# 2020 Reserve Requirement Study (RRS) Assessment Results

Patricio Rocha Garrido
Resource Adequacy Planning
RAAS
October 2, 2020

# Acronyms

**IRM** – Installed Reserve Margin

**RRS** – Reliability Requirement Study

**EFORd** – Effective Forced Outage Rate on Demand

**DY** – Delivery Year

**BRA** – Base Residual Auction

**FPR** – Forecast Pool Requirement (IRM converted to units of unforced capacity for use in the RPM auctions)

**CBOT** – Capacity Benefit of Ties (reduction in IRM due to external capacity assistance)

# 2020 Reserve Requirement Study

- Study results will re-set the IRM and FPR for 2021/22, 2022/23, 2023/24 and establish initial IRM and FPR for 2024/25.
  - The Study results will be used in the 2022/23, 2023/24 and 2024/25 BRAs
- Capacity model based on GADS data from 2015-2019 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 2019/20.
- PJM and World load models based on 2002-2014 time period and 2020 PJM Load Forecast (released in January).
- Study assumptions were endorsed at June, 2020 PC meeting.
- Load Model selection was endorsed at July, 2020 PC meeting.

# 2020 RRS Results vs 2019 RRS Results

2020 RRS Study results:

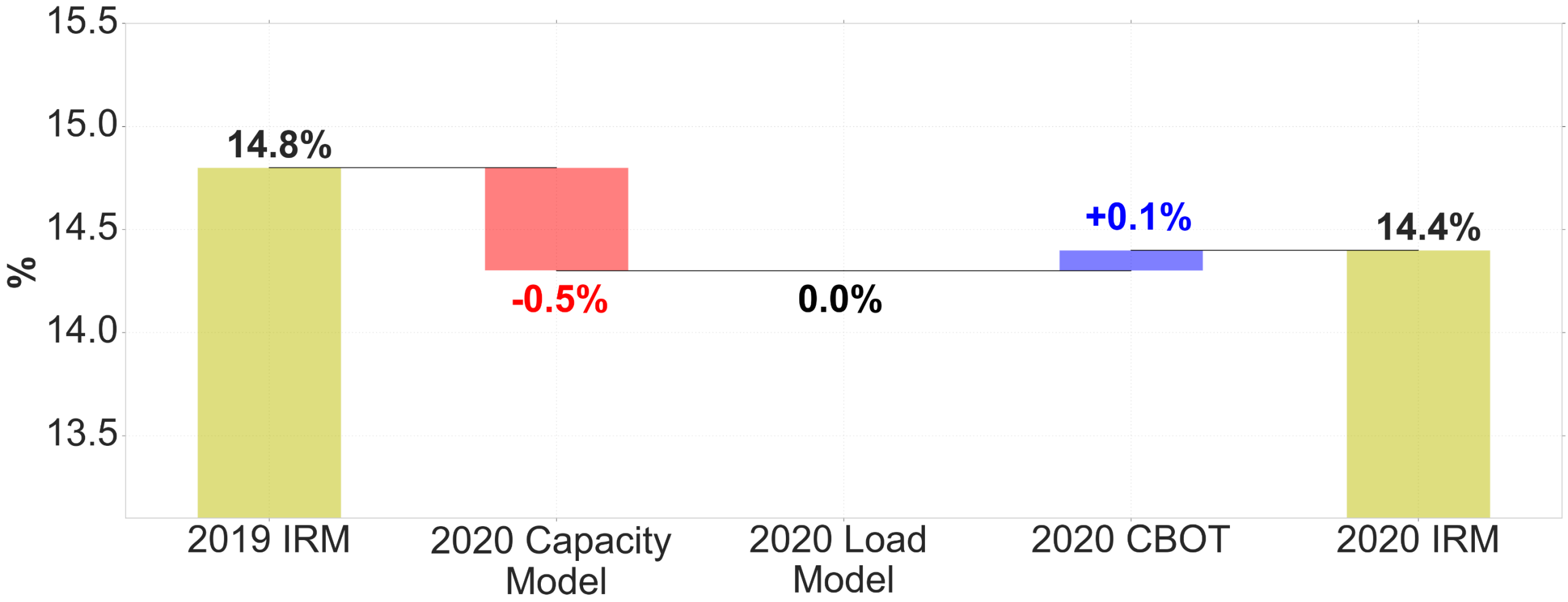
| RRS Year | Delivery Year Period | Calculated IRM | Recommended IRM | Average EFORd | Recommended FPR* |
|---|---|---|---|---|---|
| 2020 | 2021 / 2022 | 14.73% | **14.7%** | 5.22% | **1.0871** |
| 2020 | 2022 / 2023 | 14.51% | **14.5%** | 5.08% | **1.0868** |
| 2020 | 2023 / 2024 | 14.42% | **14.4%** | 5.04% | **1.0863** |
| 2020 | 2024 / 2025 | 14.39% | **14.4%** | 5.03% | **1.0865** |

