2015 IRM Study Results

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General Considerations in Draft Report

- Some statements regarding RAAS endorsement are still tentative
- Final values are identical to preliminary values reported at 9/3 RAAS meeting

2015 IRM Study

- Study results will re-set IRM and FPR for 2016/17, 2017/18, 2018/19 and establish initial IRM for 2019/20.
- GADS data based on 2010-2014 time period.
- PJM and World load models based on 2003-2012 time period and 2015 PJM Load Forecast.
- Study assumptions were endorsed at April, 2015 PC meeting.
- Load Model selection was endorsed at July, 2015 PC meeting.

Executive Summary – Table of Results

2015 RRS Study results:

RRS Year	Delivery Year Period	Calculated IRM	Recommended IRM	Average EFORd	Average XEFORd	World Peak*	Recommended FPR	Recommended DR Factor
2015	2016 / 2017	16.45%	**16.4%**	6.57%	5.91%	99.6%	**1.0952**	**0.951**
2015	2017 / 2018	16.45%	**16.5%**	6.59%	5.93%	99.6%	**1.0959**	**0.950**
2015	2018 / 2019	16.45%	**16.5%**	6.58%	6.58%	99.6%	**1.0883**	**N/A**
2015	2019 / 2020	16.46%	**16.5%**	6.60%	6.60%	99.6%	**1.0881**	**N/A**

*** World peak: World's share of its annual peak, coincident with PJM's annual peak**

2014 RRS Study results:

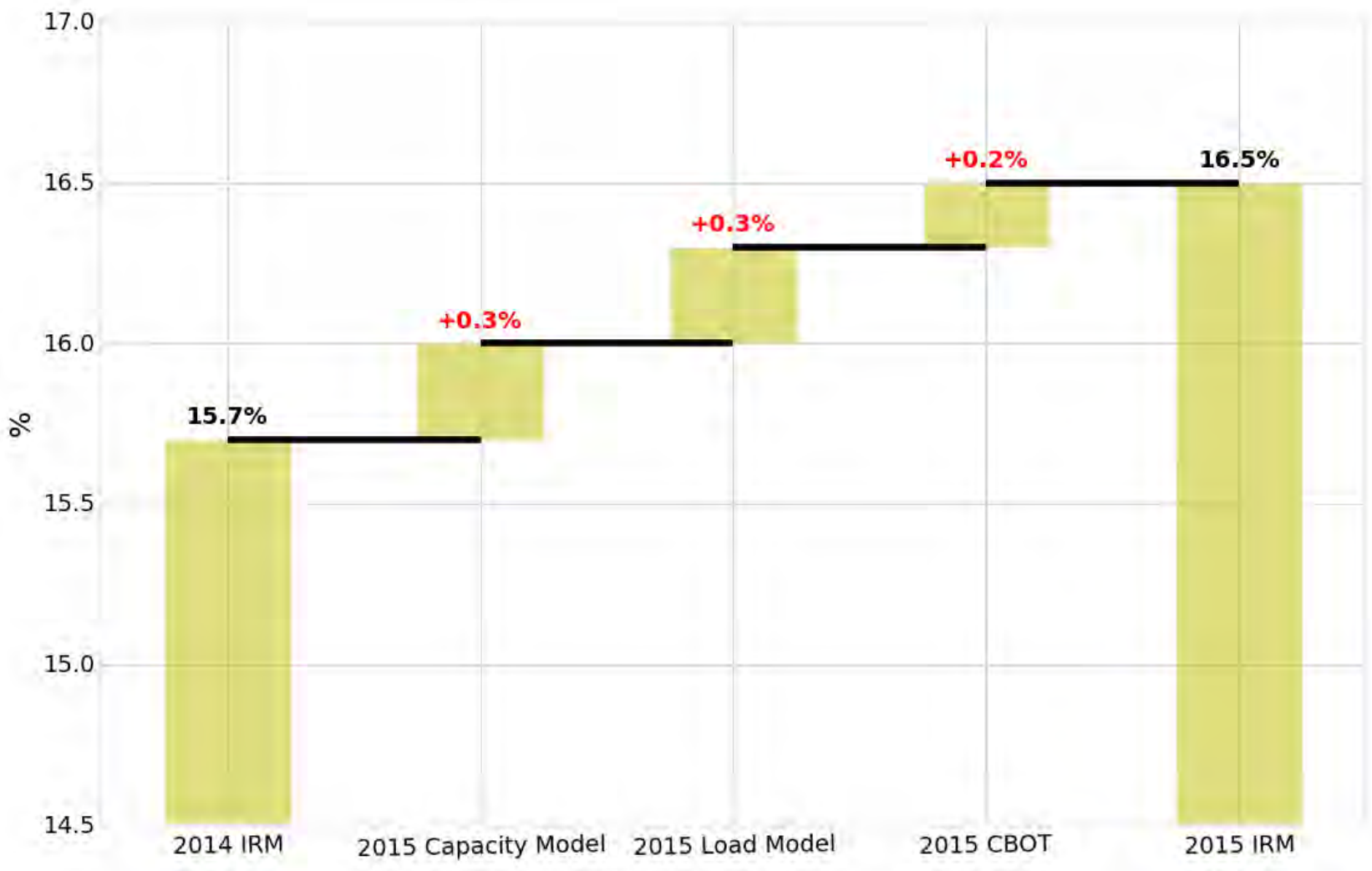
RRS Year	Delivery Year Period	Calculated IRM	Recommended IRM	Average EFORd	Average XEFORd	World Peak*	Recommended FPR	Recommended DR Factor
2014	2015 / 2016	15.58%	**15.6%**	6.19%	5.60%	96.8%	**1.0913**	**0.951**
2014	2016 / 2017	15.51%	**15.5%**	6.30%	5.66%	96.8%	**1.0896**	**0.952**
2014	2017 / 2018	15.66%	**15.7%**	6.34%	5.70%	96.8%	**1.0911**	**0.951**
2014	2018 / 2019	15.67%	**15.7%**	6.35%	6.35%	96.8%	**1.0835**	**N/A**

