



Regulation Market Issue Senior Task Force

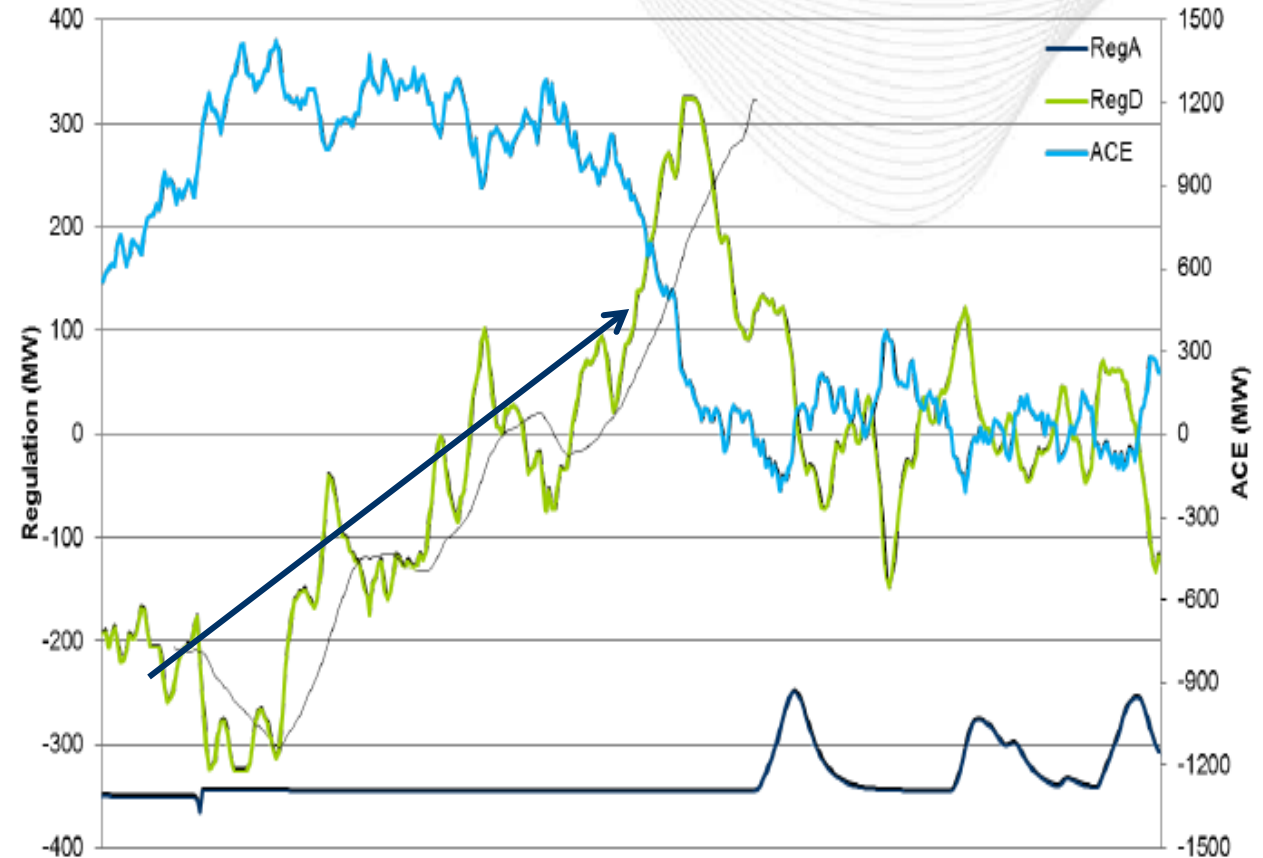
Regulation Market Issues Senior Task Force

Oct. 25, 2016

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Performance Compliance

- Problem Statement
- Area of Changes
- Solution Proposal

- Reliability Issue: RegD control signal moving in the opposite direction of ACE control
 - Need RegD signal to provide ACE control at all times, no counter ACE control movement
- Market Issue: Inconsistency in the market optimization and financial signal for the RegD market place



- Signal
- Benefits Factor/Marginal Rate of Technical Substitution (MRTS)
- Requirement
- Performance Scoring
- Settlements
- Other

Proposal Transition



Today

- RegA and RegD signal produced independently
- RegA signal can request response beyond resource ramping capabilities
 - ‘Accelerator Function’
- RegD signal kept approximately neutral over 15 minute period
 - Will go against ACE control to keep signal neutral

Phase 1
Go-live + 6 months

- RegA and RegD signal produced dependently – working together for ACE control
- RegA signal slowed down to better respect ramping capabilities
- **RegD signal is modelled as 15 minute conditional neutral signal**

Phase 2
6 months – ongoing

- RegA and RegD signal produced dependently – working together for ACE control
- RegA signal slowed down to better respect ramping capabilities
- **RegD signal is modelled as 30 minute conditional neutral signal**

