

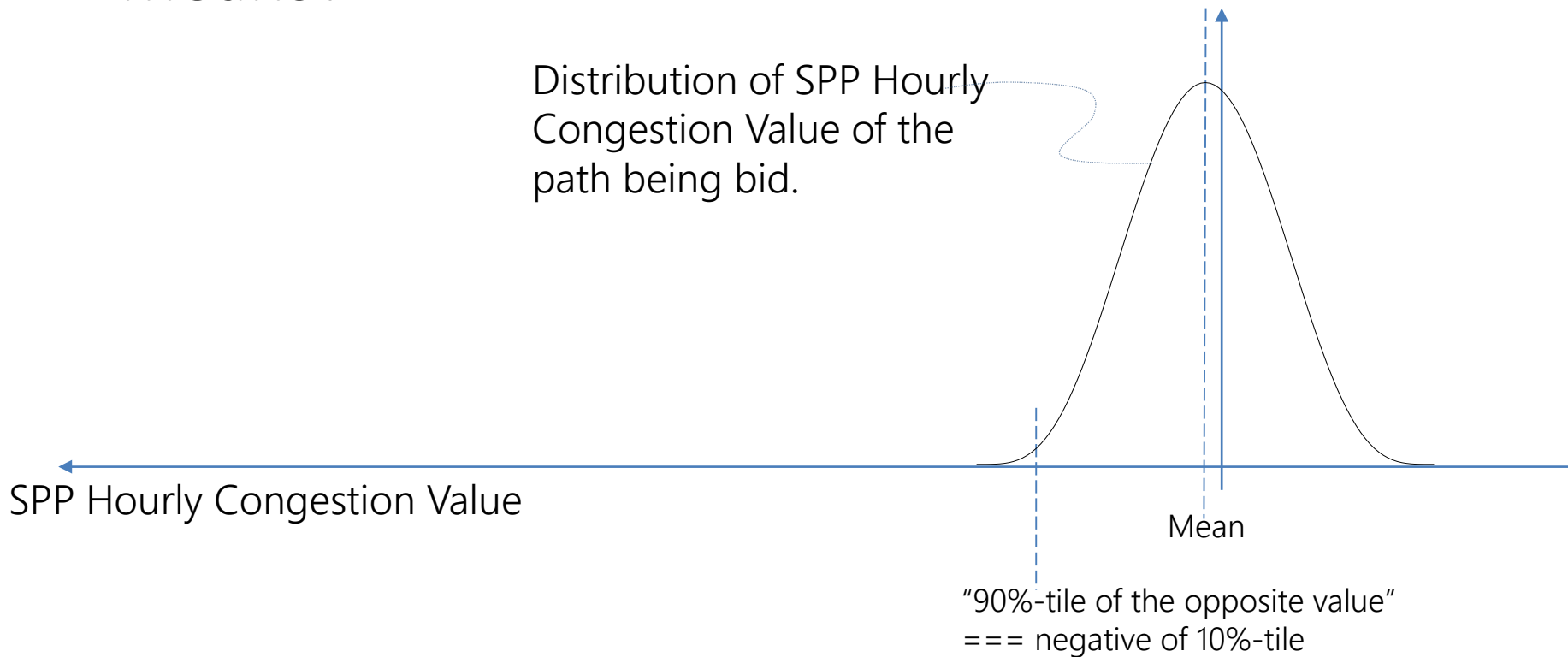


Capping/Flooring TCR Reference Prices

4/7/2016

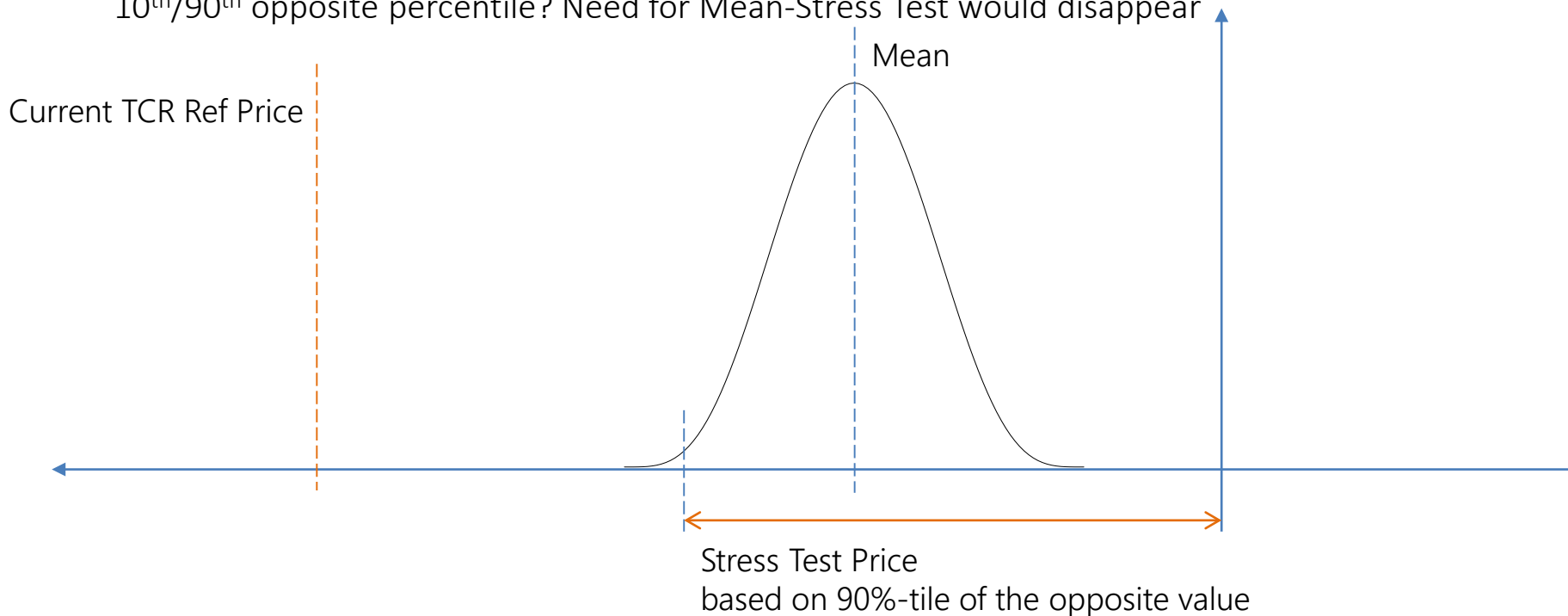
Calculation of TCR Reference Price

- Can we explain what the SPP ETCRE Segment means?



What would a cap/floor look like?

- The current method would always result in a TCR Ref Price that is more negative than the Stress Test Price
- A floor on the TCR Ref Price for negatively valued TCRs would just be a fixed percentile: 10th/90th opposite percentile? Need for Mean-Stress Test would disappear



