DOCKETED

Docket Number:	15-RETI-02
Project Title:	Renewable Energy Transmission Initiative 2.0
TN #:	212059
Document Title:	Presentation - Environmental and Land Use Technical Group Outreach to County Planning Agencies
Description:	Presentation delivered via webinar with county planning staff.
Filer:	Eli Harland
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	7/1/2016 3:24:49 PM
Docketed Date:	7/1/2016

Renewable Energy Transmission Initiative v2.0

Brian Turner

RETI 2.0 Project Director

California Natural Resources Agency

June 30, 2016

Agenda

1. RETI 2.0 background, structure, and timeline
2. Planning goals and resource values summary
3. Current activities summary
4. Transmission Assessment Focus Areas
5. County questions and data
6. Next steps

RETI 2.0 Background

Renewable Energy Transmission Initiative
v2.0

- Cooperative project of four state and one federal agency
- Statewide, non-regulatory planning effort to help meet statewide GHG and renewable energy goals.
- Explore combinations of renewable generation resources in California and throughout the West that can best meet goals
- Build understanding of transmission implications of renewable scenarios, and identify common transmission elements
- Identify land use and environmental opportunities and constraints to accessing these resources
- Accelerated, agency-driven, high-level assessment to inform future planning and regulatory proceedings

RETI 2.0 Policy Context

Executive Order B-30-15

- Established 40% GHG reduction goal by 2030
- Mandates state agencies to pursue with all statutory authority
- New California **Air Resources Board Scoping Plan**

SB 350

- CPUC and CEC increase **Renewable Requirements** from 33% by 2020 to **50% by 2030**
- Require **resource optimization** and an **Integrated Resource Planning (IRP) process**
- Expresses intent for **regional expansion of the CAISO**
- Encourages **widespread Transportation Electrification**

California Independent System Operator

- Regional expansion planning
- Transmission Planning complete for 33%; “considerable work” necessary to plan for 50%

Western developments

- Clean Power Plan
- OR, WA, NV policy developments
- Mexico electricity sector reform

