# Distribution Forecasting Working Group

**Uncertainty and Proposals to Improve DER Methods**

**Meeting 2: May 2nd 2018**



# Key Sources of Uncertainty in DER Forecast Allocation

Universal Sources of Uncertainty:

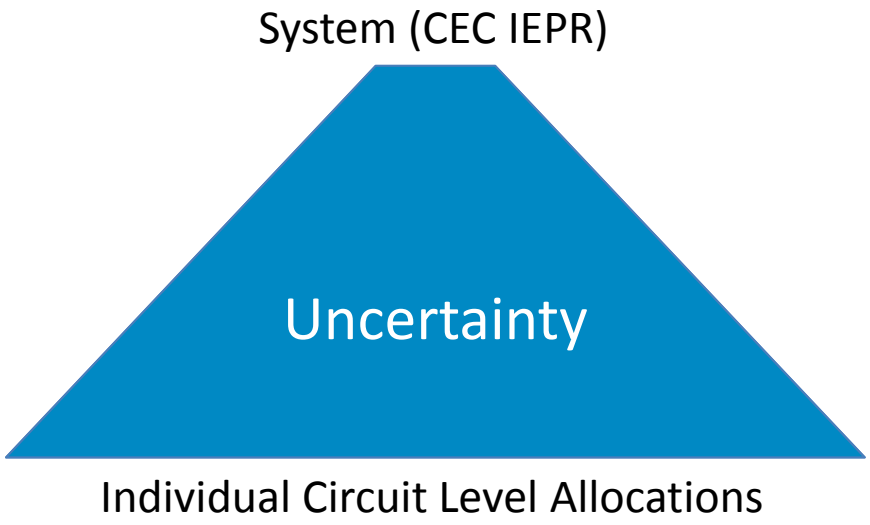
- Uncertainty in the system level forecast propagates down and compounds
- Data availability and quality
- Amount of recorded historical adoption
- Methodology
- Impact profiles/customer dispatch behavior
- Weather
- Adoption not necessarily independent between DERs
- Technical potential uncertain
- …

| DER Specific Drivers of Uncertainty in the Allocations: | |
|---|---|
| PV | • "Lumpy" non-res adoption<br>• Rapidly changing policy/economic landscape<br>• Limited information on roof type/shading |
| EV | • Location of most EV customers unknown<br>• Driving & charging patterns<br>• Bias toward large battery size adopters |
| EE | • Impact shape varies by measure adoption<br>• Unknown distribution of "upstream" measures<br>• Customer class definition between CEC and PG&E |
| DR | • Load consumption variation (significant deviation of actual load may underestimate or overestimate DR projections)<br>• Fluctuating enrollments and engagement |
| Storage | • Extremely limited historic data<br>• Dispatch behavior not guaranteed |

**Fundamentally, we are trying to predict human behavior (customer level and policy)**

# Range of Uncertainty

- Uncertainty is smallest at the system level
- Any forecast uncertainty at the system level is magnified as the forecast is allocated
  - CEC to discuss uncertainty/calibration process at the system level in Mtg 3
- Factors which create more uncertainty at the local level
  - Number of observations
  - Potential for offsetting error is reduced
  - More impact from individual customer decisions
- Local Planners and an annual distribution plan update serve as a feedback loop to mitigate uncertainty



# Degree to which Evaluation can Reduce Uncertainty

- Uncertainty is unavoidable
- Improved/additional data can mitigate to some extent
- IOUs have identified the following datasets which could support reduction of uncertainty:
  - DMV data for Electric Vehicles
  - Actual DER output data (Currently most DER are not metered separately)
- We can also reduce uncertainty by continuously improving our allocation methods as we get more data, more adopters, and more experience using the allocations in distribution planning

# Proposals to Improve Methods in 2018/19 Planning Cycle through actual data

- Each year IOUs refresh latest actual adoption data
  - Models are trained on the latest data
  - Independent variables tested for significance (where relevant to model)
- Continued collaboration with the CEC is required
  - There can be a disconnect between latest actual adoption trends and the prior CEC forecast due to the lag between forecast development and use for Distribution planning