2019 RRS Study results:

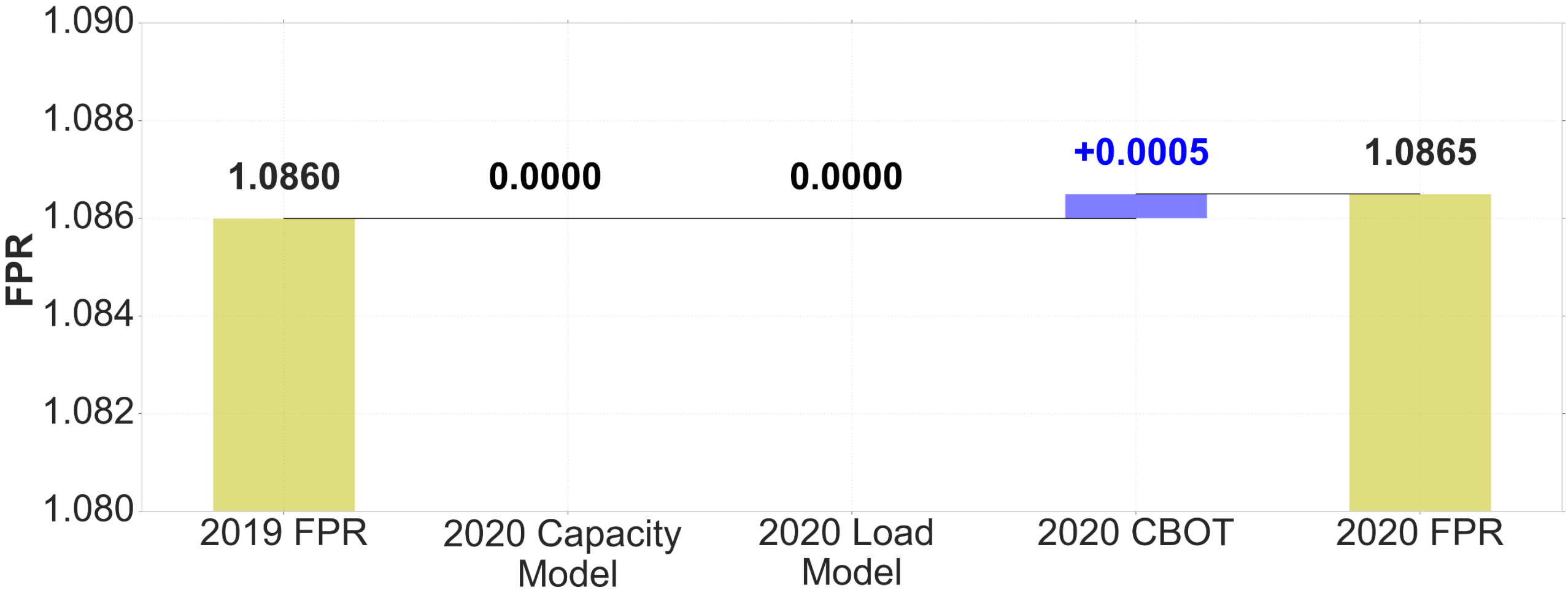
| RRS Year | Delivery Year Period | Calculated IRM | Recommended IRM | Average EFORd | Recommended FPR* |
|---|---|---|---|---|---|
| 2019 | 2020 / 2021 | 15.46% | **15.5%** | 5.78% | **1.0882** |
| 2019 | 2021 / 2022 | 15.14% | **15.1%** | 5.56% | **1.0870** |
| 2019 | 2022 / 2023 | 14.89% | **14.9%** | 5.42% | **1.0867** |
| 2019 | 2023 / 2024 | 14.84% | **14.8%** | 5.40% | **1.0860** |