RETI 1.0 and 2.0

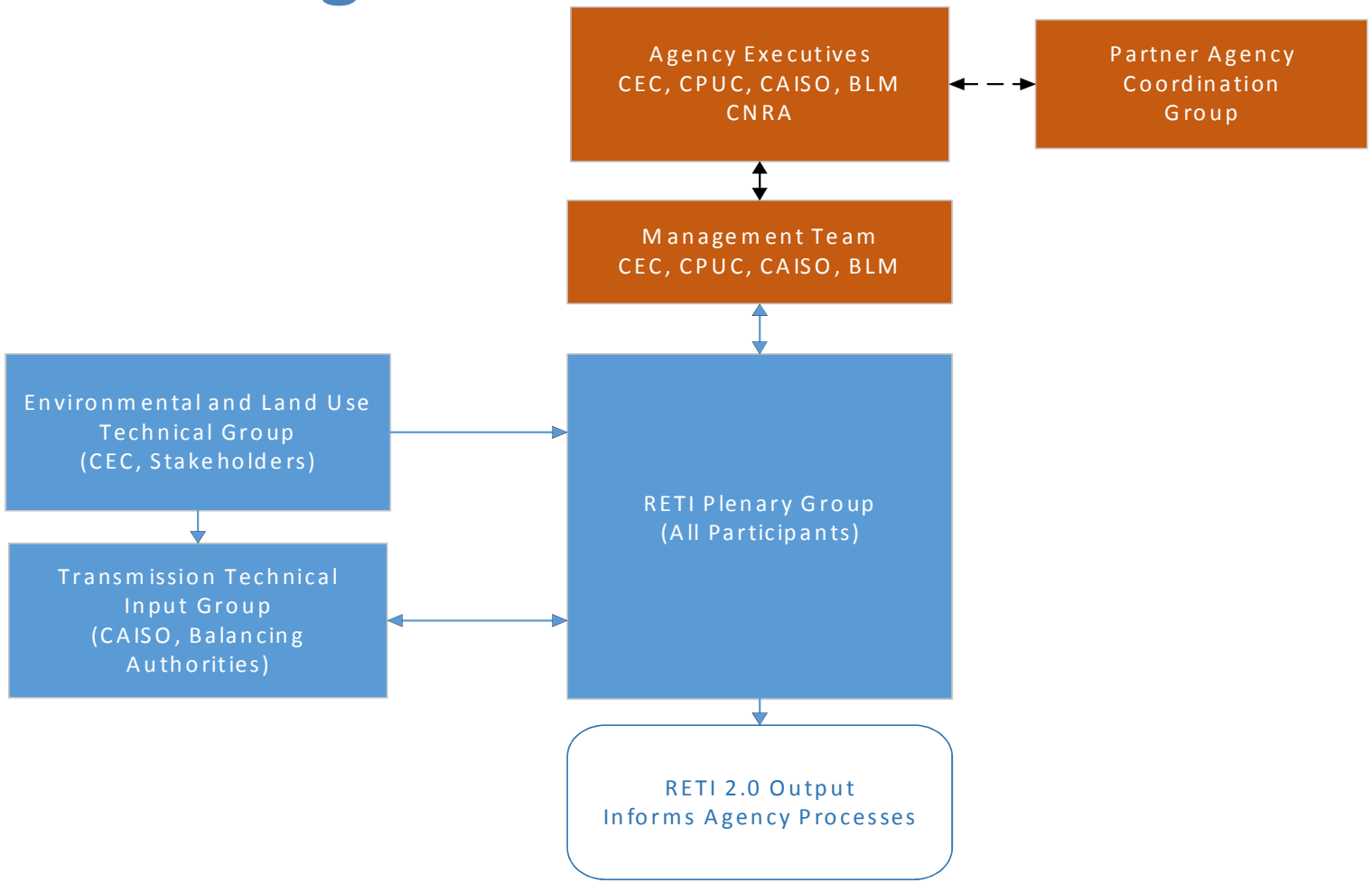
RETI 1

- 2008-2010 Stakeholder-driven process when CA RPS going from 20% to 33%
- Built exhaustive renewable resource potential and cost GIS and economic model; identified numerous potential transmission options
- Institutionalized in CPUC RPS Calculator and CAISO Policy-driven Transmission Planning

