MRC Directive to PC Regarding Uplift

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May 7, 2015

What is UPLIFT?

- Uplift = Make Whole Payment = Operating Reserves
  - This is the quantity of money paid to supply resources in order to ensure they recover their cleared offer price.
    - Demand Response
    - Import Transactions
    - Generation Resources
  - A resource's operating cost may not be fully covered by the market clearing price (LMP in this case) for a number of reasons
  - Uplift ensures that the resource is incentivized to follow PJM's instructions by ensuring that when it does it at least recovers its cleared offer price

Energy Market Uplift Senior Task Force (EMUSTF)

- EMUSTF started in July 2013
  - Main charges
    - Investigates ways to reduce uplift and enhance the current calculation methodology
    - Review the rules regarding allocation and determine if there is more effective way to allocate it
- The EMUSTF is still meeting every 3-4 weeks
- Currently reviewing solution packages for an eventual vote

	2013 Charges (Millions)						2014 Charges (Millions)					
	Day-Ahead	Balancing	Reactive Services	Synchronous Condensing	Black Start	Total	Day-Ahead	Balancing	Reactive Services	Synchronous Condensing	Black Start Services	Total
Jan	$11.1	$79.3	$23.6	$0.0	$8.5	$122.4	$35.8	$565.7	$3.8	$0.1	$4.0	$609.4
Feb	$5.1	$67.1	$17.6	$0.0	$7.0	$96.9	$9.5	$56.1	$1.0	$0.0	$0.9	$67.5
Mar	$6.7	$17.4	$14.4	$0.0	$6.8	$45.2	$5.7	$59.5	$2.7	$0.0	$2.6	$70.5
Apr	$5.7	$23.4	$13.7	$0.0	$9.2	$52.1	$4.2	$9.7	$5.3	$0.0	$2.8	$22.0
May	$12.5	$22.5	$17.2	$0.0	$8.7	$60.9	$6.4	$21.0	$5.3	$0.0	$1.8	$34.5
Jun	$10.1	$17.9	$22.1	$0.0	$8.0	$58.0	$5.3	$15.9	$4.2	$0.0	$2.1	$27.4
Jul	$8.3	$43.5	$19.6	$0.4	$5.9	$77.7	$6.7	$11.5	$2.9	$0.0	$4.4	$25.5
Aug	$4.2	$14.7	$27.8	$0.0	$7.6	$54.2	$5.8	$9.9	$1.0	$0.0	$4.1	$20.8
Sep	$12.0	$31.1	$27.5	$0.0	$7.4	$78.1	$8.0	$12.5	$1.3	$0.0	$3.9	$25.6
Oct	$2.5	$12.8	$41.7	$0.0	$6.7	$63.7	$9.5	$9.8	$0.8	$0.0	$2.6	$22.8
Nov	$2.8	$17.7	$42.7	$0.0	$6.7	$69.9	$5.6	$10.1	$0.5	$0.0	$1.4	$17.6
Dec	$5.3	$36.2	$43.5	$0.0	$4.4	$89.3	$9.0	$9.1	$0.6	$0.0	$2.3	$21.1
Total	$86.3	$383.6	$311.4	$0.4	$86.7	$868.4	$111.4	$790.8	$29.4	$0.1	$33.0	$964.7
Share	9.9%	44.2%	35.9%	0.0%	10.0%	100.0%	11.5%	82.0%	3.1%	0.0%	3.4%	100.0%

