Renewables Portfolio Standard (RPS) Calculator Overhaul:
Environmental Scoring of Renewable Portfolios?

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California ISO
Shaping a Renewed Future

Purpose of the RPS Calculator

- The RPS Calculator is an Excel-based renewable resource planning tool that develops plausible portfolios of RPS resources that meet a specific RPS procurement target (e.g., 33% RPS)
- Portfolios are used in several planning activities:
  - CPUC: Long Term Procurement Plan (LTPP)
  - CAISO: Transmission Planning Process (TPP) and renewable integration studies
  - WECC: western U.S. transmission planning
- Currently, RPS Calculator doesn't directly inform RPS procurement
  - IOUs select projects based on their CPUC-approved bid evaluation methodologies

How RPS Portfolios Are Used in Long-Term Planning Studies

RPS

- Vets and adopts RPS Calculator methodologies, inputs and assumptions annually and develops RPS portfolios
- RPS submits portfolios to LTPP for generation planning

LTPP

- Vets and adopts combinations of assumptions (including RPS portfolios) to construct multiple scenarios for use in long term planning analysis

Output

- LTPP scenario analysis informs CPUC procurement authorizations
- LTPP scenarios (with associated RPS portfolios) are provided to CAISO for use in TPP. TPP may approve new transmission infrastructure if needed to serve scenario/case.

Types of RPS Portfolios Used for Long-Term Planning Studies

- LTPP has used the RPS calculator to develop different RPS portfolios
- The RPS portfolios become one assumption in LTPP planning
- LTPP scenarios reflect a set of assumptions defining a realistic, possible future world
- LTPP scenarios have included Trajectory (most reasonably to occur if our existing RPS policies continue), High DG, and Environmentally-Preferred
  - Historically, ISO has used the Trajectory case as the “Base Case” for transmission planning
  - Environmentally-Preferred case has informed decision making, but it is not the primary case used in either CPUC procurement authorizations or ISO transmission planning

Current State of RPS Calculator

The calculator has proven to be a useful tool in planning exercises, but its use in LTPP has extended its use beyond the intent of its original design

- The market for renewable resources has fundamentally changed since the original calculator's creation, and so has our understanding of the impact of renewables on the power market
    - RPS Calculator must be updated to reflect changing marginal value and increased integration costs due to saturation effects
- The calculator inputs (e.g., technology costs) haven't been updated for several years, so model doesn't reflect recent changes in technology costs/value and renewable potential.

Consequently, the CPUC is overhauling the RPS calculator

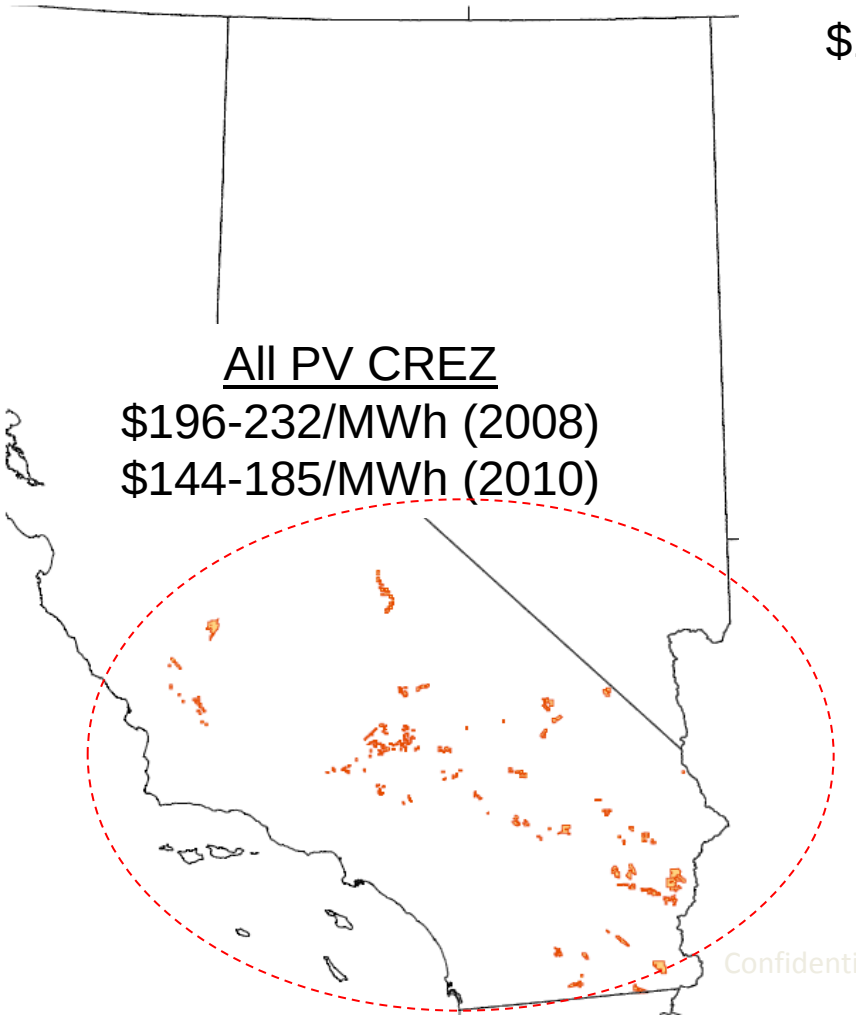
Planned RPS Calculator Revisions

To ensure that the RPS Calculator is an accurate and effective link between planning and procurement, CPUC plans to implement a number of key revisions to the calculator:

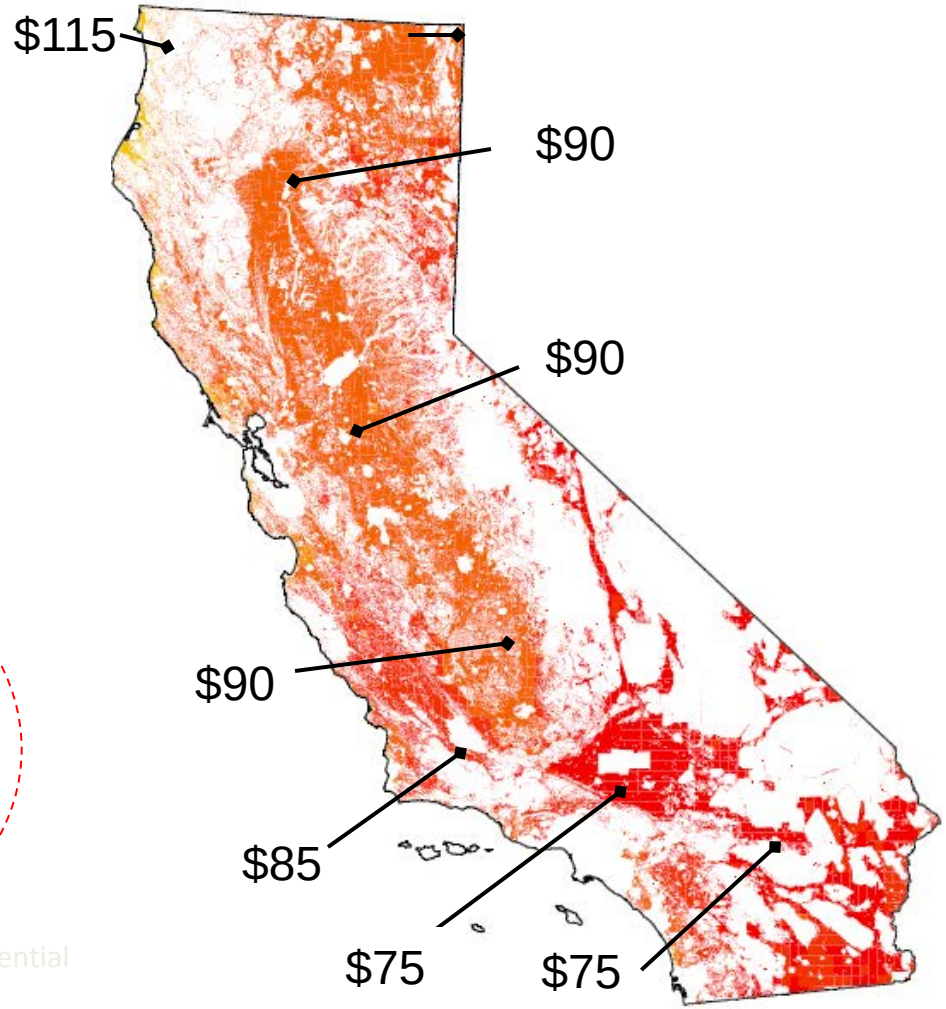
- Alignment of renewable net short calculation with actual utility RPS procurement need
- Incorporation of updated resource cost & potential information
- Implementation of dynamic resource valuation methodology
  - RPS calculator will optimize portfolios based on changing market conditions (e.g. changing energy value with resource mix)
- Updated transmission assessment and costing
- Assessing if existing environmental screening/scoring methodology needs to be revised

