Estimated Hours of System Operating Reserve Deficiency – Final Results

Capacity Commitment Period 2020-2021

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RESOURCE ADEQUACY

Foreword

This presentation details the final study results reflecting the Power Supply Planning Committee request to modify the modeling of the Canal 3 unit from a combined cycle to a combustion turbine unit.

Background

- Request from market participants to update the study on the estimates of hours of system operating reserve deficiency to reflect the changed system conditions
  - Last study was conducted in 2013 for the Capacity Commitment Period 2016-2017. Results were summarized in a memo to the Markets Committee.

    http://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2013/jul10112013/a12a_iso_memo_07_05_13.pdf

Background *(cont.)*

- This request was presented to the PSPC to solicit additional comments and guidance. The PSPC agreed that the study should reflect:
  - Inputs and assumptions used to develop the Installed Capacity Requirement (ICR) values for the Capacity Commitment Period 2020-2021 (FCA11)
  - A range of system installed capacity margins above and below the ICR, in 400 MW increments.
- ISO staff committed to publishing the results in a memo similar to the 2013 memo in the 4th quarter of 2016.
  - http://www.iso-ne.com/static-assets/documents/2016/07/Operating_Reserve_Deficiency_Forecast_07272016.pdf

Study Assumptions

- Resources and load assumptions consistent with those for developing the FCA11 ICR values
  http://www.iso-ne.com/static-assets/documents/2016/08/PSPC08252016_FCA11_ICR_Values_Results.pdf
- System Operating Reserve Requirements
  - 2,305 MW
    - 2,400 MW assumed in the 2013 study.
- Real-Time Demand Response (RT-DR)
  - Fully integrated in the energy & reserve markets, and dispatched prior to the declaration of a reserve deficiency.
- Real-Time Emergency Generation (RT-EG)
  - Assumed no longer available during Operating Procedure No. 4 (OP4) in this study
    - In the 2013 study for 2016-2017, 793 MW assumed available under OP4 after the declaration of a reserve deficiency.
- Tie Benefits
  - 1,950 MW assumed available under OP4 after the declaration of a reserve deficiency.

Study Approach

- Start with the ICR model, update the model to reflect the assumptions as specified in the prior slide, and calculate the expected number of hours per year in which there is insufficient resources to meet the system's load and reserve requirements
- Scale the system load up or down to achieve a target system installed capacity margin (in 400 MW increments above or below the Net ICR), calculate the expected number of hours per year in which there is insufficient resources to meet the system's load and reserve requirements
  - The purpose of scaling the load up or down is to mimic the condition of the system installed capacity margin being long or short.

