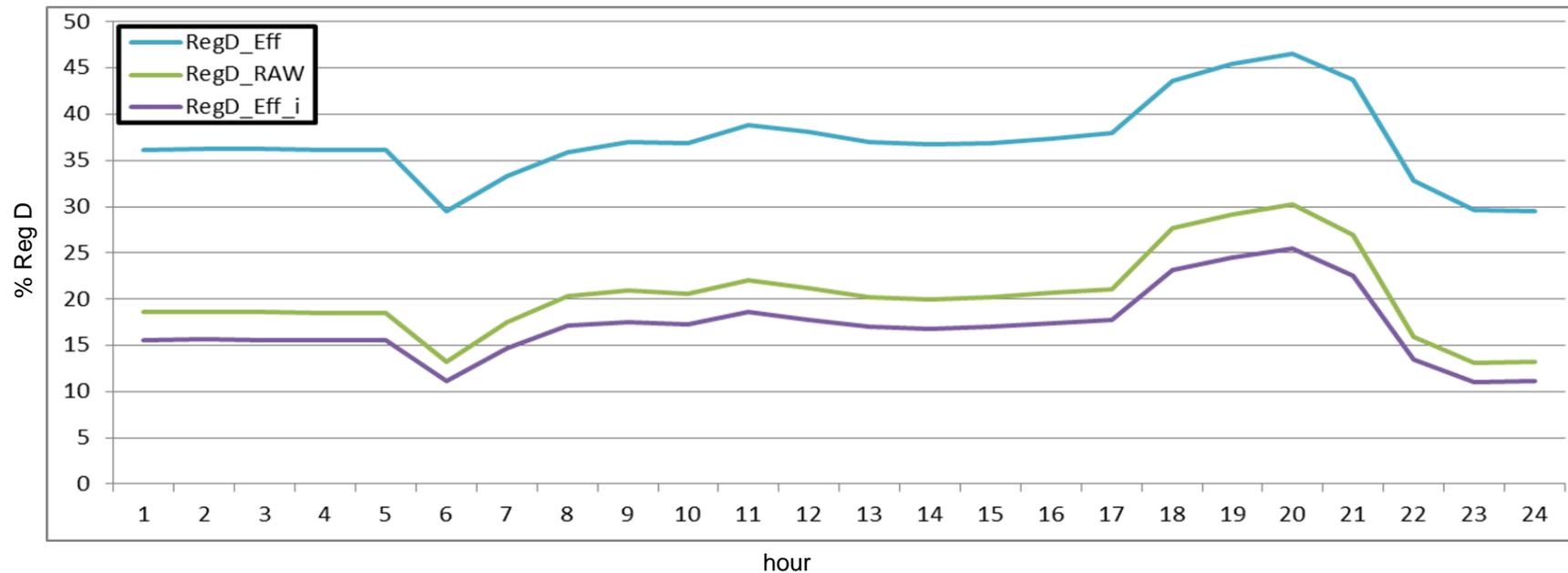




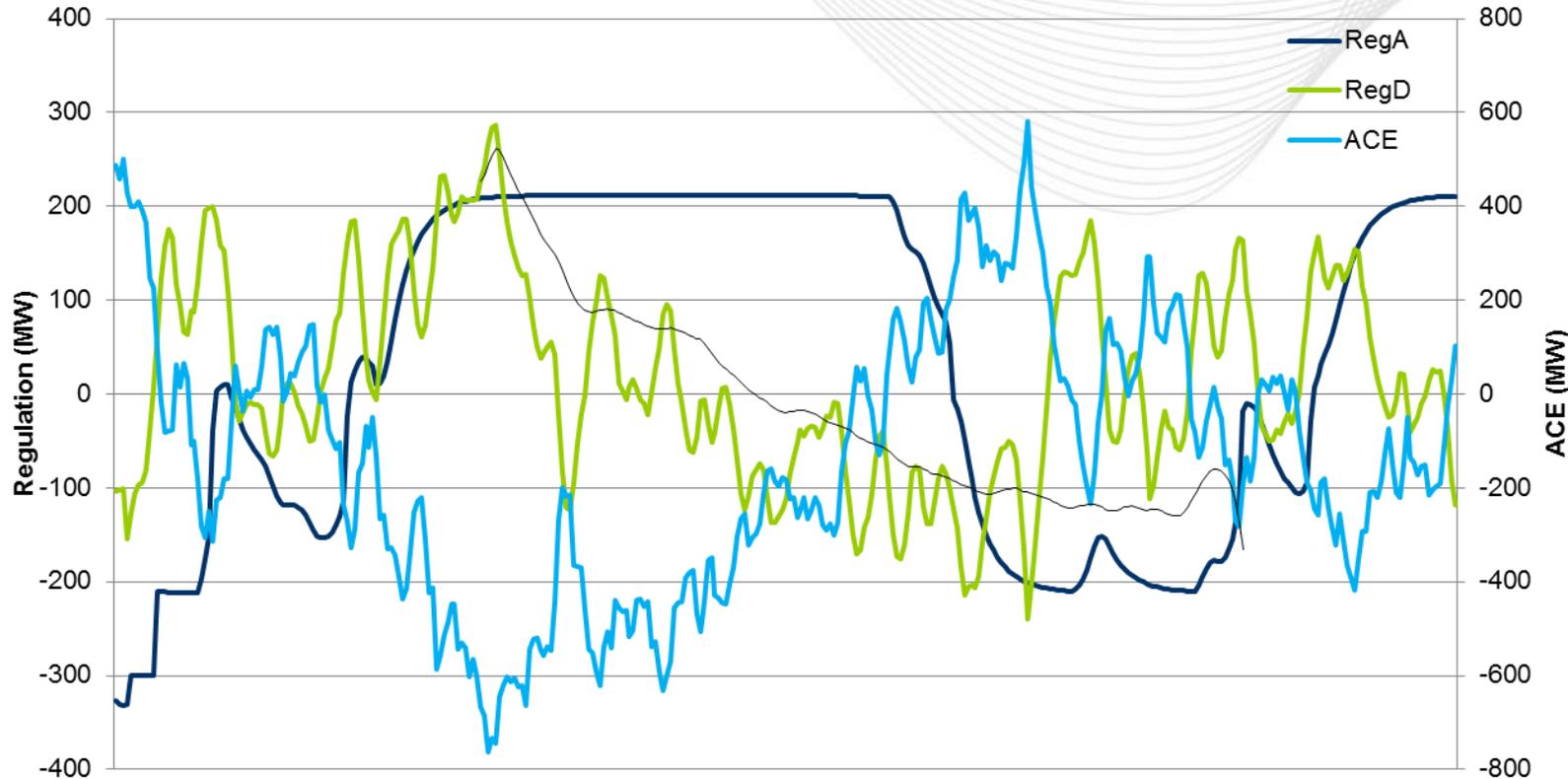
# Regulation Education

Danielle Martini  
Engineer  
July 01, 2015

- $\text{RegD\_RAW} = \text{MW Assignment}$ 
  - *RegD signal is scaled to this MW value (+/- TREG)*
- $\text{RegD\_Eff} = \text{Assigned MW} * \text{Hist. PerfScore} * \text{Benefit Factor}$ 
  - *MWs used to meet regulation requirement*
- $\text{RegD\_Eff}_i = \text{Assigned MW} * \text{Hist. PerfScore}$  –Note graph used avg. Perf Score
  - *Used when committing resources and represented as the X axis of BF curve*