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

# 2020 IRM – Waterfall Chart



# 2020 FPR – Waterfall Chart



# Explanation of Changes

- The 2020 Capacity Model is driving the decrease in the IRM.
  - The PJM Average EEFORd in the **2020 RRS (for DY 2024) is 5.78%**
  - The PJM Average EEFORd in the **2019 RRS (for DY 2023) was 6.03%**
  - The lower PJM Average EEFORd in the 2020 RRS is caused by a lower average EEFORd of the generation classes more heavily represented in the study (i.e. combined cycle units and gas turbines).
- The 2020 Capacity Benefit of Ties (CBOT) puts upward pressure on both the IRM and the FPR
  - The CBOT decreased from **1.6% (2019 RRS) to 1.5% (2020 RRS)**

# Next Steps

- October - PC, MRC and MC: Distribution of final report and **request for endorsement of recommended IRM and FPR values on Slide 4.**

- December - PJM Board: Final Approval

# Winter Weekly Reserve Target (WWRT)

- Background
  - WWRT is supplied to the PJM Operations Department which uses it to coordinate planned generator maintenance scheduling during the upcoming winter period
- Objective
  - Cover against uncertainties associated with load and forced outages during the winter months so that winter LOLE is practically zero

# Winter Weekly Reserve Target (WWRT)

- Procedure
  - Step 1: Set up an IRM case with total LOLE = 0.1 days/year.
  - Step 2: In addition to the required planned maintenance schedule, simulate additional planned maintenance 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).

# 2020/21 Winter Weekly Reserve Targets

| Month | % Available Reserves | Max % Available Reserves (by Month) |
|---|---|---|
| December | 16.25% | 23% |
| | 22.99% | |
| | 18.02% | |
| | 11.02% | |
| January | 24.91% | 27% |
| | 11.78% | |
| | 18.87% | |
| | 26.69% | |
| February | 19.78% | 23% |
| | 22.03% | |
| | 16.34% | |
| | 11.75% | |

Corresponding values last year were:

December: 22%
January: 28%
February: 24%

# 2020 RRS Report – Changes / Additions / Deletions/

- No major changes or deletions
- Additions:
  - The report this year has multiple references to the main change in the assumptions for the 2020 RRS:
    - Wind and solar resources are now excluded from the 2020 RRS Capacity Model
    - Instead, their capacity value is calculated via the Effective Load Carrying Capability (ELCC) study
  - A new subsection was added to describe the relationship between the RRS and ELCC

# Requested RAAS Action

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

2020 RRS Study results:

| RRS Year | Delivery Year Period | Calculated IRM | Recommended IRM | Average EFORd | Recommended FPR* |
|---|---|---|---|---|---|
| 2020 | 2021 / 2022 | 14.73% | **14.7%** | 5.22% | **1.0871** |
| 2020 | 2022 / 2023 | 14.51% | **14.5%** | 5.08% | **1.0868** |
| 2020 | 2023 / 2024 | 14.42% | **14.4%** | 5.04% | **1.0863** |
| 2020 | 2024 / 2025 | 14.39% | **14.4%** | 5.03% | **1.0865** |

# Requested RAAS Action

- Endorsement of the Winter Weekly Reserve Target (WWRT) values for 2020/21 as shown below

| Month | WWRT |
|---|---|
| December 2020 | 23% |
| January 2021 | 27% |
| February 2021 | 23% |

# Contact


Presenter:
Patricio Rocha Garrido,

patricio.rocha-garrido@pjm.com


Reserve Requirement Study

Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com