definition remains the same for units without soak process (e.g. CTs/RICE).**
- **Start inputs will be calculated based on PLS parameters.**
- **Dispatch log will reflect units in transition (soaking).**
- **Units will be eligible for uplift once they become dispatchable.**

Status Quo

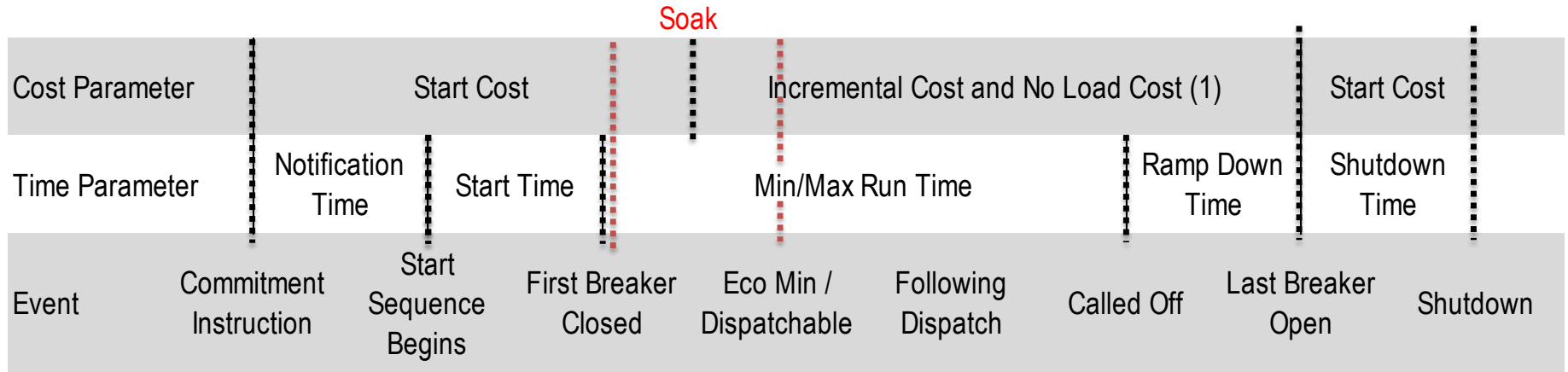
- **Steam turbines:**



(1) Eligible for uplift compensation based on start timing and dispatch log.

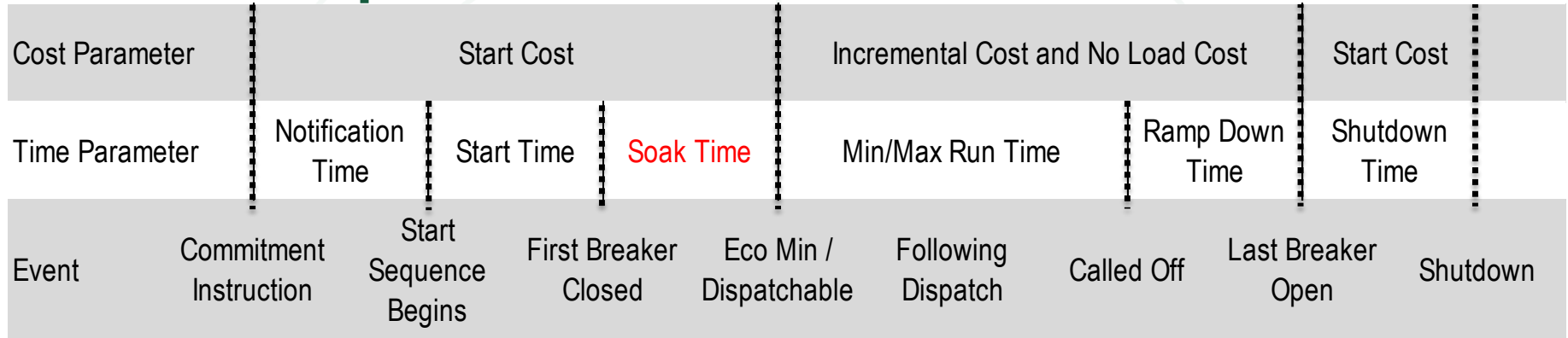
Status Quo

- **Combined Cycles:**



(1) Eligible for uplift compensation based on start timing and dispatch log.