Data: 6/1/14-6/1/15

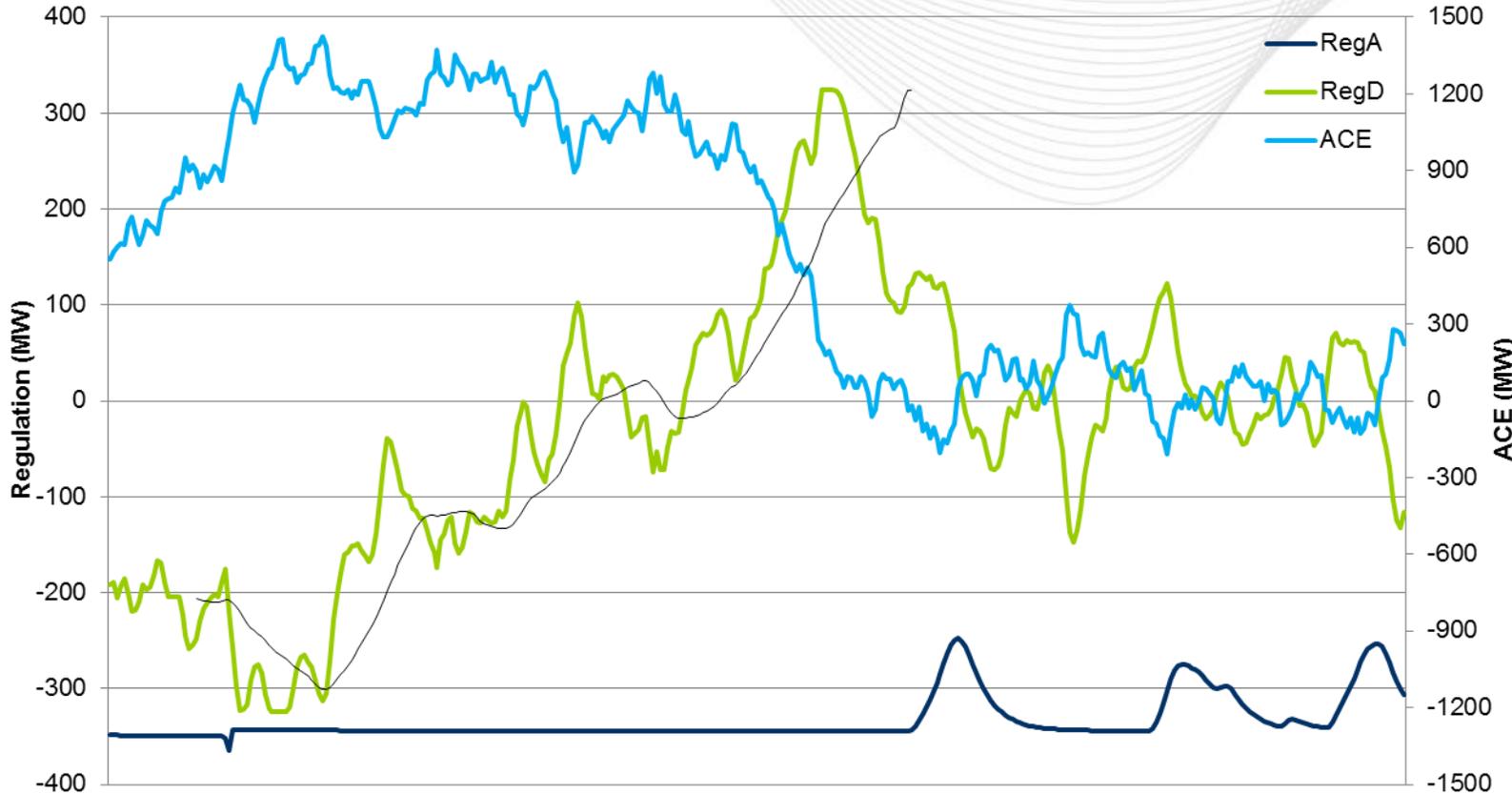


Example 1:

10/20/2014 08:00-09:00

- ACE is low (-760 to -200)
- RegA is in full raise (~210MW)
- RegD is dropping off (~286MW to ~-170MW)
- RegD % 75
- **CPS1 152.96**