Phase 3
2 years – ongoing (TBD)

- RegA and RegD signal produced dependently – working together for ACE control
- RegA signal slowed down to better respect ramping capabilities
- **RegD signal non-neutral**
 - **TBD- dependent on resource performance and signal analysis**

Proposal Transition

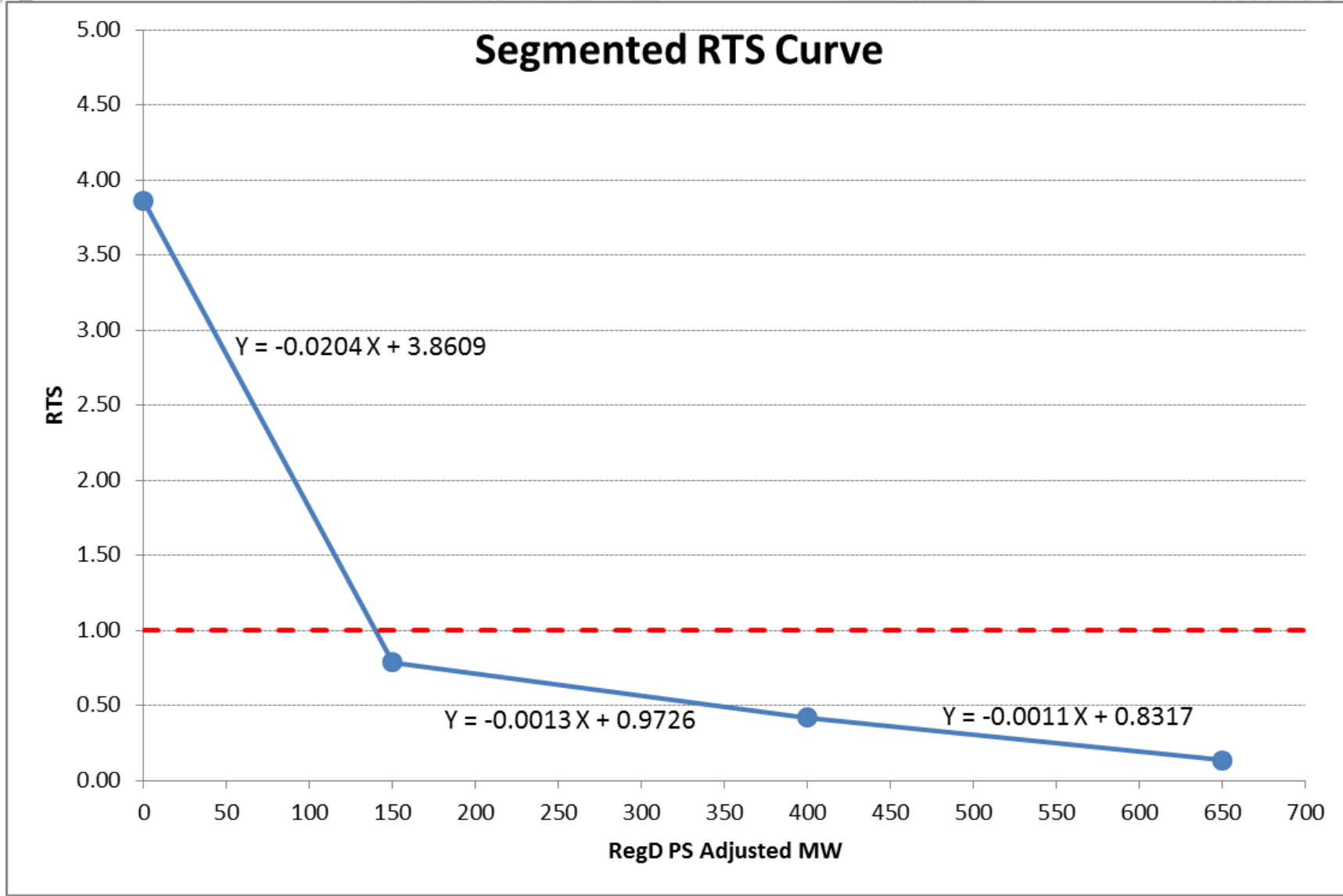


Today

- Benefits Factor Curve
 - Excursion and Non-Excursion hours
 - Excursion hours clear
- Excursion hours clear to BF=1 at 26.2%
- Non-Excursion hours clear to BF=0 at 42%
- Calculate Effective MW as a block

Phase 1 Go-live - ongoing

- Rate of Technical Substitution Curve representing control metrics
 - Ramp/Non-Ramp and Seasonal
- Ability to clear resources down to MRTS=0
- Calculate Effective MW as area under the curve
- Quarterly review and potential revisions to MRTS based on observed operations and unit performance



Proposal Transition



Today

- Requirement defined as on-peak and off-peak
- On-peak hours 700MW requirement
 - HE 6-24
- Off-peak hours 525MW requirement
 - HE 1-5

