Draft Proposal for Production Cost Modeling Process to Review IRP Portfolios

Integrated Resource Plan proceeding (R.16-02-007)

Modeling Advisory Group Webinar #5

9/6/2017 – 9AM PDT

Webinar Access

Date and Time:

- Sept. 6, 2017, 9AM to 11AM PDT

To Join by Phone:

- Conference number: 712-775-7031
- Participant code: 349332

To Join the Online Meeting:

- Go to: https://www.freeconferencecall.com/join/cpuc_irp

Materials:

- Content from today's and previous MAG webinars or workshops will be posted on the CPUC's website here: http://www.cpuc.ca.gov/General.aspx?id=6442453968

Outline

- Q&A format during the webinar
- IRP Modeling Advisory Group
- Production cost modeling in CPUC processes
- Overall analytical process in IRP
- Production cost modeling objectives
- Scope and Conventions
- Reference System Plan modeling steps
- Preferred System Plan modeling steps
- Standard of Review for LSE Plans
- Q&A

IRP Modeling Advisory Group

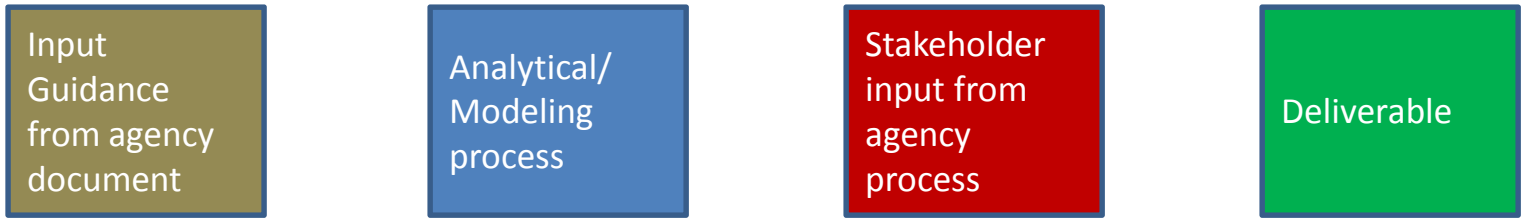
- IRP MAG: informal, interactive forum to discuss technical aspects of modeling to support the CPUC's IRP process
  - Q4 2016 – discussed RESOLVE capacity expansion model for developing the Reference System Plan
  - Q4 2017 – discuss production cost modeling for evaluating the Reference System portfolio and the Preferred System portfolio
    - 8-15-17 workshop – discussed CES-21 project's application of the SERVM model to examine reliability and operational flexibility of the CAISO system
    - 9-6-17 webinar – introduce Energy Division proposed process to evaluate IRP portfolios using the SERVM model
    - Additional webinars as needed, as schedule allows

Production cost modeling in CPUC processes

- 2010, 2012, 2014 Long-Term Procurement Plan (LTPP)
  - Modeling testimony: CAISO, SCE, ORA, UCS in 2014 LTPP (R.13-12-010, contact the CPUC docket office)
- 2016 IRP-LTPP
  - Sep 2016 Ruling directing production cost modeling requirements
    http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442451199
  - Portfolio construction (RESOLVE model)
  - Portfolio evaluation (SERVM model)
- Resource Adequacy (RA) – Effective Load Carrying Capability (ELCC) methods for Qualifying Capacity
  http://www.cpuc.ca.gov/General.aspx?id=6442451972
- Renewables Portfolio Standard (RPS) – proposals for marginal ELCC calculations to inform procurement
  http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M192/K869/192869027.PDF
- Aliso Canyon gas-electric reliability investigation
  http://www.cpuc.ca.gov/AlisoOII/
- Other
  - Collaborative Review of Planning Models
    http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6626
  - CES-21 project
    http://www.cpuc.ca.gov/General.aspx?id=6442453968

