Wind and Solar
Effective Load Carrying Capability

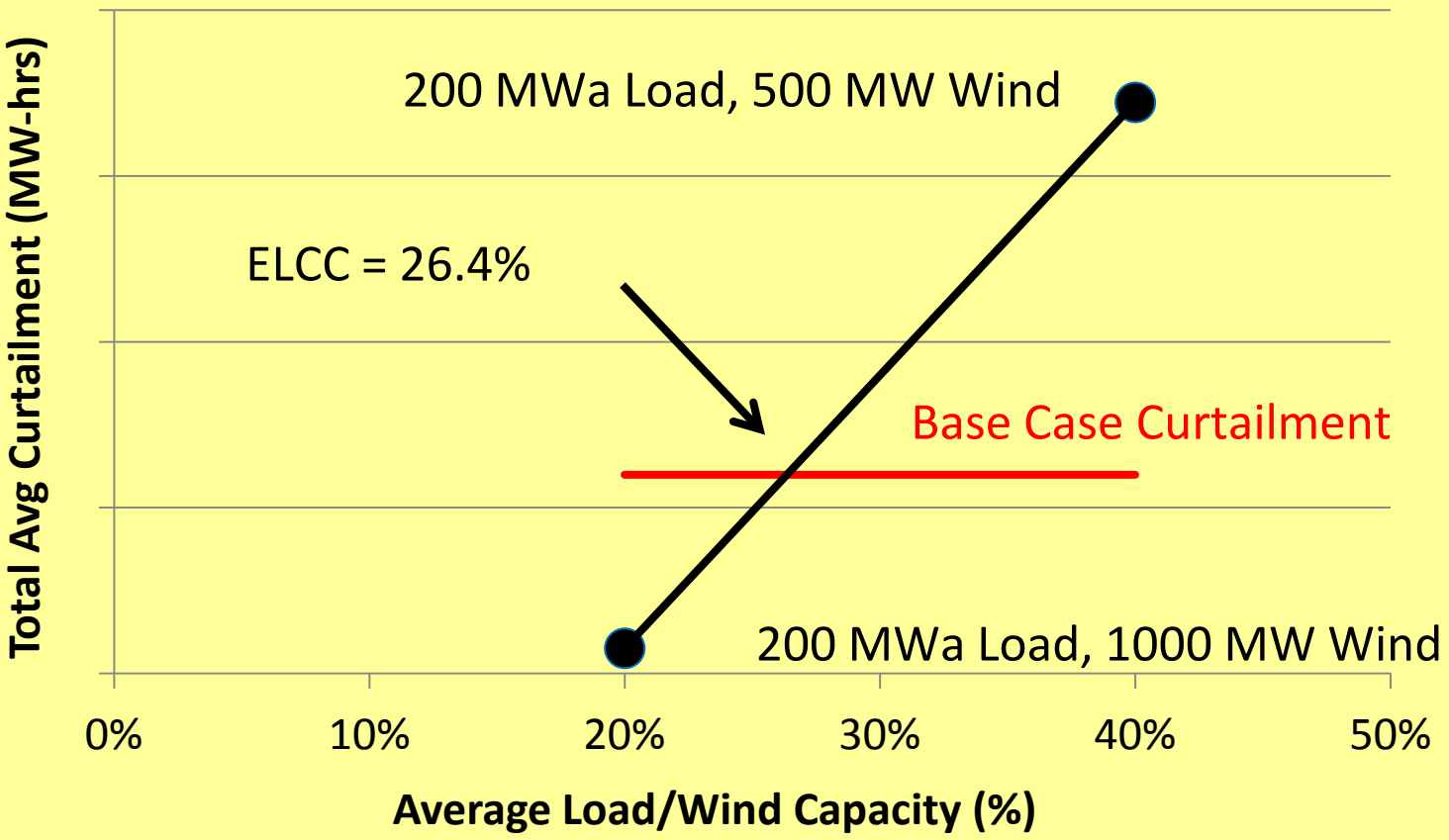
RAAC Steering Committee Meeting

March 9, 2015

Methodology to Assess Annual ELCC

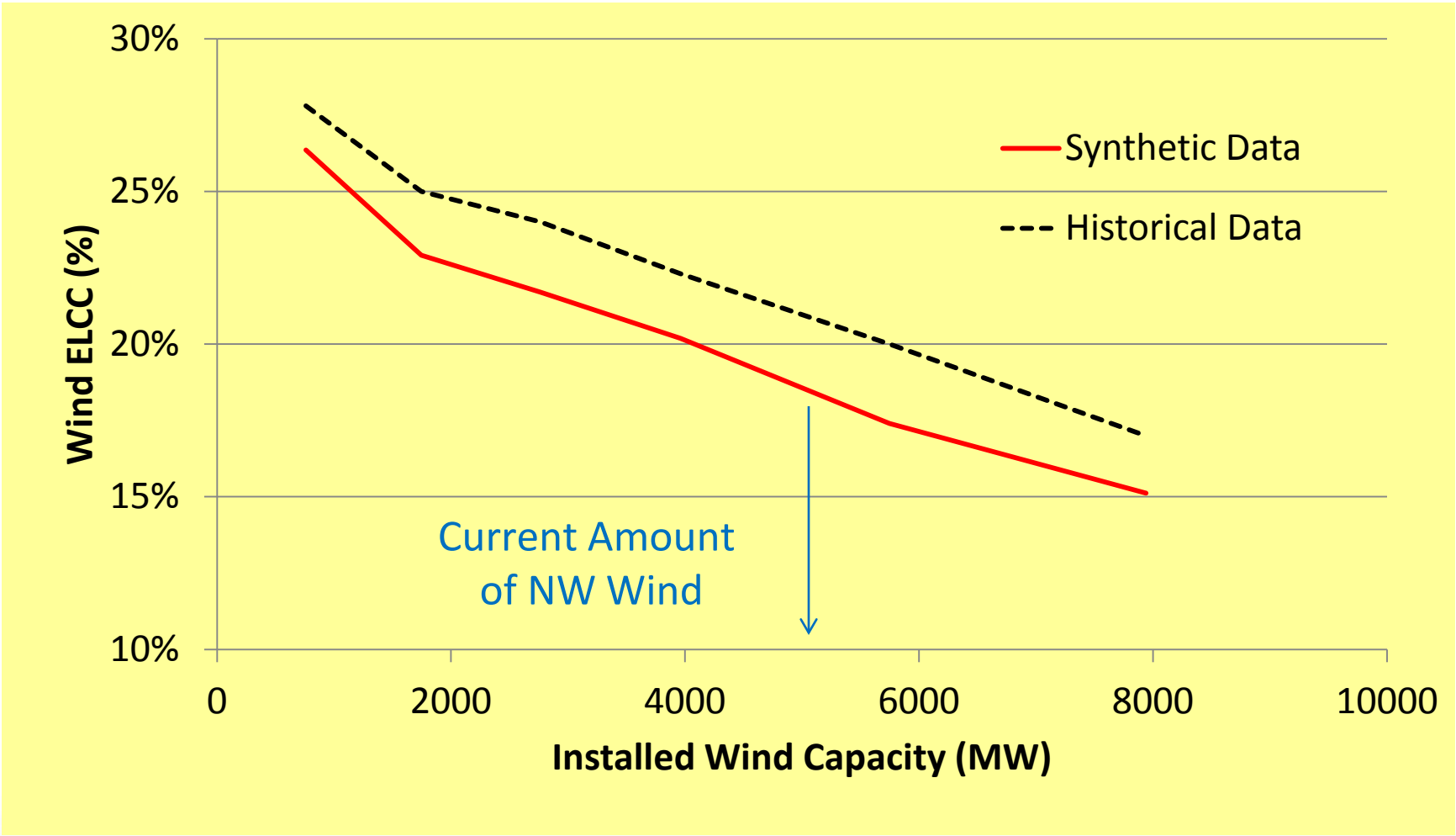
- Begin with a system with no wind
- Use Monte-Carlo simulation to assess average annual curtailment
- Add an increment of (shaped) load – curtailment will increase
- Add increments of new resource until the average curtailment equals that in the base
- ELCC = load/amount of new resource

ELCC Results (+200 MWa load)