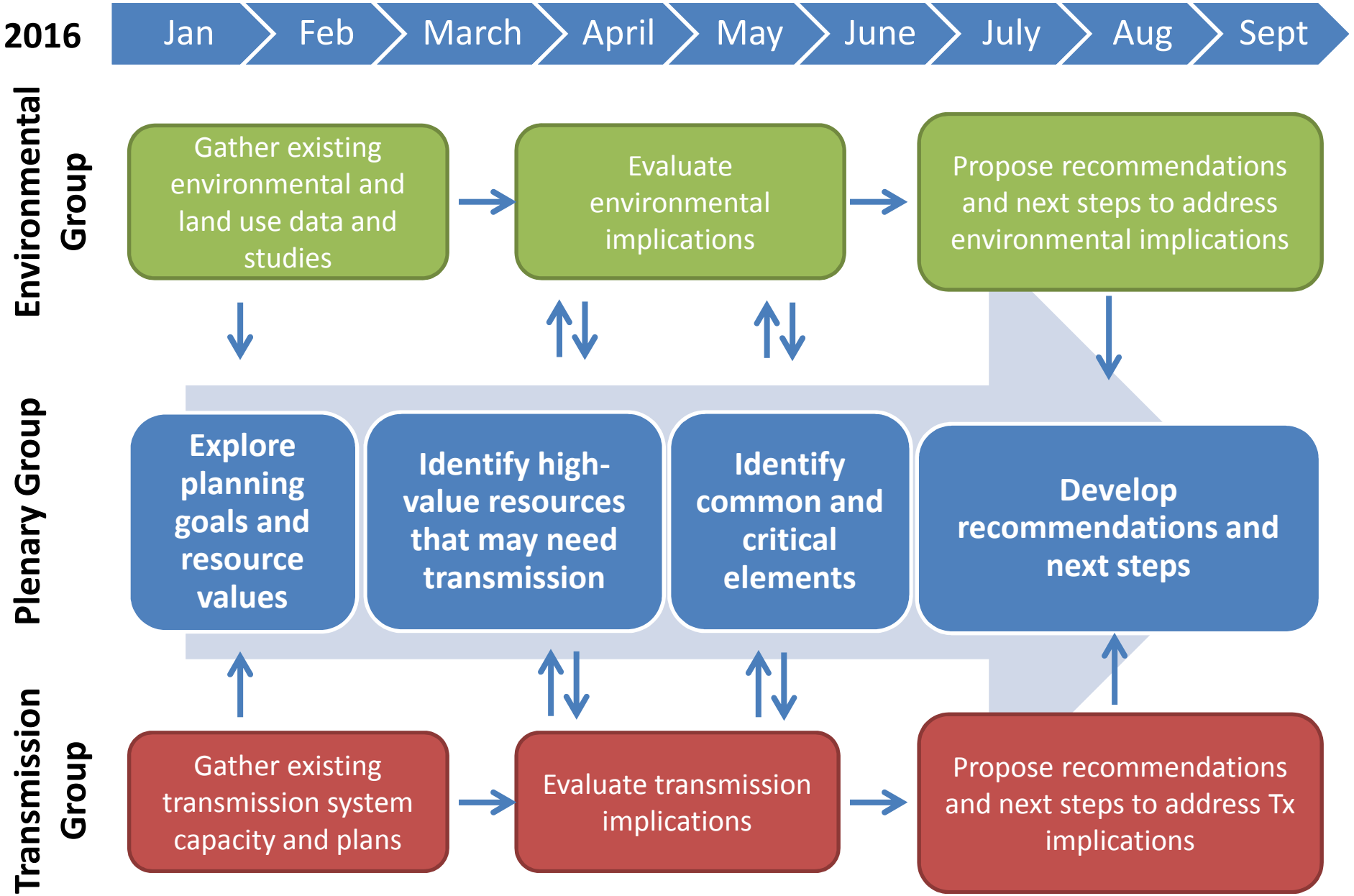
RETI 2

- Accelerated, agency-driven, RETI reprise
  - Final report by October 2016
  - Inform 2017 CPUC IRP and ISO TPP
- Leverage existing studies – no new models
- Emphasis on long-term resource portfolio optimization and GHG reduction in Western context