Reliability challenges to managing system control can occur during times when there is a large percentage of RegD MWs providing regulation. This issue is caused by the RegD control signal moving in the opposite control direction than desired by dispatch



Example 2:  
11/12/2014 18:00-19:00

- ACE is high (-1425 to -690)
- RegA is in full lower (~340MW)
- RegD is ramping up
- (~-320MW to ~320MW)
- RegD % 45
- **CPS1 -52.12**

Reliability challenges to managing system control can occur during times when there is a large percentage of RegD MWs providing regulation. This issue is caused by the RegD control signal moving in the opposite control direction than desired by dispatch

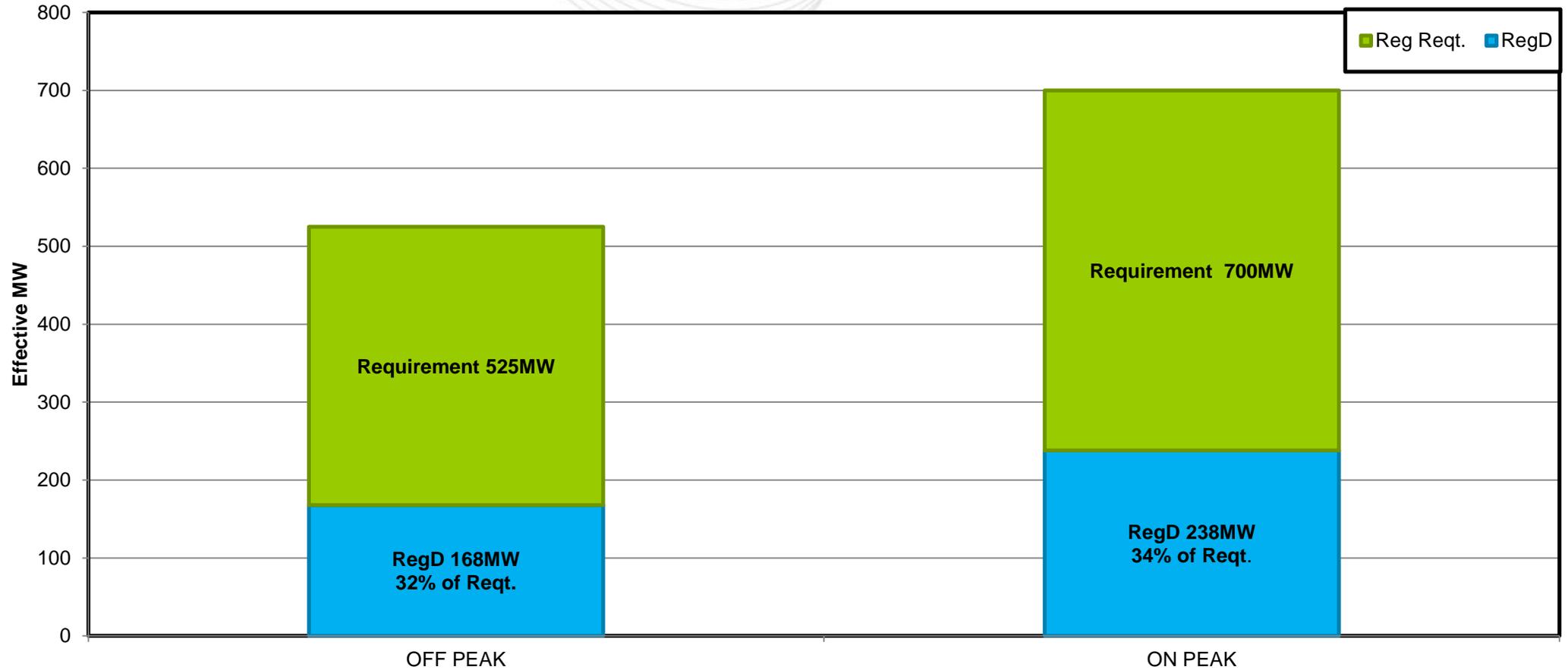
Resource MW breakdown qualified for Regulation D Market [as of 6/1/2015](#)