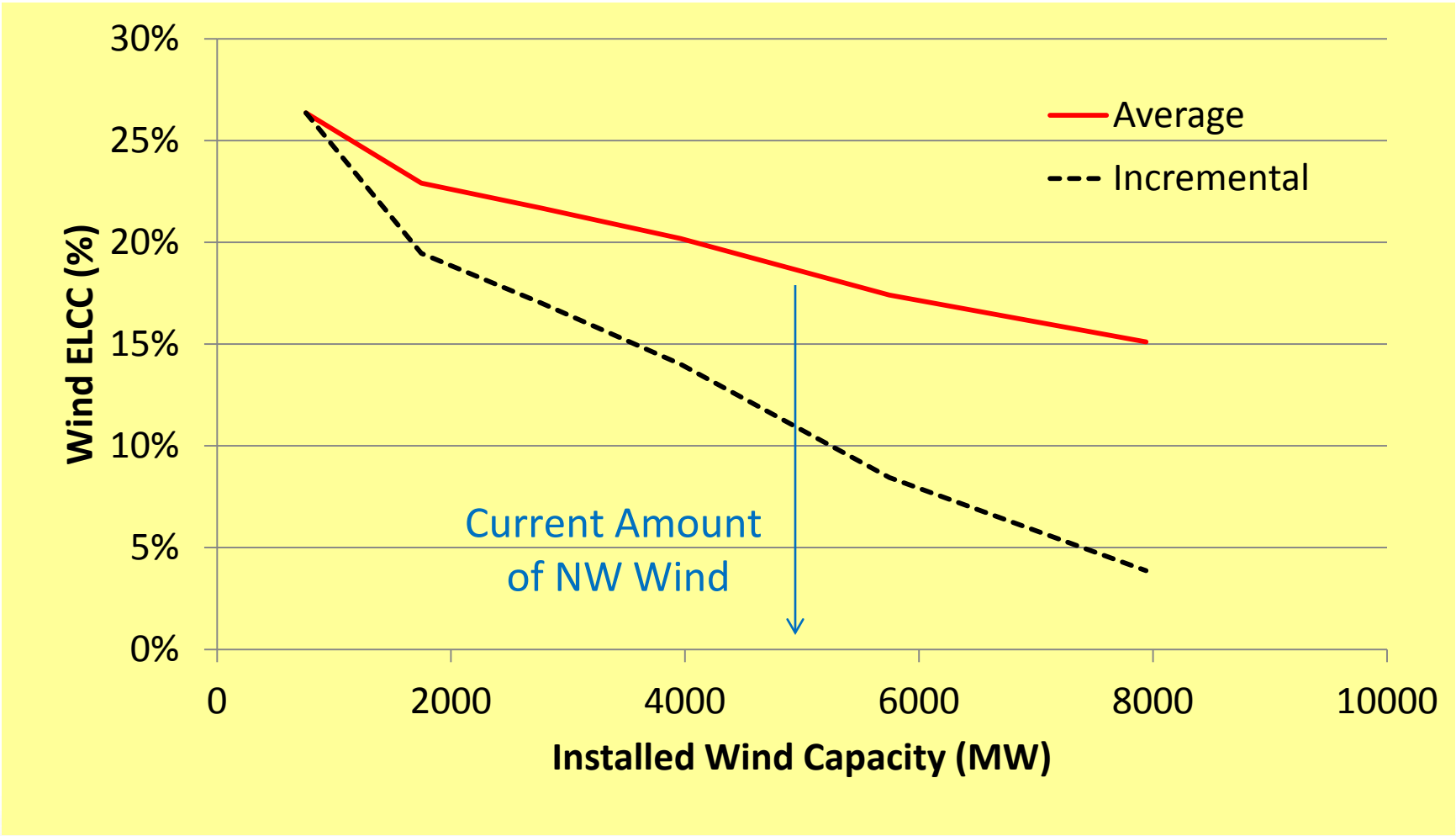
Illustrative Results

Annual ELCC – Synthetic vs. Historical Data



Illustrative Results

Average and Incremental ELCC Synthetic Data



Preliminary Results

Observations

- ELCC declines with increasing amounts of wind because system flexibility is used up
- Eventually wind ELCC will flatten out
- Average annual wind generation is about 32%, yet aggregate ELCC is closer to 20%
  Thus, can't plan on average wind generation

- Adding storage should increase ELCC
- Adding more diverse wind generation should also increase aggregate ELCC

Capacity ELCC

- Same method as for energy ELCC
- Observe simulated curtailments over peak hours only
  - Single hour
  - Sustained period
- As an estimate, look at wind generation during worst simulated curtailments
  - For the 2019 assessment
  - Over the worst 10% curtailments
  - Wind generation was 5%

Solar ELCC

- Same method can be used
- Need data
  - Historic data set may be too small
  - Synthetic data (based on historic) could be developed (e.g. like the wind data)
  - Perhaps wind speed data could be used?