Organizational structure



RETI 2.0 Process and Timeline

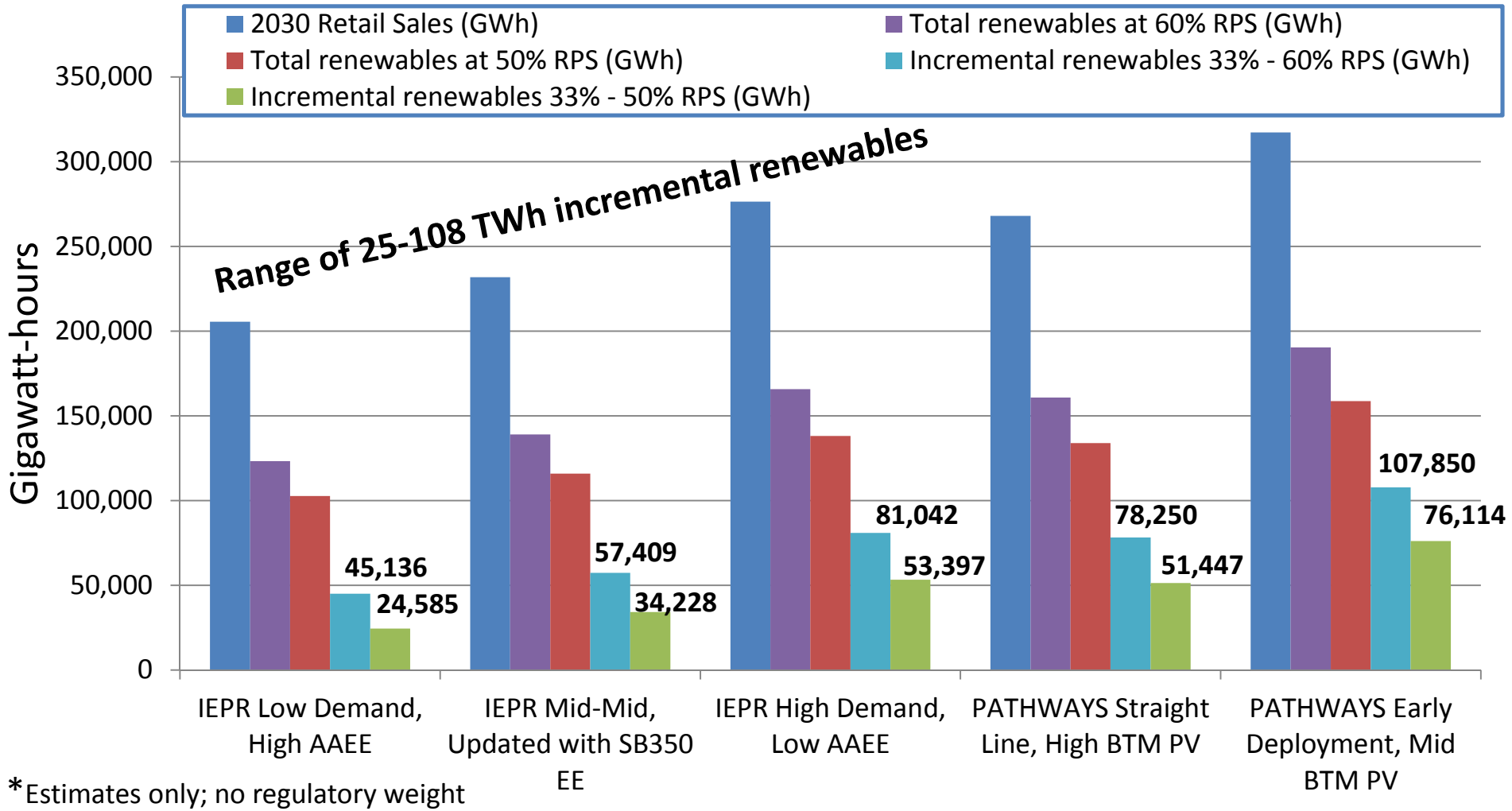


Planning Goals Summary

Planning Goals Background

- Goal is to characterize (ballpark) the scale of renewable energy that may be needed to reach 2030 energy and GHG goals, in the context of Western renewables demand
- No regulatory weight or status
- Used to guide the scale of demand for renewable resources from specific geographic areas
- Create hypothetical range* based on:
  - Minimum needs to reach 50% RPS by 2030
  - Maximum need to reach 40% economy-wide GHG reduction by 2030, on track to 80% by 2050
- Data Sources:
  - California Energy Commission
    - California Energy Demand Forecast
  - California Public Utilities Commission
    - Renewable Portfolio Standard proceedings
  - L.A. Department of Water and Power
    - 2015 Integrated Resource Plan
  - Energy and Environmental Economics (E3)
    - California PATHWAYS State Agencies' project
  - Western Electricity Coordinating Council
    - 2026 Common Case

Potential 2030 Renewables under different scenarios



*Estimates only; no regulatory weight

STATE OF CALIFORNIA resources AGENCY