*** World peak: World's share of its annual peak, coincident with PJM's annual peak**

FPR = (1+IRM) * (1-XEFORd)

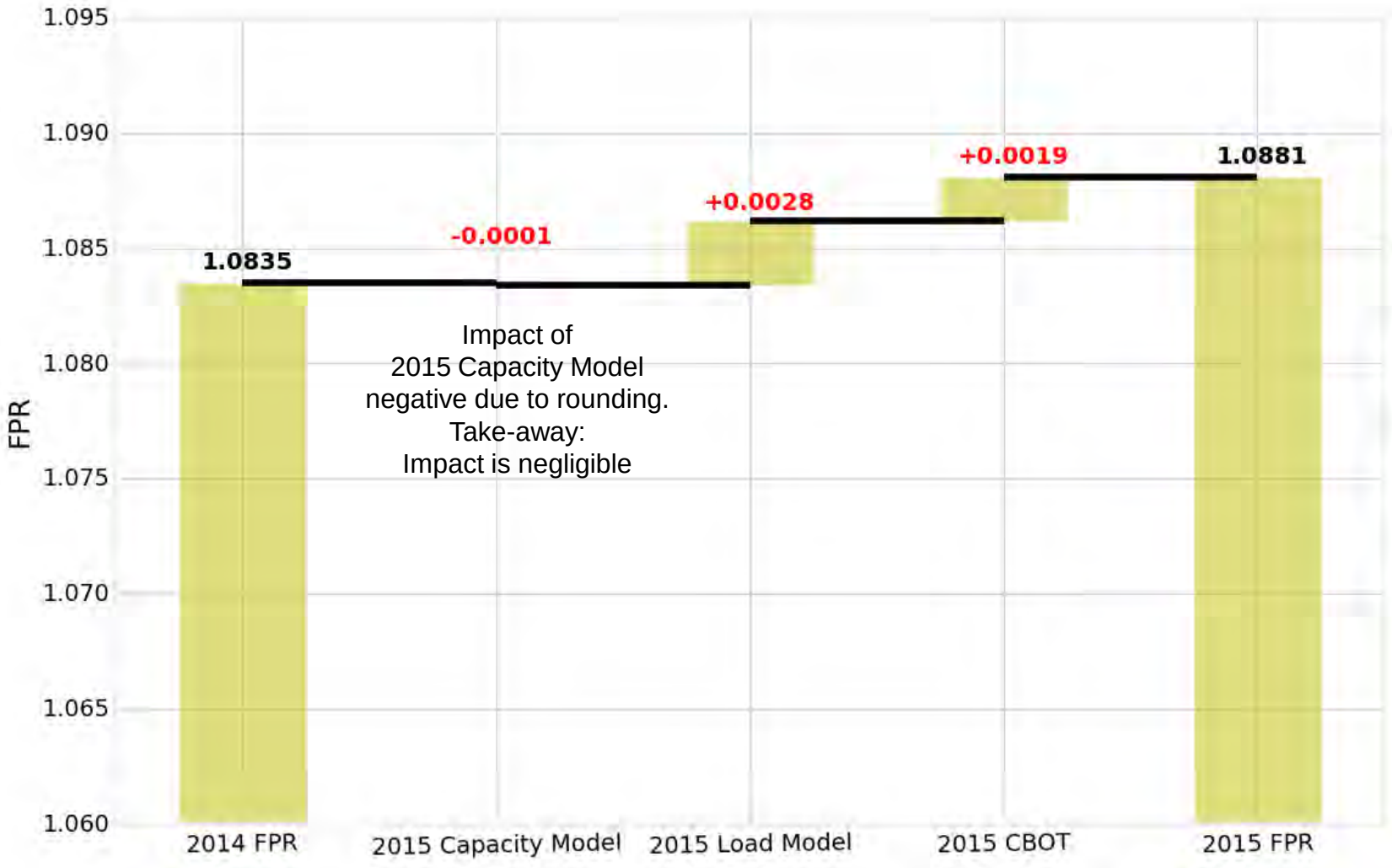
2015 IRM – Waterfall chart

CBOT:
Capacity Benefit
of Ties



2015 FPR – Waterfall chart

CBOT:
Capacity Benefit of Ties



General Observations

- Implementation of Capacity Performance rules alone should not result in a lower IRM
  - IRM Studies have always assumed that generators will perform at CP standards
- The Reliability Requirement in RPM auctions uses the FPR, not the IRM
  - The FPR is largely unaffected by changes in EFORd

General Observations

- FPR is largely dependent on the PJM and World load models
  - This year's load model was endorsed by the PC in July
  - This year's load model is the best match for the CP1 distribution in the 2015 PJM Load Forecast.
  - PJM and World's annual peaks are becoming more coincident
    - This reduces the CBOT and increases the IRM and the FPR

PJM RTO			WORLD		PJM/World Coincidence
Day	Date	Hour	CP	Annual Peak	
Monday	8/10/2009	17:00	225891	226030	**0.9994**
Wednesday	7/7/2010	17:00	238299	238299	**1.0000**
Thursday	7/21/2011	17:00	244051	244081	**0.9999**
Tuesday	7/17/2012	17:00	233103	233452	**0.9985**
Thursday	7/18/2013	17:00	229493	230514	**0.9956**

Sensitivity Study Results

- PJM selected an IRM Study load model based on the CP1 curve produced by the new, proposed load forecast model
  - The load period 2005-2011 is the best match to the new CP1 curve
  - This load model produces an IRM of 16.6% for 2019/20
- PJM re-computed generator EFORd's excluding January, 2014 data.
  - PJM average 5-year average EFORd drops to 6.5% (from 6.6%)
  - The IRM drops from 16.5% to 16.4%
  - The FPR is unchanged at 1.0881

