33% Renewables – Program Update

DOCKET
09-IEP-IG
DATE June 29 2009
RECD. July 13 2009

CEC Joint Renewables and IEPR Committee Workshop

June 29, 2009

Getting to 33% RPS – The Big Picture

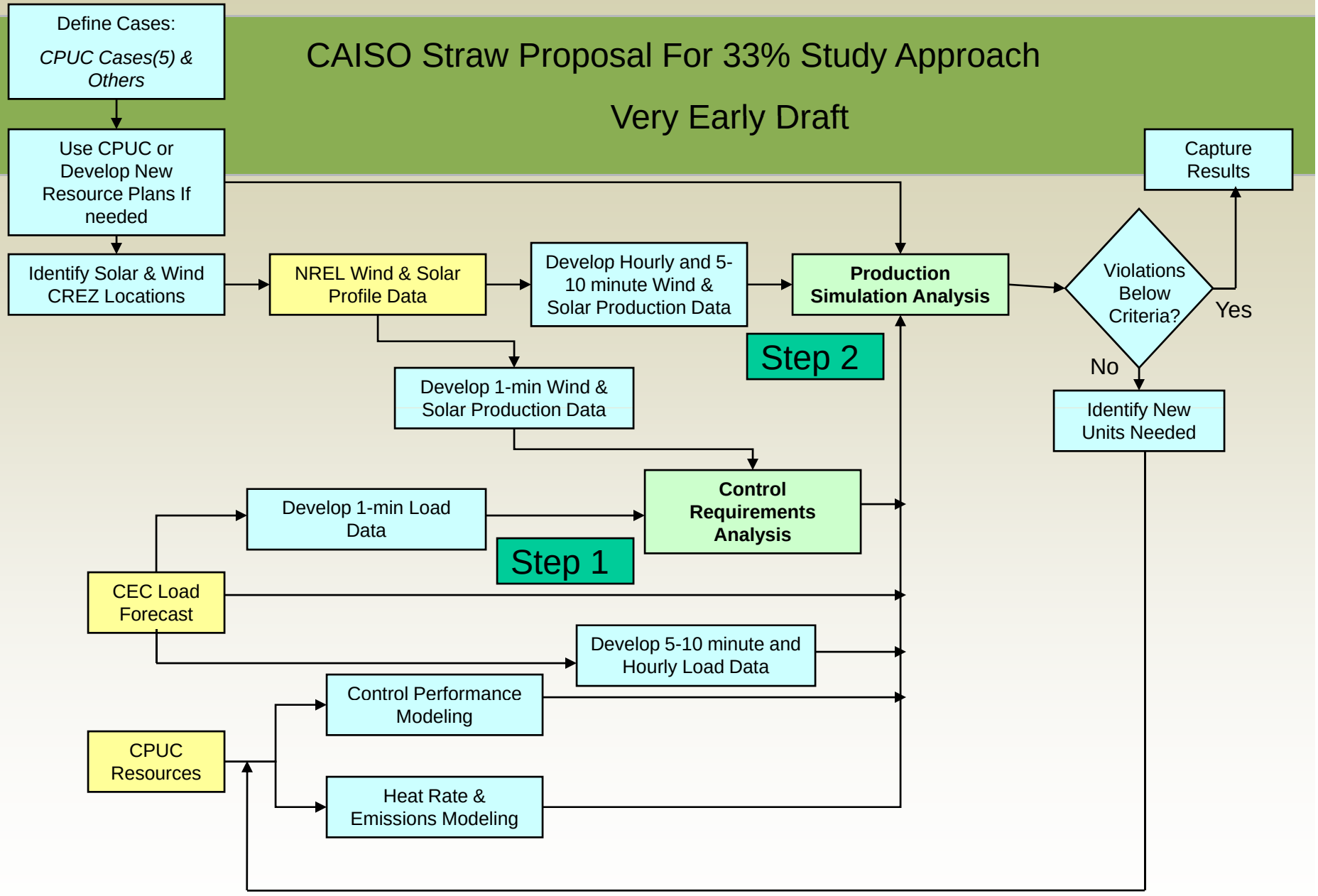
- Needs Assessments
  - Regulation, load following, other Ancillary Services requirements
  - Fleet characteristics -resource flexibility (cycling, min load, ramping)
  - Over-generation Issues
  - Transient and dynamic stability - frequency response, voltage, etc.
- Balancing Area Cooperation - Wide Area Network Studies, ACE diversity, reduced scheduling timelines, dynamic transfers
- Resource performance expectations – develop standards for new technologies to contribute to system reliability, i.e., power factor, voltage control, frequency response, dynamic control
- Energy Storage – Integrate into Ancillary Services and Energy markets, enhance transmission capacity and security
- Demand Response
- Transmission R&D efforts – eliminating thermal and stability limitations

CAISO 33% Assessment

- Study cases – CPUC developed scenarios
  - Reference/balanced
  - High wind generation
  - High Solar generation
  - High imports from out-of-state
  - High distributed generation
- CAISO has engaged Nexant to help with the studies
  - Creation of profiles by areas for
    - **Wind**
    - **Solar CSP**
    - **Solar PV**

CAISO Straw Proposal For 33% Study Approach

Very Early Draft



Profiling Requirements

- **Wind and Solar**
  - **For Step 1 - 1 minute granularity**
  - **For Step 2 – 5 to 10 minute and hourly granularity**
  - **Geographical diversity**
  - **Technology representation for Solar (CSP vs. PV residential vs. PV utility size)**
- **For Load**
  - **For Step 1 - 1 minute granularity**
  - **For Step 2 – 5 to 10 minute and hourly granularity**
- **For all**
  - **Data to be Time Synchronized**
  - **Use same year source year**
  - **Align weekends with study year**

What Data is Avaliable

- From NREL
  - Wind speed and production at many sites in the West at granularity of 10 minute average data for years 2004- 2006
  - Solar insolation data in the West at granularity of 60 minutes for years 2003- 2005
- Gap exists between what is needed and what is available requiring some form of synthesis of more granular data
- In general, two areas need to be addressed
  - What sites to use
  - What synthesis to perform

Wind Sites Being Considered

- Driven by CPUC/E3 Cases
- Driven by total High Wind Case Needs
- Driven by diversity and accuracy needs

Solar Sites Being Considered

- Driven by CPUC/E3 Cases
- Driven by 33% Reference Case and Transmission Constrained Case Needs
- Driven by diversity and accuracy needs
- Driven by technology differences
  - Solar CSP
  - Solar PV Utility sized, thought to be tracking installations
  - Solar PV Residential, thought to be fixed installations

Reference: Solar Site Tables

Reference: RETI Site Maps

Data Synthesis

- Why? - To quantify the approximate short term (within the hour) AS requirements associated with load and renewable variations
- How?
  - CAISO has used in the past for wind analysis
  - Adding solar
- Solar PV is more critical to Step 1 analysis due to limited inertia
- Solar PV is more difficult to synthesize for the same reason

CAISO 33% Study Timeline

- June – July 2009 — Finish 20% RPS studies
- Oct. 2009 — Publication of results of 33% scenarios
- Dec. 2009 — Complete full report of 33% scenarios
- Q1 – Q2 2010 — Continue work on analyzing operational impacts of 33% renewables. Include DR Pilots
- Q2 2010 — Non-generating resource participation in AS markets rules revised