California Public Utilities Commission

California Energy Commission

California ISO

Resource Values Background

- Goal is to identify locations of potential large-scale renewable resource development that helps meet 2030 need.
- Involves two basic questions:
  - Latest and greatest on costs and value of different renewable technologies in different areas
  - Insights on the portfolio of different resources that may be necessary to operate a majority-renewables grid at lowest cost

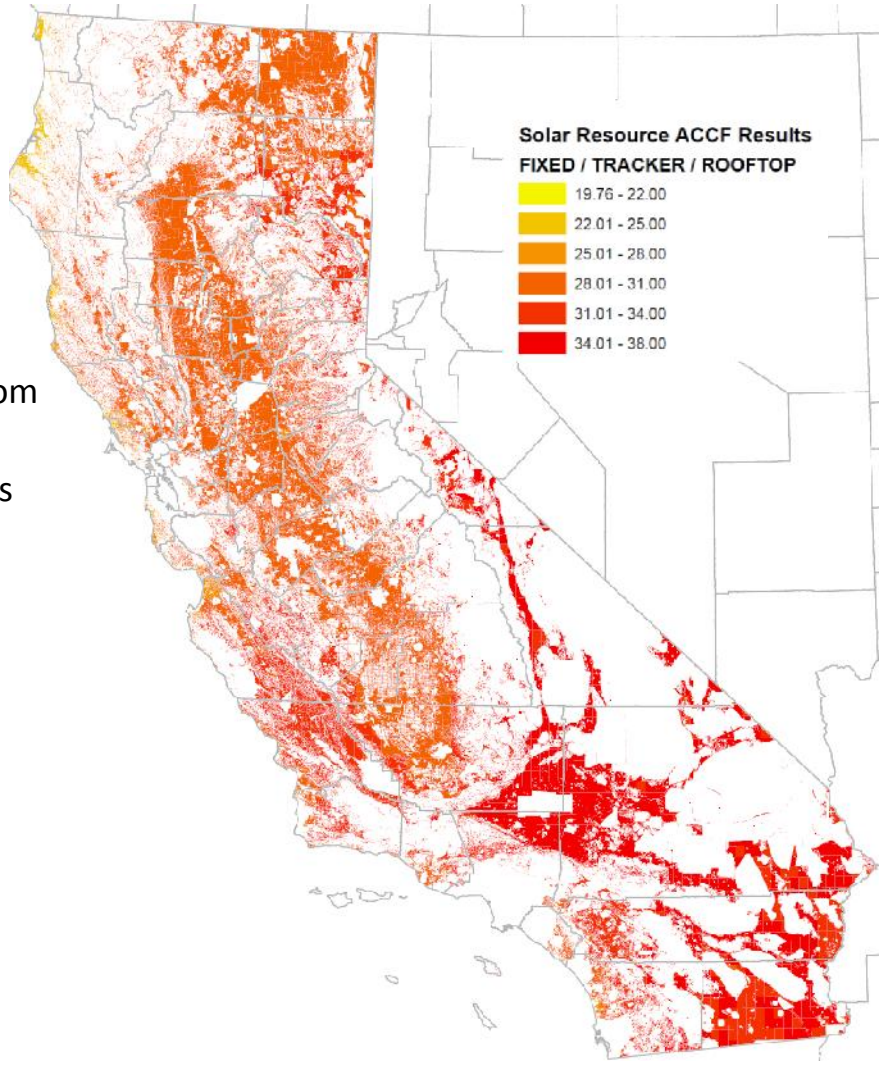
In-state Solar Resources

Solar Photovoltaic

- Widespread and generally good quality throughout California
- Cost reduction of 82% in last six years ; LCOE range from $35/MWh to $57/MWh (*Lazard's 2015)
- The worst current RPS Calculator PV resource now less expensive than the best RETI 1.0
- Substantial improvement in PV capabilities, barriers appear more institutional than technological
  - Voltage / VAR control and/or Power Factor regulation
  - Fault ride-through
  - Real power control, ramping, and curtailment
  - Primary frequency regulation
  - Frequency droop response
  - With storage, potential for black start capability