- YTD 2015 is about $193 million
  - $105 million was accrued in February

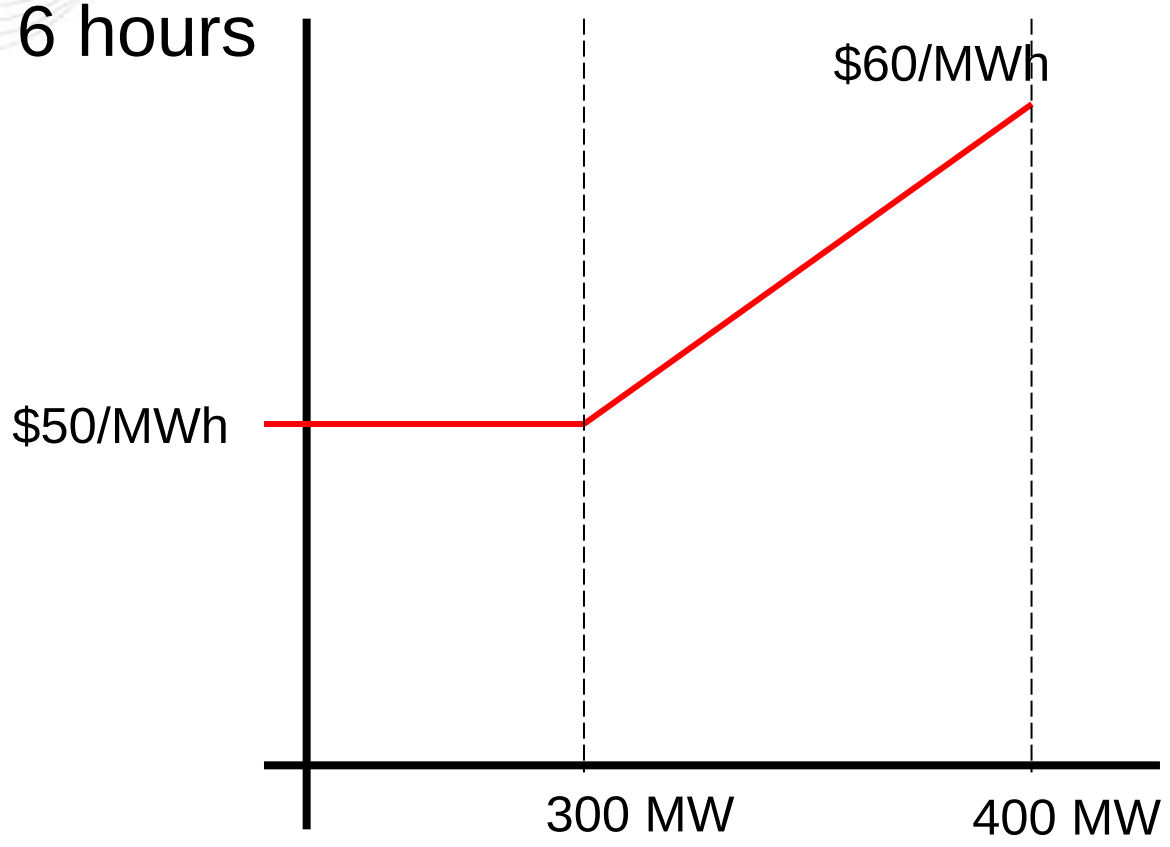
MRC Directive to PC

- From the MRC (via the EMUSTF Matrix)…
  - 2 – Objective Function: Transmission Planning
    - Add enhancement to operational performance that would allow us to capture contributors to uplift.
    - Provide transparency to triggers for operational performance and market efficiency
    - Add scenario to RTEP modeling process (for high uplift)
    - make sure that we capture the benefits and costs of reactive service devices appropriately

Uplift Examples

Generator Information

- Name = Pebble Beach 1
- Start/Notification (Lead) Time = 6 hours
- Min Run Time = 4 hours
- Min = 300 MW
- Max = 400 MW
- Offer Price =
  - 300 MW @ $50/MWh
  - 400 MW @ $60/MWh
- Startup Cost = $10,000
- No-Load = $2,000/hr



Formulas

- LMP Credits = MW * LMP
- Offer Curve = price interpolated from offer Curve at MW point
- Offer Cost = area under offer curve at MW point
- Amortized Startup = Startup cost / run-time
  - $10,000 / 4hrs = $2,500/hr
- Total Cost = Offer Cost + Amortized Startup + No-Load
- Hourly Net = LMP Credits – Total Cost
  - Negative if running at a loss for the hour

HE	10	11	12	13	14	15
MW	0	400	400	300	300	0
LMP ($/MWh)	30	65	75	20	25	35
LMP Credits ($/MWh)	0	26,000	30,000	6,000	7,500	0
Offer Curve ($/MWh)	0	60	60	50	50	0
Offer Cost ($)	0	20,500	20,500	15,000	15,000	0
Amortized Startup ($)	0	2,500	2,500	2,500	2,500	0
No Load ($/hr)	0	2,000	2,000	2,000	2,000	0
Total Cost ($)	0	25,000	25,000	19,500	19,500	0
Hourly Net ($)	0	$1,000	$5,000	**($13,500)**	**($12,000)**	0

Example Details

- Unit running in real-time at PJM direction
- No other credits accrued during operating day
- Unit following dispatch
- Unit operating at a loss for the day
  - Sum of “Hourly Net” row is **($19,500)**
  - Unit would be paid BOR in this case
- Allocation would depend on BORCA chart

HE	10	11	12	13	14	15
MW	0	320	330	390	310	0
LMP ($/MWh)	30	**52**	**53**	**59**	**51**	35
LMP Credits ($/MWh)	0	16,640	17,490	23,010	15,810	0
Offer Curve ($/MWh)	0	**52**	**53**	**59**	**51**	0
Offer Cost ($)	0	16,020	16,545	19,905	15,505	0
Amortized Startup ($)	0	2,500	2,500	2,500	2,500	0
No Load ($/hr)	0	2,000	2,000	2,000	2,000	0
Total Cost ($)	0	20,520	21,045	24,405	20,005	0
Hourly Net ($)	0	**($3,880)**	**($3,555)**	**($1,395)**	**($4,195)**	0

Example Details

- Unit running in real-time at PJM direction
- No other credits accrued during operating day
- Unit following dispatch
- Unit is marginal for its entire run period
  - LMP only covers marginal costs of the unit
  - Startup and no load require a make whole
  - Sum of “Hourly Net” row is **($13,025)**
  - Unit would be paid BOR in this case
- Allocation would depend on BORCA chart