



# 2022 Reserve Requirement Study (RRS) Results

Patricio Rocha Garrido  
Resource Adequacy Planning  
Planning Committee  
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# 2022 RRS Results vs 2021 RRS Results

## 2022 RRS Study results:

RRS Year	Delivery Year Period	Calculated IRM	Recommended IRM	Average EFORd	Recommended FPR*
2022	2023 / 2024	14.87%	<b>14.9%</b>	4.87%	<b>1.0930</b>
2022	2024 / 2025	14.75%	<b>14.8%</b>	4.83%	<b>1.0926</b>
2022	2025 / 2026	14.72%	<b>14.7%</b>	4.81%	<b>1.0918</b>
2022	2026 / 2027	14.70%	<b>14.7%</b>	4.81%	<b>1.0918</b>

## 2021 RRS Study results:

RRS Year	Delivery Year Period	Calculated IRM	Recommended IRM	Average EFORd	Recommended FPR*
2021	2022 / 2023	14.93%	<b>14.9%</b>	5.08%	<b>1.0906</b>
2021	2023 / 2024	14.76%	<b>14.8%</b>	5.04%	<b>1.0901</b>
2021	2024 / 2025	14.68%	<b>14.7%</b>	5.02%	<b>1.0894</b>
2021	2025 / 2026	14.66%	<b>14.7%</b>	5.02%	<b>1.0894</b>

\* FPR = (1 + IRM)\*(1 - Average EFORd)

- The slight increase in the FPR is driven by a lower Capacity Benefit of Ties (CBOT, the emergency imports available from the World into PJM) in this year's study relative to last year's study, which more than offsets the downward pressure on the FPR exerted by the 2022 Load Model. The 2022 Capacity Model, relative to the 2021 Capacity Model, has no impact on the FPR.
- The 14.7% IRM for 2026/2027 calculated in this year's study is identical to the IRM computed for 2025/2026 in last year's study. This identical IRM result is obtained because the upward pressure exerted by the lower 2022 CBOT is exactly offset by the downward pressures exerted by the 2022 Load and Capacity Models.



# 2022/23 Winter Weekly Reserve Targets

Month	% Available Reserves	WWRT (Max Monthly % Available Reserves)
December	17.58%	21%
	20.84%	
	20.76%	
	9.83%	
January	23.79%	27%
	12.85%	
	18.58%	
	26.24%	
February	17.07%	23%
	22.70%	
	18.73%	
	13.73%	

Last year's values were:

December: 24%  
 January: 27%  
 February: 21%

- For FPR and IRM
  - Oct-Nov, MRC and MC: review and vote on FPR and IRM
  - Dec, PJM Board: final approval of FPR and IRM
  
- For WWRT
  - Oct, OC: first read of WWRT
  - Nov, OC: vote on WWRT

- Endorsement of the Recommended FPR and IRM values in the table below

RRS Year	Delivery Year Period	Calculated IRM	Recommended IRM	Average EFORd	Recommended FPR*
2022	2023 / 2024	14.87%	<b>14.9%</b>	4.87%	<b>1.0930</b>
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- Endorsement of the WWRT values for 2022/23 as shown below

Month	WWRT
December 2022	21%
January 2023	27%
February 2023	23%

SME/Presenter:

Patricio Rocha-Garrido

[Patricio.Rocha-Garrido@pjm.com](mailto:Patricio.Rocha-Garrido@pjm.com)

**2022 Reserve Requirement Study**



**Member Hotline**

(610) 666 – 8980

(866) 400 – 8980

[custsvc@pjm.com](mailto:custsvc@pjm.com)