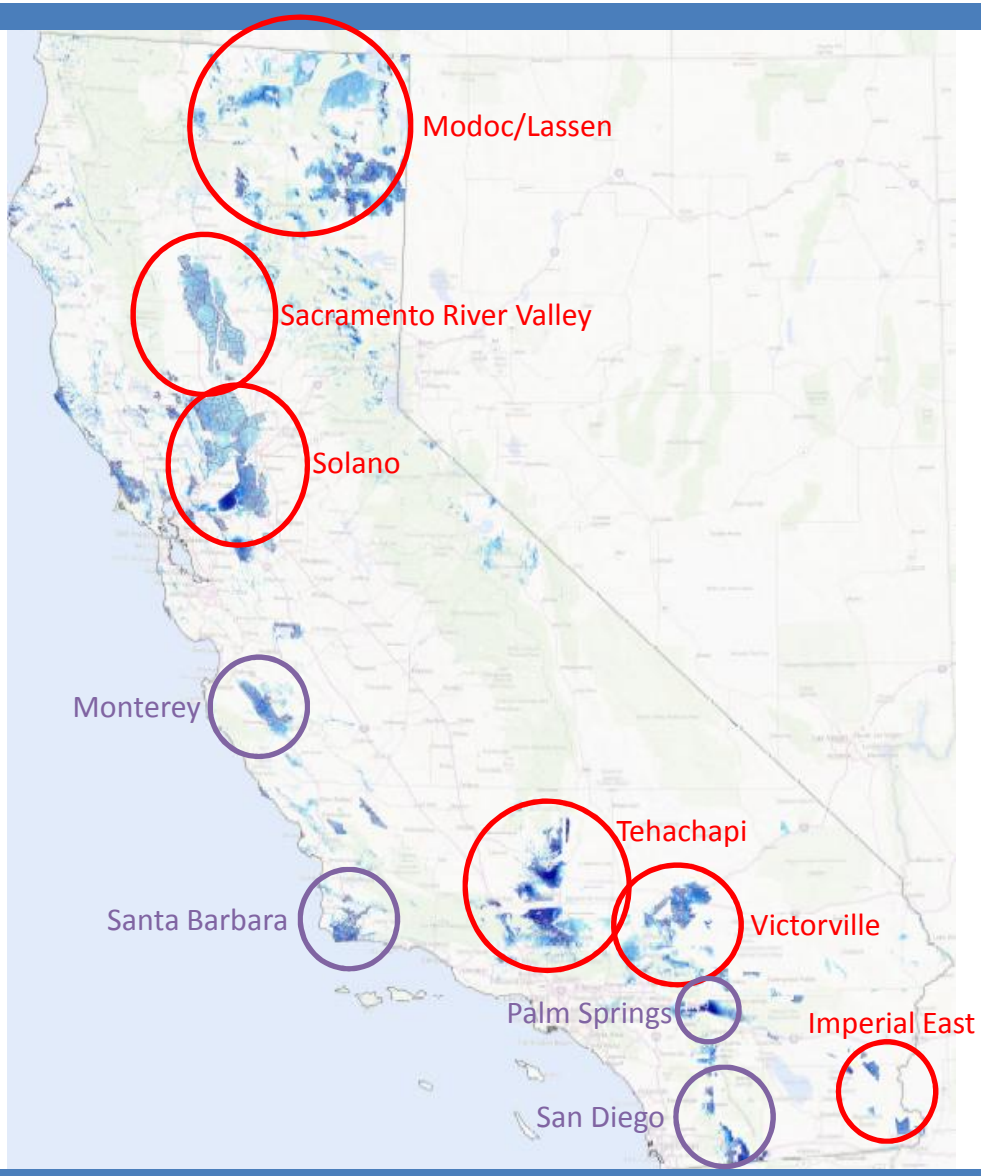
Solar Thermal technologies

- Stakeholders advised not competitive



In-state Wind Resources

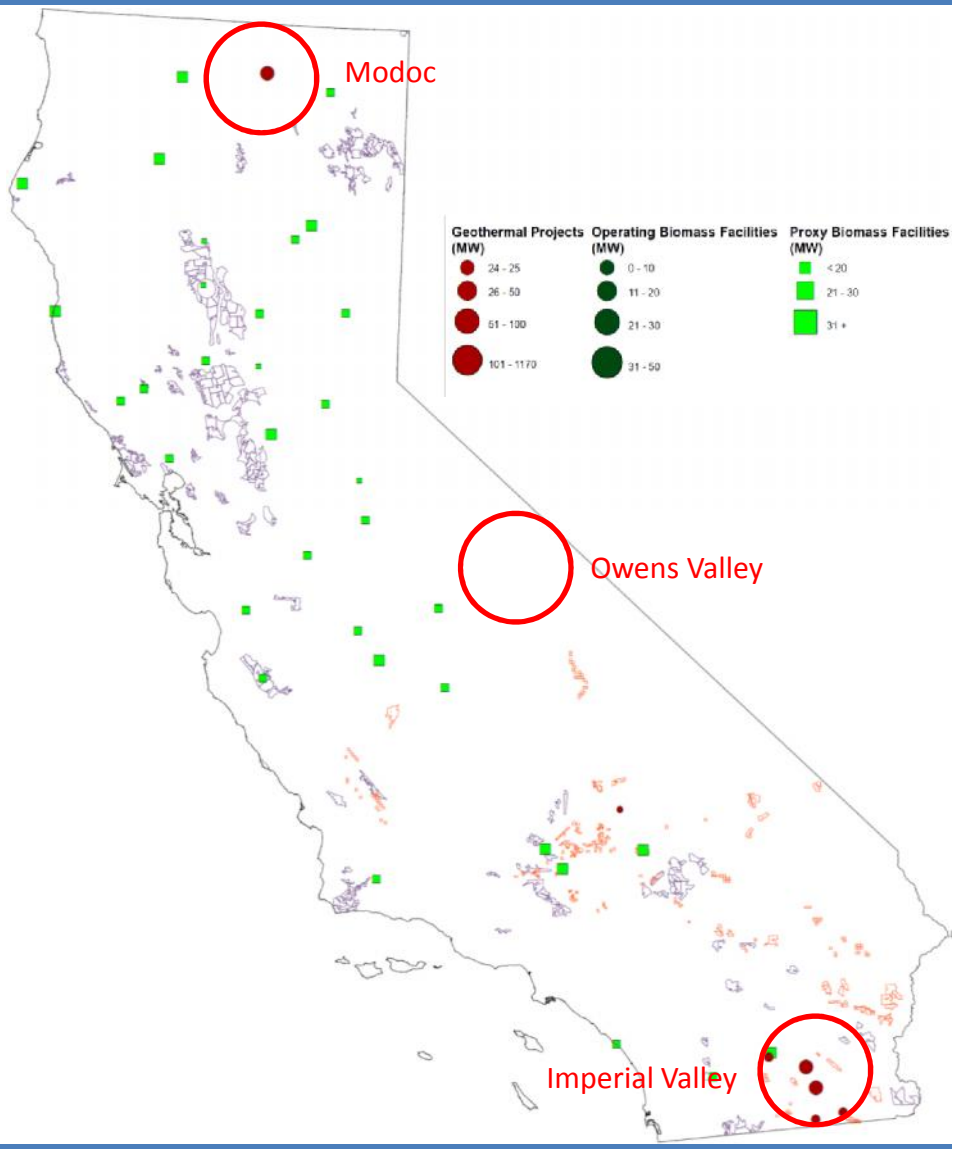
- High technical potential wind resources concentrated in a few areas
- Most highest potential sites already developed
  - Repowering existing sites
- Skepticism about many remaining undeveloped areas
  - CalWEA estimates a maximum potential undeveloped resource of 1,000-2,000 MW



In-State Geothermal and Biomass

- Geothermal concentrated in very few areas
- Costs are very site-specific, and subject to considerable dispute
- High capacity factor and potential flexibility

- Biomass very dispersed across state
- Current tree mortality planning does not suggest new large facilities