Proposal for Units with Soak Process



- **Soak time is not a current operating parameter but it is included (cold soak) in minimum run time. For calculating the start cost, a soak time is necessary. The MMU recommends the following defaults:**
 - For min run time < 4, Soak Time is min run time minus 1 hour
 - For $4 < \text{min run time} \leq 8$, Soak Time is min run time minus 2 hours
 - For min run time > 8, Soak Time is min run time minus 3 hours

Proposed Definition of Start Cost

- **For units with soak process: Start cost shall mean the net unit costs from PJM's notification to Dispatchable Output and from last breaker open to shutdown.**
- **For units without soak process: Start cost shall mean the unit costs from PJM's notification to first breaker close and from last breaker open to shutdown.**
- **For all: Start cost consists primarily of the cost of fuel, as determined by the unit's start heat input (adjusted by the performance factor) times the fuel cost. It also includes operating costs, maintenance adders, emissions allowances, taxes and station service power cost. Start cost can vary with the unit offline time being categorized in three unit temperature conditions: hot, intermediate and cold.**

Inputs Definition – Start Fuel

- **For units with soak process: Fuel consumed from first fire of start process (initial reactor criticality for nuclear units) to Dispatchable Output (including auxiliary boiler fuel) plus fuel consumed from last breaker open to shutdown.**
- **For units without soak process: Fuel consumed from first fire of start process to first breaker close plus fuel consumed from last breaker open to shutdown.**

Inputs Definition – Station Power / Net Gen

- **For units with soak process: Electricity consumed from PJM's notification to first breaker close and electricity consumed after last breaker open to shutdown above normal base station use minus electricity produced from first breaker close to Dispatchable Output. Normal base station service is the consumption prior to PJM's notification.**
- **For units without soak process: Electricity consumed from PJM's notification to first breaker close and electricity consumed after last breaker open to shutdown above normal base station use. Normal base station service is the consumption prior to PJM's notification.**

Input Calculation Proposed Method - Soak

- **Station Power: MWh consumed from T0 to T1 and from T2 to T3 where:**
 - **T0 = First breaker close minus applicable unit specific start time plus notification time.**
 - **T1 = First breaker close**
 - **T2 = Last breaker open.**
 - **T3 = Last breaker open plus (unit specific minimum down time minus hot start time).**
- **Net Generation: MWh produced from T0 to T1 where:**
 - **T0 = First breaker close.**
 - **T1 = First breaker close plus Soak Time**

Input Calculation Proposed Method - Soak

- **Fuel: MMBtu consumed from T0 to T1 and from T2 to T3 where:**
 - **T0 = First breaker close minus applicable unit specific start time plus notification time.**
 - **T1 = First breaker close plus Soak Time**
 - **T2 = Last breaker open.**
 - **T3 = Last breaker open plus (unit specific minimum down time minus hot start time).**



Input Calculation Proposed Method – No Soak

- **Fuel consumed and station power must be from T0 to T1 and from T2 to T3 where:**
 - **T0 = First breaker close minus applicable unit specific start time plus notification time.**
 - **T1 = First breaker close.**
 - **T2 = Last breaker open.**
 - **T3 = Last breaker open plus (unit specific minimum down time minus hot start time).**

Dispatch and Settlement Implications

- **Units will be logged as running for PJM (released to PJM) once they reach Dispatchable Output.**
- **Because soak costs will be included in the start cost, units will be eligible for uplift once they reach the Dispatchable Output.**
- **Logging the units correctly should also be used to not assign reserves while soaking.**



Example

HE	MWh	MMBtu	Comment
3:00	(2)	50	
4:00	(4)	100	
5:00	(4)	100	
6:00	(4)	100	
7:00	(4)	100	
8:00	1	100	Breaker Close
9:00	20	300	Uplift ineligible
10:00	20	300	Uplift ineligible
11:00	40	500	Uplift ineligible
12:00	250	2,000	Uplift eligible
13:00	500	3,500	Uplift eligible
14:00	500	3,500	Uplift eligible

Parameters	Value
Notification Time (hr)	1
Start Time (hr)	3
Min Run Time (hr)	4
Default Soak Time (hr)	3
Dispatchable Output (MW)	250



Example

Inputs	Proposal	Current	Comment
Station Service (MWh)	16	18	Reduced based on approved PLS
Net Generation (MWh)	41	0	Included as revenue at station service rate
Start Fuel (MMBtu)	1,100	450	Increased to include heat input during soak

Prices		
Gas Cost (\$/MMBtu)	\$5.00	\$5.00
Station Service Rate (\$/MWh)	\$25.00	\$25.00
Start Cost (\$/start)	\$4,875	\$2,700

Other Items

- **Removal of start additional labor costs. Costs will remain includable in ACR.**
- **Equivalent service hour calculation and cyclic starting factors will be based on OEM.**
- **Only one start cost allowed if offering dispatchable points within an aggregated unit (e.g. multiple CTs offered as one unit).**
- **Cogenerators can only include no load and start costs when host load is offline.**
- **Pseudo tied units can only include no load and start costs when entire unit is transferred to PJM.**

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