Phase 1 Go-live

- Requirement defined as on-ramp and off-ramp, seasonally
- **On-ramp hours 800MW requirement; Off-ramp hours 525MW requirement**
- Ramp hours defined by season
- Quarterly review of requirement and update based on system performance

Phase 2 Quarterly Review

- Requirement defined as on-ramp and off-ramp, seasonally
- TBD requirement, intent to minimize requirement based on unit performance
- Ramp hours defined by season
- Quarterly review of requirement and update based on system performance

- Current Regulation Requirement:
 - On-Peak (0500-2359) – 700MW
 - Off-Peak (0000-0459) – 525MW
 - 15,925 MWh daily for regulation
- Proposed Regulation Requirement:
 - Seasonal Requirements (Fall, Winter, Spring, Summer)
 - Ramp/Non-Ramp periods defined based on historical evaluation and engineering study
 - Ramp hours will procure more MW compared to Non-Ramp hours

- Fall
 - On-Ramp 800MW, Off-Ramp 525MW
 - Months: September 1 – November 30
 - Ramp hours: HE6 – HE8, HE18 – HE24
 - Daily Procurement: 15,350 MW
- Winter
 - On-Ramp 800MW, Off-Ramp 525MW
 - Months: December 1 – February 29
 - Ramp hours: HE6 – HE9, HE18 – HE24
 - Daily Procurement: 15,625 MWh

- Spring
 - On-Ramp 800MW, Off-Ramp 525MW
 - Months: March 1 – May 31
 - Ramp hours: HE6 – HE8, HE18 – HE24
 - Daily Procurement: 15,350 MW
- Summer
 - On-Ramp 800MW, Off-Ramp 525MW
 - Months: June 1 – August 31
 - Ramp hours: HE6 – HE14, HE19 – HE24
 - Daily Procurement: 17,000 MWh

Proposal Transition



Today

- Performance Score calculated as hourly average of 10 second evaluation of $\frac{1}{3}A + \frac{1}{3}D + \frac{1}{3}P$
- Participation Threshold set to 40% historic PS
- Compensation Threshold set to 25% hourly PS
- Qualification Threshold set to 75% test PS

Phase 1 Go-live – 1 yr

- Performance Score calculated as hourly average of 10 second evaluation of $\frac{1}{3}A + \frac{1}{3}D + \frac{1}{3}P$ when precision > 75% and $\frac{1}{3} \cdot 0 + \frac{1}{3} \cdot 0 + \frac{1}{3} \cdot P$ when precision < 75%
- **Participation Threshold set to 50% historic PS**
- Compensation Threshold set to 25% hourly PS
- Qualification Threshold set to 75% test PS
- Quarterly Review of Performance Score

Phase 2 1yr- 2yr

- Performance Score calculated as hourly average of 10 second evaluation of $\frac{1}{3}A + \frac{1}{3}D + \frac{1}{3}P$ when precision > 75% and $\frac{1}{3} \cdot 0 + \frac{1}{3} \cdot 0 + \frac{1}{3} \cdot P$ when precision < 75%
- **Participation Threshold set to 60% historic PS**
- Compensation Threshold set to 25% hourly PS
- Qualification Threshold set to 75% test PS
- Quarterly Review of Performance Score

Phase 3 2yr – ongoing

- Performance Score calculated as hourly average of 10 second evaluation of $\frac{1}{3}A + \frac{1}{3}D + \frac{1}{3}P$ when precision > 75% and $\frac{1}{3} \cdot 0 + \frac{1}{3} \cdot 0 + \frac{1}{3} \cdot P$ when precision < 75%
- **Participation Threshold set to 70% historic PS**
- Compensation Threshold set to 25% hourly PS
- Qualification Threshold set to 75% test PS
- Quarterly Review of Performance Score

Proposal Transition

Today

- Settlements calculation with mileage ratio (MR)
- $\text{Credit} = \text{CCP} * \text{MW} * \text{PS} + \text{PCP} * \text{MR} * \text{MW} * \text{PS}$
- CCP = Capability Clearing Price
- PCP=Performance Clearing Price

Phase 1 Go-live - ongoing

- Settlements calculation with marginal rate of technical substitution (MRTS)
- $\text{Credit} = \text{CCP} * \text{MRTS} * \text{MW} * \text{PS} + \text{PCP} * \text{MRTS} * \text{MW} * \text{PS}$
- CCP = Capability Clearing Price
- PCP=Performance Clearing Price

Proposal Transition

A thick blue arrow pointing from left to right, spanning the width of the slide, indicating a transition or flow from the 'Today' section to the 'Phase 1' section.

Today

- Lost Opportunity Cost: Settlements uses cheapest of price or most expensive of cost schedule
- Qualification Up-rate test: 1 test per day per resource

Phase 1

Go-live – ongoing

- Lost Opportunity Cost: Use the schedule the resource was committed on
- Qualification Up-rate test: 1 test per month per resource