Resource Type	RAW_MW
Battery/Storage	136
DSR	14
Hydro	420
CT	30

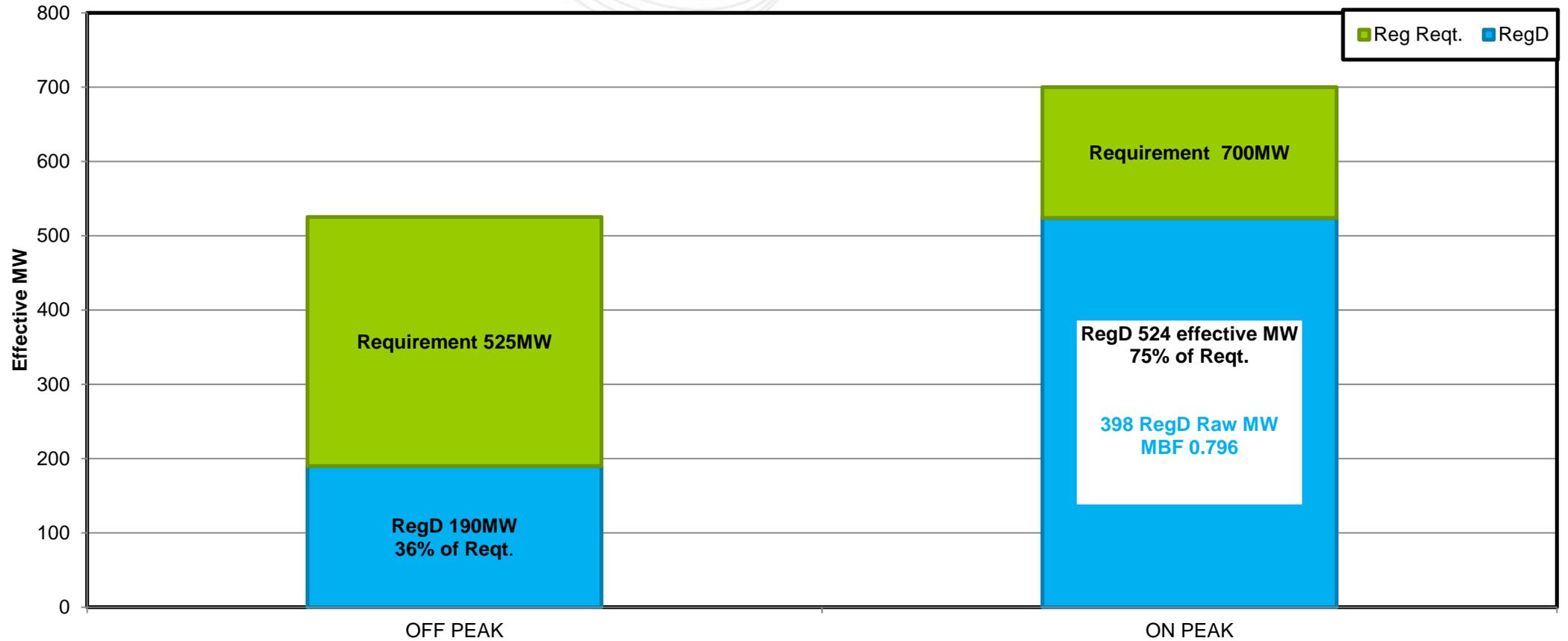
\*Note: Some Batteries also in DSR



# Average Hourly RegD Effective MW Participation in Regulation



# pjm Maximum Hourly RegD Effective MW Participation in Regulation



<b>RegD On/Off Peak</b>	<b>Average RegD %</b>	<b>Maximum RegD %</b>
On Peak	34	75
Off Peak	32	36

## RegD Effective MW Percent Occurrence 6/1/2014 - 6/1/2015