STATE OF CALIFORNIA resources AGENCY

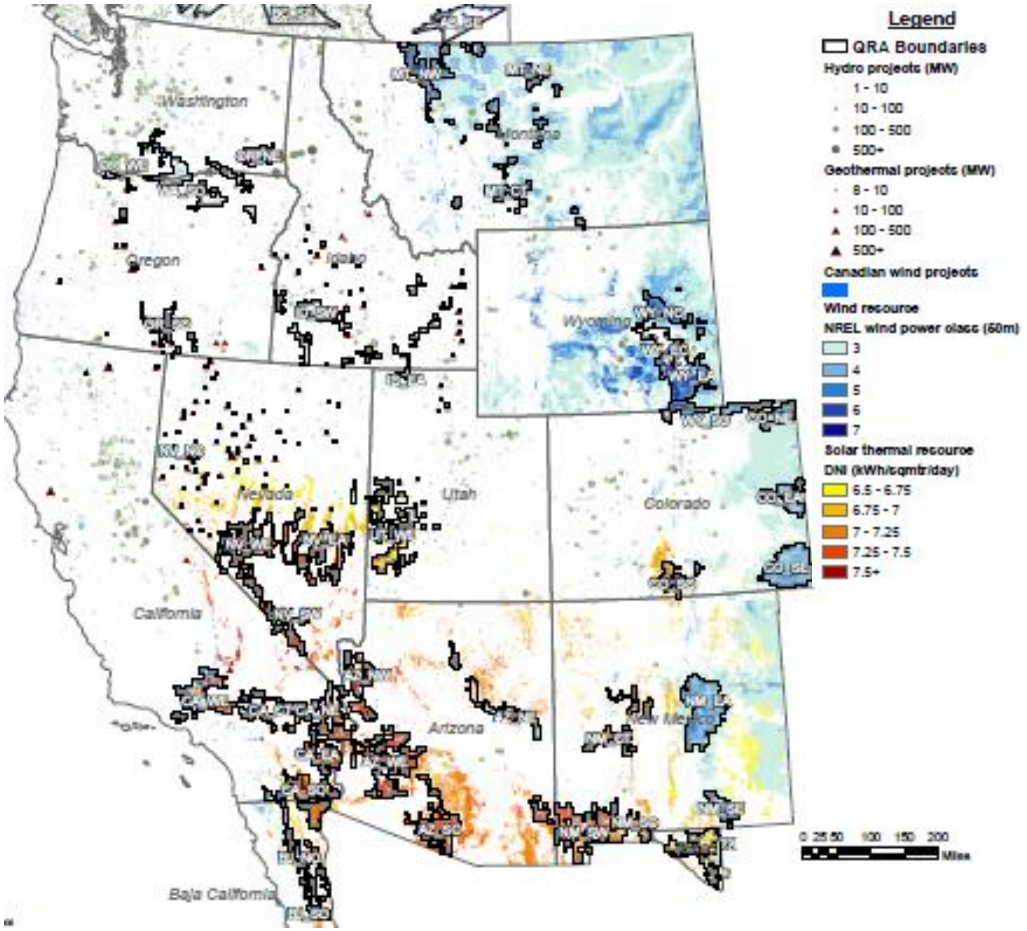
California Public Utilities Commission

California Energy Commission

California ISO

Western renewable energy potential

- Solar
  - Active development in AZ and NV
  - Advance solar land use planning, including BLM
- Wind
  - Best resources for CA in Wyoming, New Mexico
  - Colorado and Montana also good resource, but more remote
- Geothermal
  - Northern Nevada
  - SE Oregon



STATE OF CALIFORNIA resources AGENCY

California Public Utilities Commission

California Energy Commission

California ISO

California Low Carbon Grid Study

Low Carbon Grid Study
Principal Conclusions

I. Climate & Clean Energy Goals are Technically Feasible without significant rate impacts

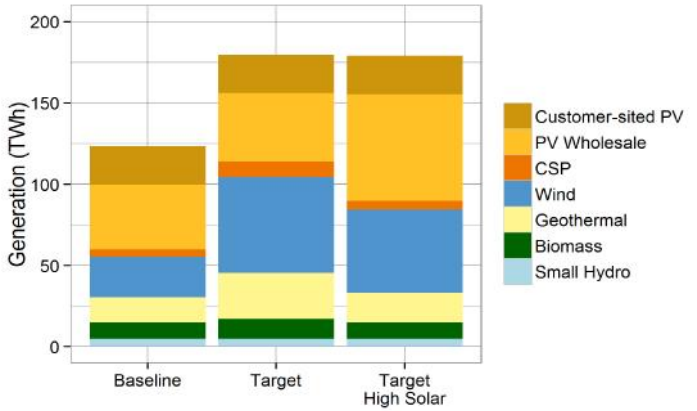
- The California electric sector can reduce 40-50MM Tons/CO2 annually by 2030, a significant contribution to executive order B-30-15, for 40% below 1990 GHG levels. On the trajectory to meet long term goal of 80% reduction.
- Meets or exceeds a 50-60% RPS
- Accommodates a 50% reduction in commercial and industrial energy use in buildings
- Absorbs the increased energy load from a projected 3.3 MM electric vehicles