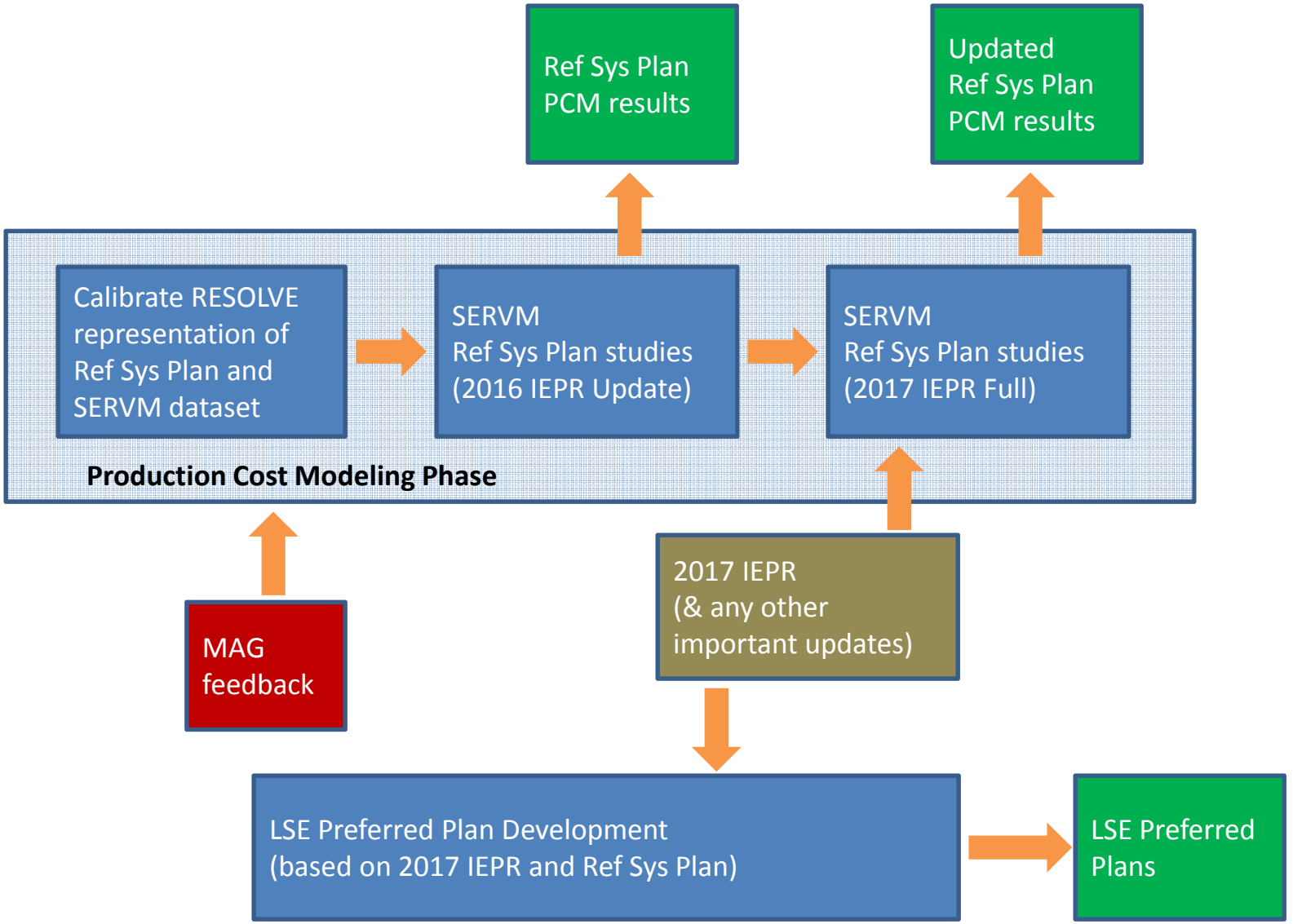
Overall Analytical Process in IRP

Diagram color scheme on following slides:

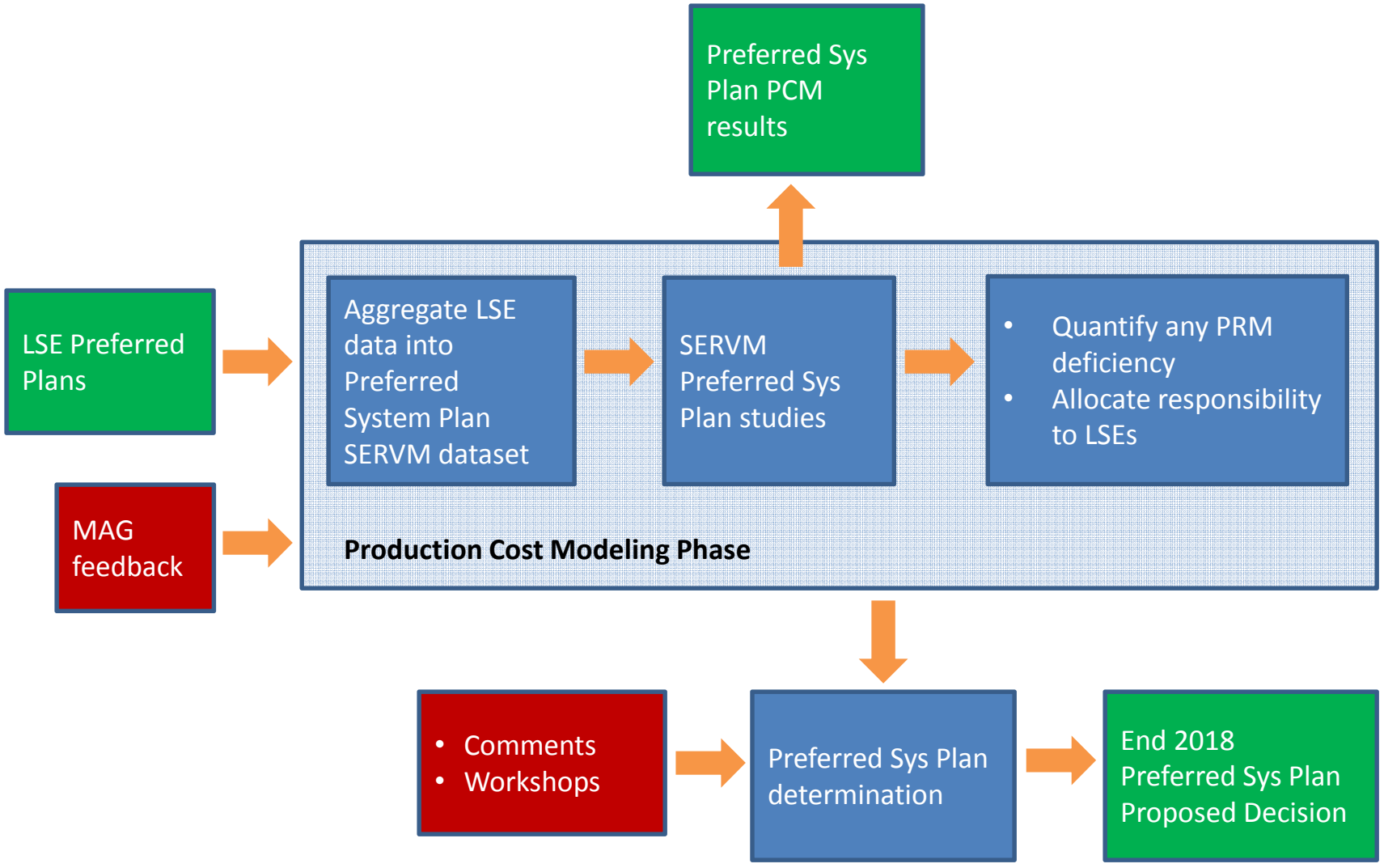


Reference System Plan Development

(1) Production Cost Modeling (PCM) Phase



(2) Production Cost Modeling (PCM) Phase



Reference & Preferred System Plan PCM Objectives

- Evaluate Reference and Preferred System portfolios with higher operational detail and wider distribution of conditions
  - Measure probabilistic reliability level, emissions, renewable generation, curtailment, production cost, etc.
  - Determine satisfaction of Planning Reserve Margin (PRM) requirement
  - Calculate marginal ELCCs to inform LSEs' plan development
- Develop a PCM framework to guide other parties' modeling efforts