Study Results – 2020/2021

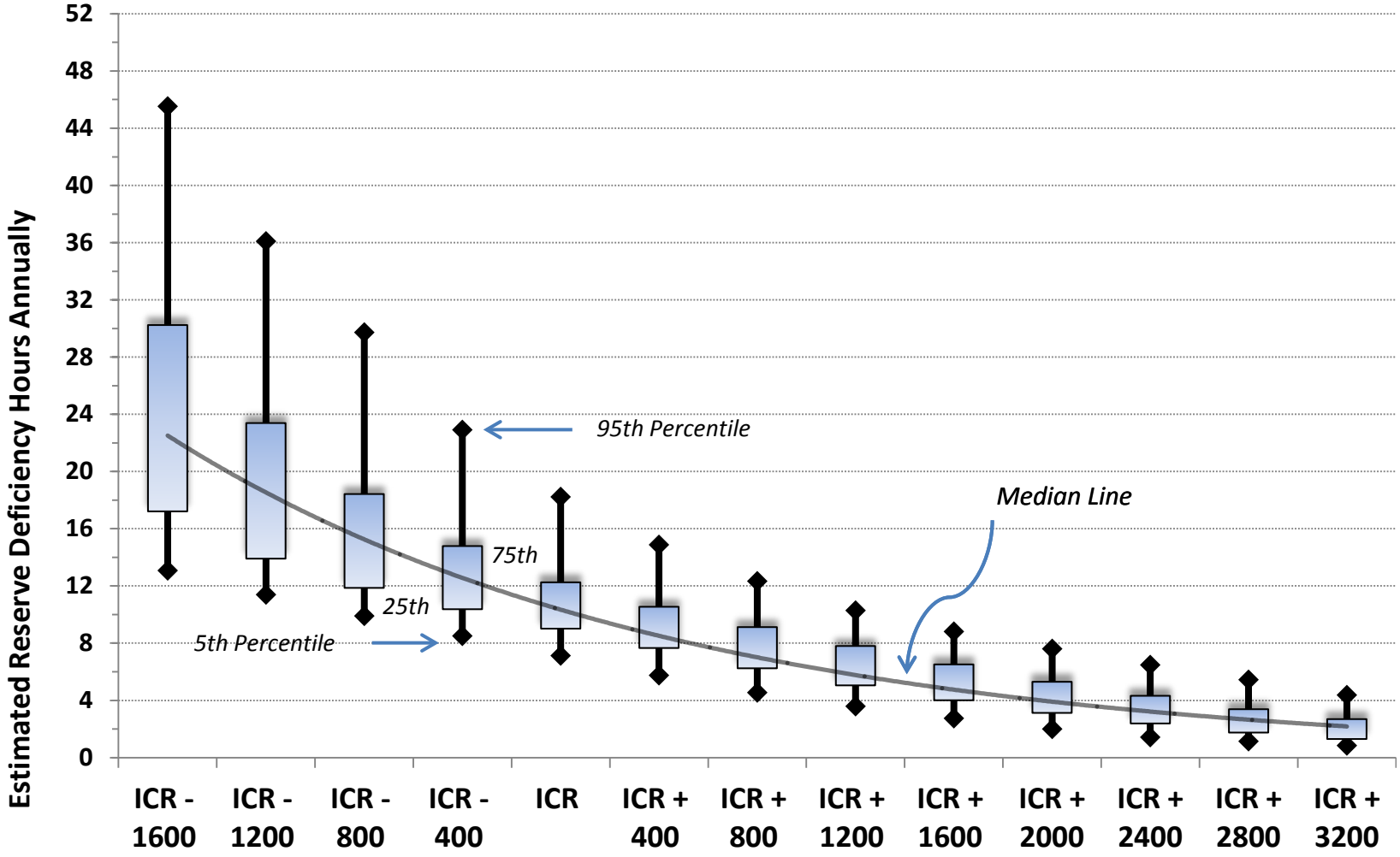
- The table in slide 7 provides the summary information regarding (a) the expected number of hours of operating reserve deficiency conditions annually, and (b) the estimated relative frequency of hours of operating reserve deficiency conditions annually.
- Entries in the column titled ‘5 / 95’ indicate the lower 5th percentile of the simulation results for the number of hours with system operating reserve deficiency conditions; entries in the ‘50 / 50’ column indicate the median hours; and entries in the ‘95 / 5’ column show the 95th percentile.
- For example, the value 0.8 in the first row and ‘5 / 95’ column means that, based on the model, there is a 1-in-20 (or 5%) chance that the annual total hours with operating reserve deficiency conditions would equal 0.8 hour or less when installed capacity equals ICR plus 3,200 MW. Similarly, the value of 4.4 in the far-right ‘95 / 5’ column means that, based on the model, there is a 19-in-20 (or 95%) chance that the total hours with operating reserve deficiency conditions would be 4.4 or less annually.

Study Final Results – 2020/2021, cont.