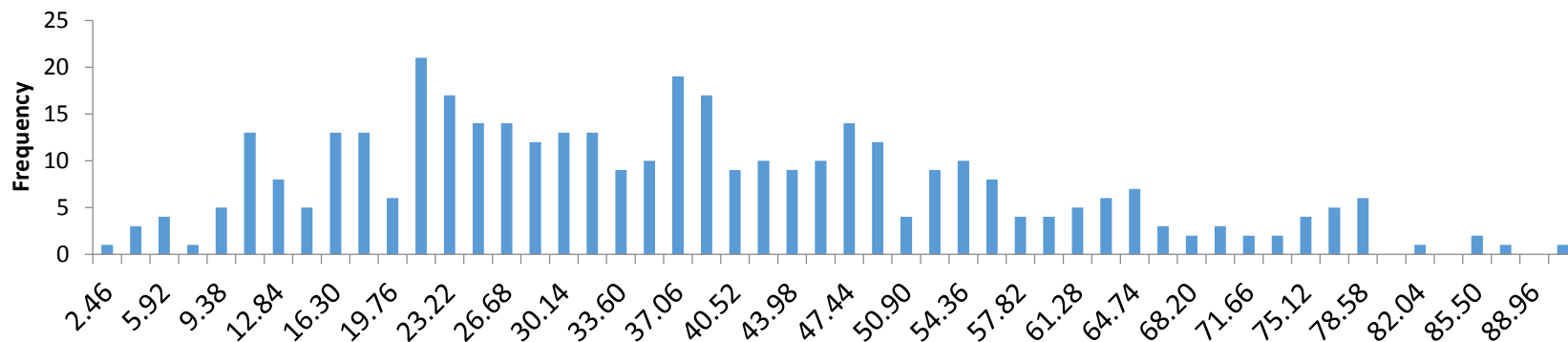
Calculation Details

- Mean: 75%(most recent year) + 25%(year prior to most recent) using historical hourly congestion prices
- Stress Test: 90th percentile opposite flow value for negative mean TCRs, 75th percentile opposite flow value for positive mean TCRs (ref price cannot exceed mean price so Stress Test Price minimum is 0)

Example: OMPA_WIND_FARM-->OKGECENTWIND Off

| Path | 2015 Mean | 2014 Mean | Resulting Mean | Stress Test Price | TCR Ref Price | TCR Ref Price w/Floor (90th %tile) |
|-------------------------------|-----------|-----------|----------------|-------------------|---------------|------------------------------------|
| OMPA_WIND_FARM-->OKGECENTWIND | -36.33 | -36.58 | -36.39 | 68.29 | -104.68 | -68.29 |
| OKGECENTWIND-->OMPA_WIND_FARM | 36.33 | 36.58 | 36.39 | 0 | 36.39 | 36.39 |

Histogram



- ❑ Potential Issue with keeping current method but with cap:
 - Not unreasonable to expect TCR to settle between \$10-80, a \$70 range
 - In this case, the stress test price is zero so distribution is not considered when assessing credit requirements

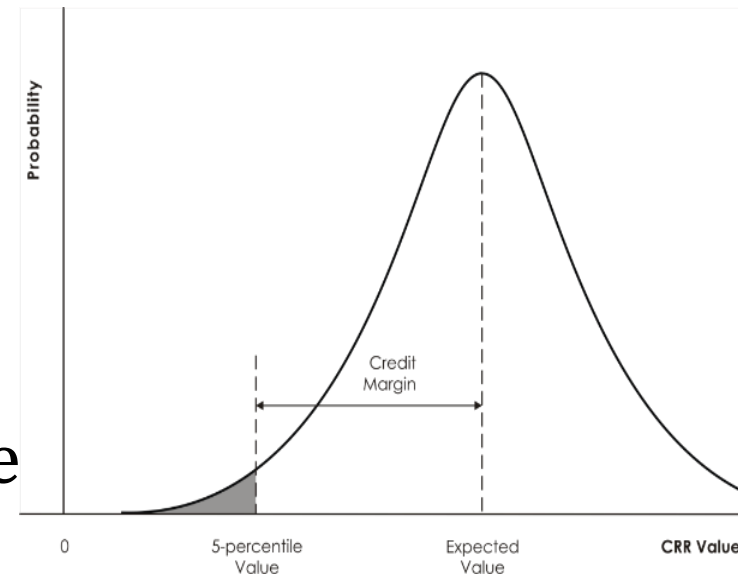
CAISO CRRs

- CAISO credit margin “using the Value-at-Risk (VaR) approach”
- CAISO credit requirement observes

- Bid price
- Plus Credit Margin

- Where:

Credit Margin in \$/MW–hour
 = Average Value – 5%–tile Value

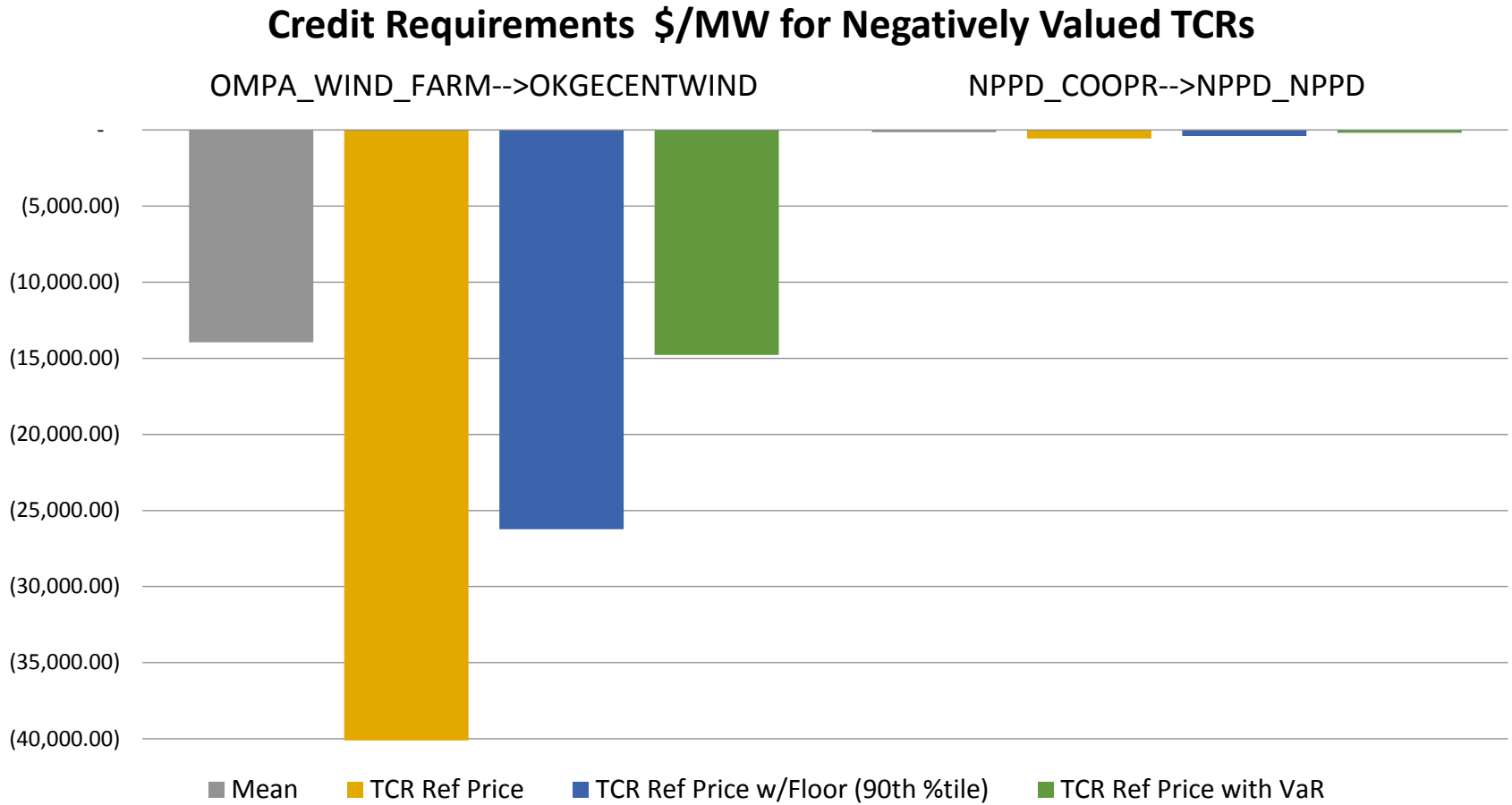


Source: CAISO BPM CRR V1 8.docx Attachment H on Pre–Auction Credit Requirement

Examples with a VaR Calculation

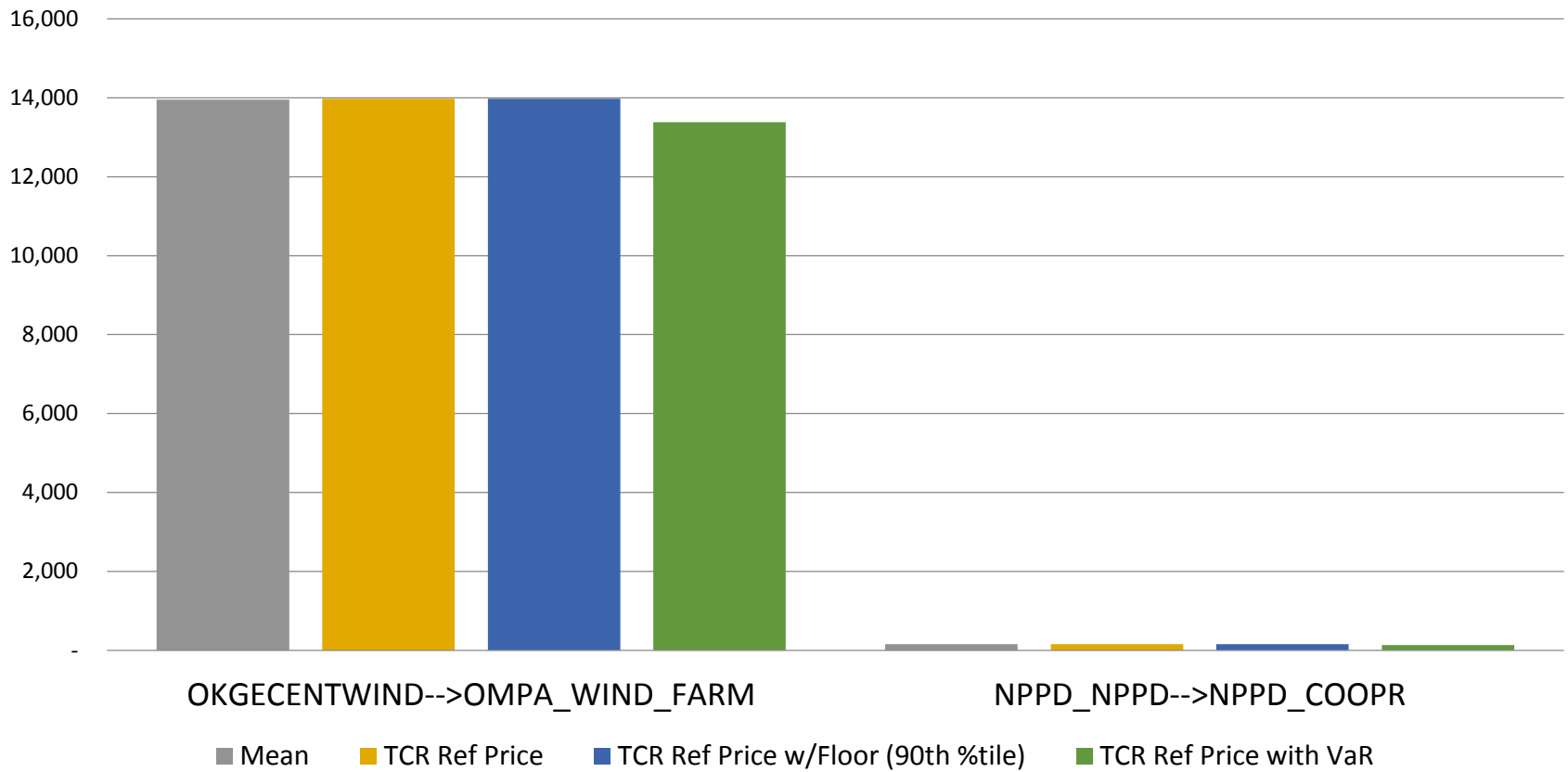
| Path | Stress Test Price | Resulting Mean | \$/MW | | | |
|-------------------------------|-------------------|----------------|-------------|---------------|------------------------------------|------------------------|
| | | | Mean | TCR Ref Price | TCR Ref Price w/Floor (90th %tile) | TCR Ref Price with VaR |
| OMPA_WIND_FARM-->OKGECENTWIND | 68.29 | -36.39 | (13,951.31) | (40,199.05) | (26,224.16) | (14,781.27) |
| OKGECENTWIND-->OMPA_WIND_FARM | 0 | 36.39 | 13,951.31 | 13,974.88 | 13,974.88 | 13,377.11 |
| NPPD_COOPR-->NPPD_NPPD | 1.58 | -0.58 | (160.73) | (564.58) | (403.85) | (184.07) |
| NPPD_NPPD-->NPPD_COOPR | 0 | 0.58 | 160.73 | 160.73 | 160.73 | 135.02 |

Examples with a VaR Calculation



Examples with a VaR Calculation

Credit Requirements \$/MW for Negatively Valued TCRs



Questions for the CPWG

- Should we explore using a VaR calculation?
- Is the Floor/Stress Test Price an appropriate way to measure TCR Ref Prices?
- Should the Stress Test Price change if the Floor method is adopted?