Historical FPR Values

Auction Date	Delivery Year	Auction Type	IRM	Average EFORd	FPR
March, 2014	2014/2015	3IA	16.2%	5.97%	1.0926
July, 2014	2015/2016	2IA	15.7%	5.62%	1.0920
September, 2014	2016/2017	1IA	15.7%	5.64%	1.0917
May, 2014	2017/2018	BRA	15.7%	5.65%	1.0916
March, 2015	2015/2016	3IA	15.6%	5.60%	1.0913
September, 2015	2017/2018	1IA	15.7%	5.70%	1.0911
May, 2013	2016/2017	BRA	15.6%	5.69%	1.0902
July, 2015	2016/2017	2IA	15.5%	5.66%	1.0896
March, 2013	2013/2014	3IA	15.9%	6.05%	1.0889
July, 2013	2014/2015	2IA	15.9%	6.05%	1.0889
May, 2016	***2019/2020***	***Proposed BRA***	***16.5%***	***6.60%***	***1.0881***
May, 2009	2012/2013	BRA	16.2%	6.44%	1.0872
March, 2012	2012/2013	3IA	15.6%	5.98%	1.0869
september, 2012	2014/2015	1IA	15.4%	5.89%	1.0860
July, 2012	2013/2014	2IA	15.4%	5.90%	1.0859
May, 2012	2015/2016	BRA	15.4%	5.90%	1.0859
September, 2013	2015/2016	1IA	15.3%	5.91%	1.0849
August, 2015	2018/2019	BRA	15.7%	6.35%	1.0835
February, 2008	2010/2011	BRA	15.5%	6.21%	1.0833
May, 2008	2011/2012	BRA	15.5%	6.21%	1.0833
July, 2011	2012/2013	2IA	15.5%	6.26%	1.0827
September, 2010	2012/2013	1IA	15.4%	6.28%	1.0815
September, 2011	2013/2014	1IA	15.3%	6.25%	1.0809
May, 2011	2014/2015	BRA	15.3%	6.25%	1.0809
May, 2010	2013/2014	BRA	15.3%	6.30%	1.0804
April, 2008	2008/2009	BRA	15.0%	6.12%	1.0796
September, 2009	2009/2010	BRA	15.0%	6.13%	1.0795
May, 2007	2007/2008	BRA	15.0%	6.17%	1.0790
				Average	**1.0860**

Winter Weekly Reserve Target

Month	% Weekly Reserves level for 1D/10 YR	LOLE (3rd Margin State)
December	22.45	6.20E-05
	22.24	3.31E-05
	23.56	4.13E-06
	27.79	0.00E+00
January	31.57	0.00E+00
	23.99	1.02E-04
	28.68	0.00E+00
	30.73	0.00E+00
	34.83	0.00E+00
February	22.33	7.85E-05
	27.06	0.00E+00
	31.52	0.00E+00
	24.86	2.48E-05
Average Weekly Reserves	**27.0**	

- Winter 15/16
- Target = 27%
- Identical to Winter 14/15
- Analysis is run in GE-MARS

Report Changes/Additions/Deletions

- Results table in Executive Summary changed to include information about PJM-World diversity (World Reserve Margin column was dropped)
- Results table in Executive Summary includes impact of Capacity Performance on reported parameters (elimination of OMC events and DR Factor beginning in 2018/19 DY)
- A bullet was added to the Executive Summary describing the reasons for the FPR increase (compared to last year's FPR)
- Sensitivity 25 - PJM Capacity Model built excluding outages from January 2014 (Polar Vortex month) was added

Next Steps

- PC meeting on October 8
  - Review IRM Study Report and vote on recommendation to MRC
- MRC meeting on October 22
  - Review IRM Study Report and vote on recommendation to MC
- MC meeting on November 19
  - Vote on recommendation to PJM Board
- December/January
  - PJM Board approval of IRM, FPR and DR Factor for 2016/17, 2017/18, 2018/19 and 2019/20.

Requested RAAS Actions

- Endorsement of IRM, FPR and DR Factor for Delivery Years 2016/17 – 2019/20 as indicated on slide 4.
- Endorsement of Winter Weekly Reserve Target Value of 27% for 2015/2016 winter operating period as indicated on slide 11.
- Comments on RRS Report.