(1) Modeling Scope & Conventions

- Study years: 2022, 2030
- Hourly timesteps
- Loss-of-load event definitions & counting conventions, and operating reserve targets – consistent with SERVM ELCC modeling in RA
- For ELCC calculations:
  - Target loss-of-load-expectation (LOLE) reliability level 0.1/year total covering the months Jun to Sep
  - Calibration by adding/removing generation – consistent with SERVM ELCC modeling in RA
- BTM PV modeled as generation rather than part of load

(2) Modeling Scope & Conventions

- Reserve margin accounting conventions:

Component	Counting convention
Peak demand	IEPR 1-in-2 annual peak consumption forecast adjusted for load-modifier impacts but excluding BTM PV impact
Existing non-wind, non-solar	Use current Net Qualifying Capacity values
New non-wind, non-solar	Use same conventions as the RESOLVE model
Wind and solar (including BTM PV), existing and new	Calculate the average portfolio ELCC of these resources combined

- For marginal ELCC calculations:
  - 1000 MW block
  - Only one wind & one solar tech
  - Only CAISO area
  - Only years 2022 and 2030
  - Estimates extracted from the RESOLVE model are a viable alternative

Reference System Plan Modeling Steps

A. Calibrate RESOLVE representation of the Ref Sys Plan and the SERVM dataset
   - Report areas of alignment and differences between models
   - Post SERVM dataset

B. Conduct PCM studies for 2022 and 2030
   - Evaluate operational performance, compare to RESOLVE
   - Calculate average portfolio ELCC of wind + solar (including BTM)
   - Calculate reserve margin
   - Repeat for alternative RESOLVE case if needed to support CAISO studies
   - Calculate marginal ELCCs for utility-scale wind and solar in Ref Sys Plan

C. Update SERVM dataset to use 2017 IEPR

D. Repeat PCM studies

Preferred System Plan Modeling Steps

A. Aggregate LSE data into Preferred System Plan SERVM dataset
   - Reconcile LSE data with Ref Sys Plan data, adding new data as needed
   - Post SERVM dataset

B. Conduct PCM studies for 2022 and 2030
   - Evaluate operational performance, compare to Ref Sys Plan studies
   - Calculate average portfolio ELCC of wind + solar (including BTM)
   - Calculate reserve margin

C. Quantify any reserve margin deficiency and allocate responsibility to LSEs
   - Option A: each LSE procures a share according to load ratio
   - Option B: direct IOUs to procure and use Cost Allocation Mechanism to distribute costs to all benefiting LSEs