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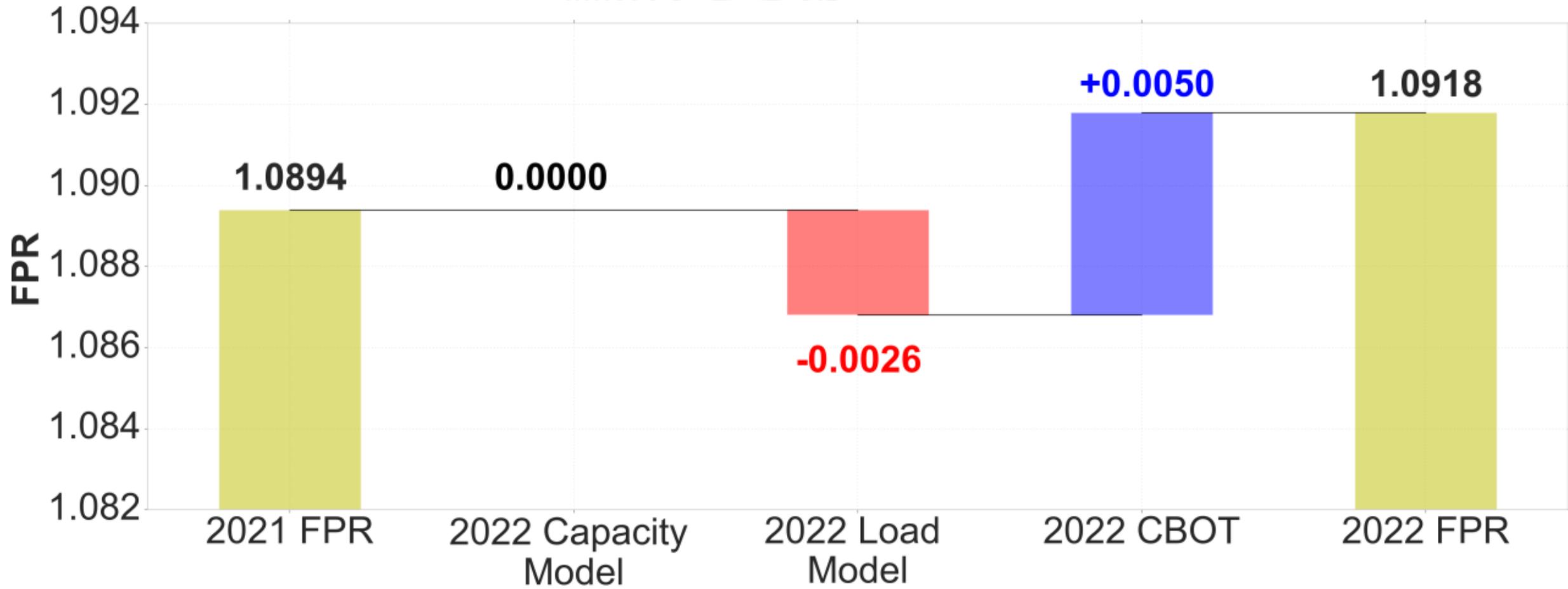
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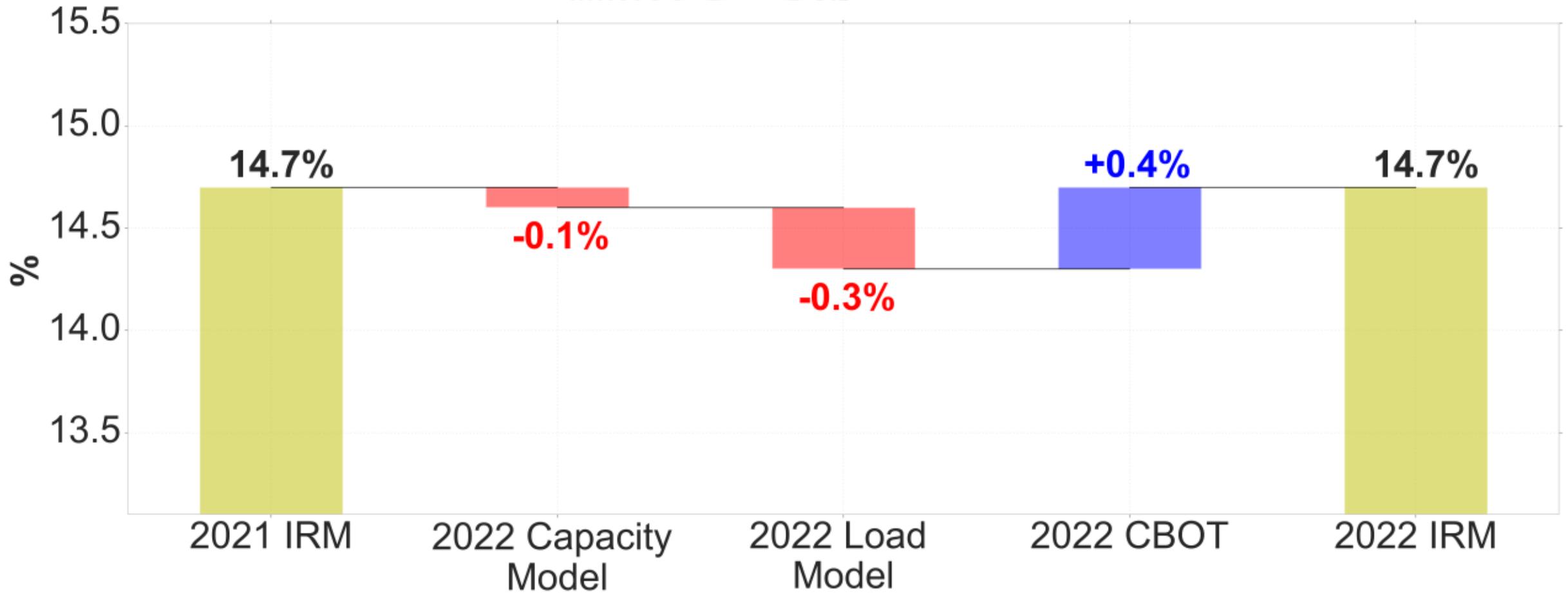
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# Appendix