Estimated Annual Hours of System Operating Reserve Deficiencies

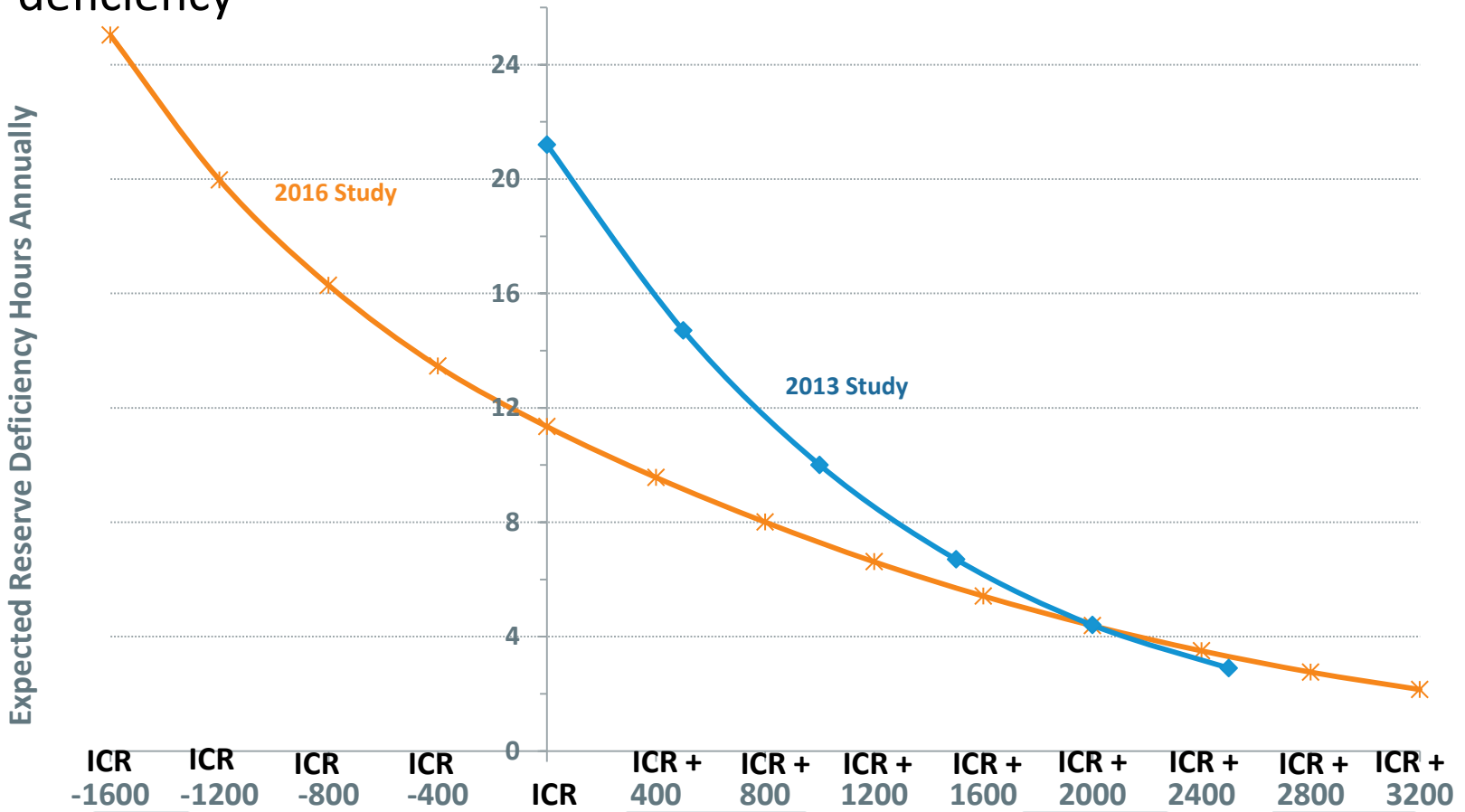
Capacity Level	Expected	5 / 95	50 / 50	95 / 5
ICR + 3200 MW	**2.1**	0.8	1.9	4.4
ICR + 2800 MW	**2.8**	1.1	2.5	5.4
ICR + 2400 MW	**3.5**	1.4	3.3	6.5
ICR + 2000 MW	**4.4**	2.0	4.1	7.6
ICR + 1600 MW	**5.4**	2.7	5.1	8.8
ICR + 1200 MW	**6.6**	3.6	6.4	10.3
ICR + 800 MW	**8.0**	4.6	7.7	12.3
ICR + 400 MW	**9.6**	5.7	9.0	14.9
ICR	**11.3**	7.1	10.4	18.2
ICR - 400 MW	**13.5**	8.5	11.9	22.9
ICR - 800 MW	**16.3**	9.9	14.3	29.7
ICR - 1200 MW	**20.0**	11.4	17.4	36.1
ICR - 1600 MW	**25.0**	13.1	22.2	45.5

Study Final Results – 2020/2021, cont.



Results – 2016 Study vs. 2013 Study

- Comparison of the expected hours of system operation reserve deficiency



Observation

- As compared with the 2013 study results for 2016-2017, the estimated annual hours of operating reserve deficiencies for 2020-2021 are generally lower.
  - Mainly caused by assumption changes relating to the RT-EG, an OP4 resource activated after a reserve deficiency:
    - 793 MW of such OP4 resources, that would be activated after the declaration of a reserve deficiency, are no longer assumed available in this study.
    - Equivalent approximately to moving these resources to non OP4 resources category. Having more non OP4 MW to meet load and reserve requirement before needing to invoke OP 4 means that the frequency needed to activate OP4 would be reduced.

Questions