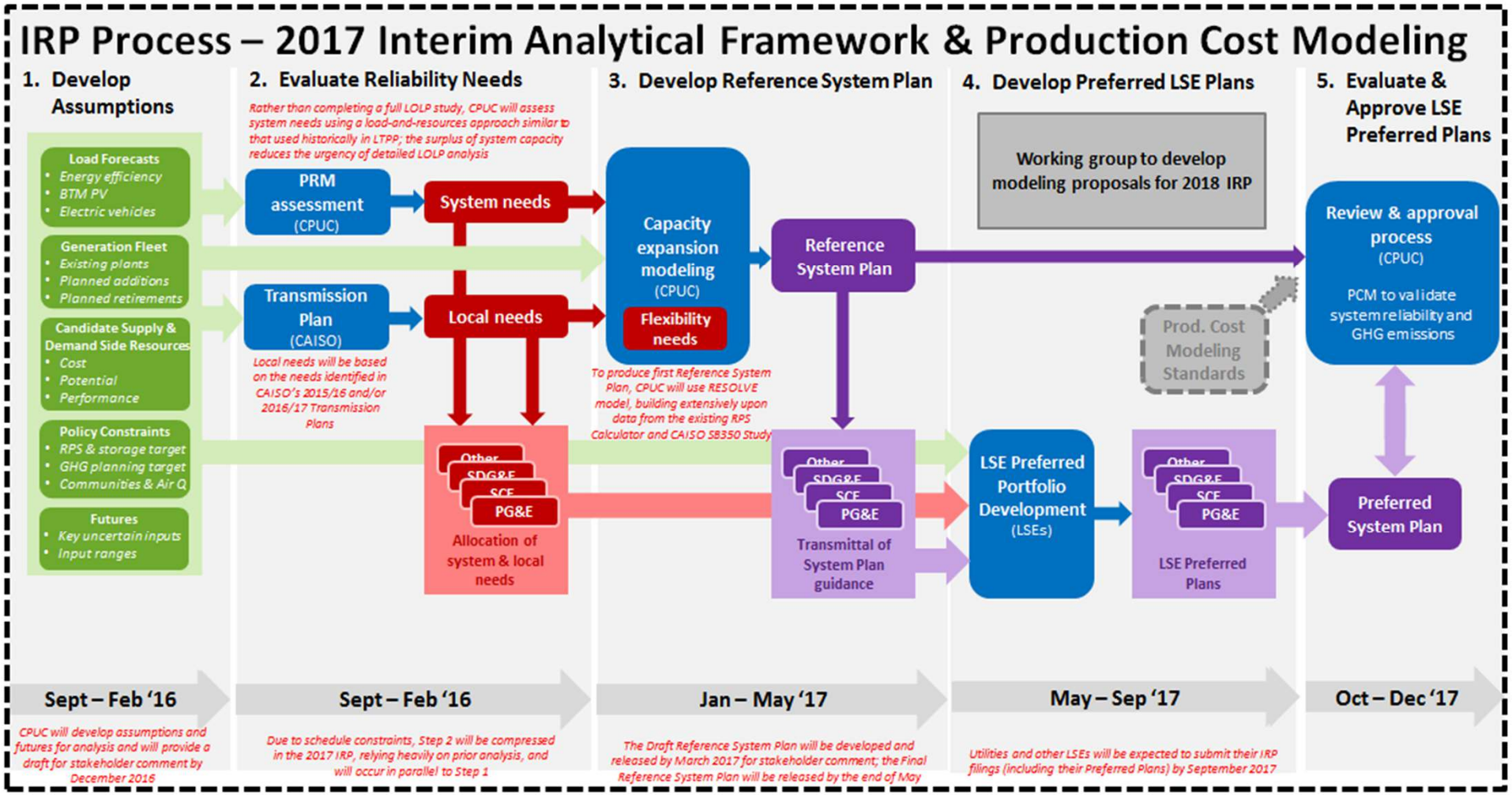
Standard of Review for LSE Plans

- PCM techniques will be used to evaluate IRP portfolios at the system level, but not for individual LSEs
- Individual LSE Plans will be evaluated using simpler analytics or reviewing an LSE's own demonstration of meeting requirements
- Assume there are no significant unaddressed market externalities at this time
  - LSEs bear all the costs of their own decisions
  - Low likelihood of significant imposition of costs from one LSE onto others

Q & A

BACKGROUND SLIDES

ELCC terms

- Resource Class ELCC
  - Effective capacity of a whole class of resources in a generation fleet (e.g. all wind units in the N. CA portion of CAISO area)
  - May require diversity adjustment when adding up effective capacity of several classes
- Portfolio ELCC
  - Effective capacity of a whole portfolio of several classes of resources in a generation fleet (e.g. all wind + all solar in the CAISO area)
  - No diversity adjustment – it's already part of the portfolio effective capacity
- Average ELCC
  - Effective capacity of a whole resource class or a whole resource portfolio
- Marginal ELCC
  - Effective capacity of a marginal addition of a given resource class
  - If a fleet is "saturated" with a given resource class, the effective capacity of a marginal addition will be very small

Analytical Framework described in Q4 2016