- Study results will re-set the FPR and IRM for 2023/24, 2024/25, 2025/26 and establish initial IRM and FPR for 2026/27.
  - The Study also sets the Winter Weekly Reserve Target (WWRT) for Winter 2022/2023
- Capacity model built with GADS data from 2017-2021 time period for all weeks of the year except the winter peak week.
  - For the winter peak week, the capacity model is created using historical actual RTO-aggregate outage data from time period DY 2007/08 – DY 2021/22 (in addition, data from DY 2013/14 was dropped and replaced with data from DY 2014/15)
- PJM and World load models based on 2002-2012 time period and 2022 PJM Load Forecast.
- Study assumptions were endorsed at June, 2022 PC meeting.
- Load Model selection was endorsed at August, 2022 PC meeting.





- The 2022 Load Model, relative to the 2021 Load Model, puts downward pressure on both the FPR and the IRM
  - Variability of the annual peak load distribution is less in 2022 RRS than in 2021 RRS
- The 2022 Capacity Benefit of Ties (CBOT), relative to the 2021 CBOT, puts upward pressure on both the FPR and the IRM
  - The CBOT decreased to 1.0% (2022 RRS) from 1.4% (2021 RRS).
  - The decrease is driven by a higher PJM peak load at the time of the World's peak (96.7% of the annual peak in 2022 while in 2021 it was 92.1%)
- The 2022 Capacity Model, relative to the 2021 Capacity Model, puts downward pressure on the IRM.
  - The Average EEFORd in the 2022 RRS (for DY 2026) is 5.70% whereas in the 2021 RRS (for DY 2025) was 5.80 %

- **Background**
  - WWRT is supplied to the PJM Operations Department so that it can be used to coordinate planned outages scheduling during the upcoming winter period
- **Objective**
  - Cover against uncertainties associated with load and forced outages during the winter months so that the calculated winter LOLE is practically zero

- Procedure
  - Step 1: Set up an IRM case with total LOLE = 0.1 days/year.
  - Step 2: In addition to the required planned outage schedule, simulate additional planned outages during each week of the three winter months until the annual LOLE is worse than 0.1 days/year.
  - Step 3: Calculate the available reserves in each of the winter weeks as a percentage of the corresponding monthly peak.
  - Step 4: The WWRT for each month is the highest weekly reserve percentage (rounded up to the next integer value).