Solar PV Cost and Potential Has Changed Over Time

Renewable Energy Transmission Initiative (RETI) 2010



2013 Resource Update



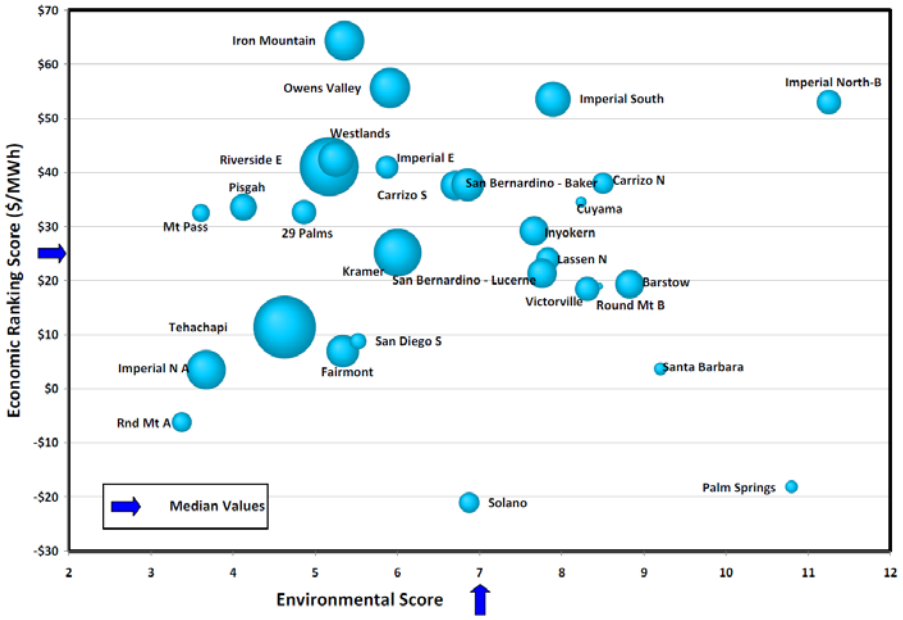
Recent Resource Update Highlights Enviro Scoring Needs to be Revisited

- Updated economically-viable renewable potential is orders of magnitude larger than needed to achieve 40% RPS
- Good resources available throughout California
  - Northern and Southern California (vs. mostly Southern before)
  - Close to available transmission (vs. distant previously)
  - Much on private land including farmland (vs. largely on desert lands, many of which are under control of BLM)
- Increased availability and lower costs likely leads to:
  - Greater flexibility in siting (including environmentally degraded lands)
  - Potentially fewer transmission investments

Given significant changes in renewable market, current environmental scoring methodology needs to reassessed

Many Approaches to Environmental Scoring

- RETI Phase 1B and 2B
- WGA - Western Renewable Energy Zones
- LTPP 2010
- LTPP 2012 - 2014
- WECC - Environmental Data Task Force



NOTE: Desert Renewable Energy Conservation Plan (DRECP) is not explicitly an environmental scoring process

Summary of Enviro Scoring Methods

	RETI Phase 1B and 2B	WREZ	LTPP 2010	LTPP 2012 - 2014	WECC EDTF
Timeframe when it was developed	2008 (1B) and 2010 (2B)	2009	2010	2012	2012
Numerical Scoring?	✓		✓	✓	
Mapping of Environmental Screens?	✓	✓		*	✓
Stakeholder Vetted ?	Yes	Yes	Yes	Limited, after development	Yes
Data Sources	Federal, State or Province, NGO, Vendors	Federal, State or Province, NGO, Vendors	Same as RETI, with updates	Largely DRECP data	Federal, State or Province, NGO, Vendors, Other Studies, Tribal, some earlier RETI and WREZ sources
Ease of Application	Time consuming ranking of each CREZ. Not for individual projects; many are outside CREZs.	Easy - GIS based for resource assessment only	Based on RETI with updates	Relatively easy, but requires project specific location data	Easy - GIS based for transmission routing
Generation or Transmission focus?	Generation & Needed Transmission for CREZ	Generation	Generation	Generation	Transmission
Geography	California	WECC	California	California	WECC
Applications	Resource assessment, CREZ ranking	Resource assessment	Environmental scoring in 2010 LTPP	Environmental scoring in 2012 - 2014 LTPP	Transmission planning

Review of Past Environmental Scoring Methods

- Different screening and scoring methods have different purposes and approaches
- There is not a single approach that has been widely accepted, is easy to apply, and works for both generation and transmission planning
- None of the methodologies have ever been benchmarked against actual environmental impact to see if one methodology is more predictive than another methodology

Guiding Principles for Revising Environmental Scoring Methodology

- Permitting consistency
  - Align with existing permitting guidelines, i.e., no additional permitting requirements
  - Does not pre-judge permitting
- No additional market uncertainty (not unduly discounting, screening projects)
- Methodology needs to actually correlate with environmental permitting risk and/or environmental impact
- Methodology addresses the entire state and the WECC
- Incorporate DRECP and other ongoing processes
- Incorporate vetted stakeholder concerns
- Facilitate efficient siting of projects (generation and transmission) prior to permitting

Questions for Stakeholders

- How well have the environmental-preferred portfolios assembled by LTPP align with actual environmental impact?
- Does feasibility of a higher RPS % require an environmental evaluation?
- If there is so much renewable energy potential (i.e., solar PV) identified that we need to discount it by 95%, does it still make sense to score resources environmentally? Should environmental scoring only apply when assessing new transmission upgrades?
- What is the appropriate level of methodological granularity needed to assess viability of transmission upgrades need to go beyond 33% RPS?
- Should an environmental scoring methodology be able to assess environmental trade-off of in-state vs. out-of-state renewable procurement and transmission?

Closing Thought

"RETI's goal is to identify electric transmission facilities needed to provide access to areas which can provide renewable energy most cost effectively and with the least impact to the environment."

"RETI Phase 1B – Environmental Assessment of CREZ" – December 31, 2008