II. Multiple Paths with Significantly Different Costs

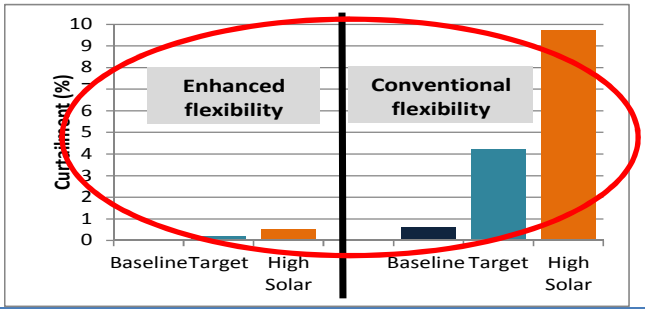
- Conventional Flexibility measures present significant cost barriers to effective GHG reduction
- Enhanced Flexibility measures present low cost means to 2030 GHG reduction target as well as pathway to deeper reductions

III. Critical Components of Enhanced Flexibility

1) Real-time carbon accounting for dispatch, unit commitment as well as procurement and planning
2) Technologically and geographically diverse renewable energy portfolio including: grid-scale PV solar, rooftop solar, regional wind, geothermal, biomass, and concentrating solar power with thermal storage
3) Bulk storage benefits shared across multiple balancing authorities and utilities, including both new projects and an optimized, statewide use of existing non-IOU pumped hydro
4) Essential reliability services provided by non-thermal resources including CSP w/ TES and the entire state hydro fleet
5) Strategic dispatch of natural gas resources, staggered quick starts to prevent idling, ramping
6) Increased flexibility in unbundled REC accounting, enabling optimal sub-hourly dispatch



Case	Net Cost (% of RevReq)	CA Carbon (MMT/yr)	RE Curtailment (%)
Diverse/Enhanced	0.6%	41.1	0.2%
High Solar/Enhanced	2.2%	42.2	0.5%
Diverse/Conventional	2.3%	45.0	4.2%
High Solar/Conventional	4.1%	46.8	9.7%



STATE OF CALIFORNIA resources AGENCY

California Public Utilities Commission

California Energy Commission

California ISO

Current Activities Summary

Transmission Assessment Focus Area: Approach

Explore planning goals and resource values

1. How much renewables *might* we need?
   - Bookend scale of renewable need by 2030
   - Sources include IEPR, Pathways
2. Which resources *might* be important by 2030?
   - Review resource costs and values in 2030 context to identify resources and zones of potential value for 2030
   - Sources include industry and stakeholder comments, academic and government studies

Identify high-value resources that may need transmission

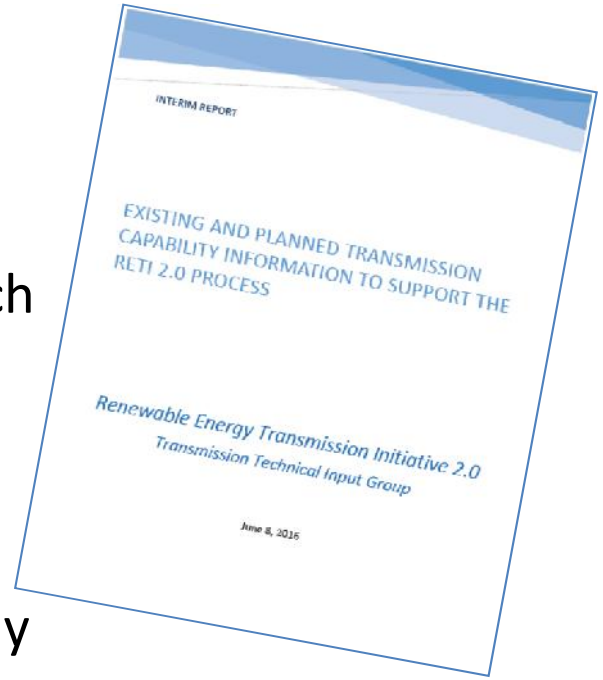
3. How much renewables *might* come from different areas?
   - Bookend range of renewable resources from specific areas that may be developed by 2030
   - Sources include comments, studies
4. *Might* this level of renewables require new transmission?
   - Match resource ranges to existing transmission capacity and identify where resource range exceeds transmission capacity
   - Sources include TPP and WECC studies, stakeholder comment

Proposed Focus Area List

1. In-state resources
   - California Desert
     - Tehachapi
     - Victorville/Barstow
     - Riverside East
     - Imperial Valley
   - San Joaquin Valley
     - Modesto to Bakersfield
   - Northern California
     - Solano and East Bay
     - Sacramento River Valley
     - Lassen & Modoc
2. Import/Export Paths
   - Eldorado/Mead/Marketplace
   - Palo Verde/Delaney
   - California-Oregon Intertie
   - Central and Northern Sierra
3. Out-of-State Projects
   - WY and NM wind
   - NV and AZ solar
   - NV geothermal
   - NW wind and geothermal
   - OOS “Delivery” projects
   - OOS “Network” projects

Transmission Technical Input Group

- TTIG has published an initial report “Existing and Planned Transmission Capability Information to Support the RETI 2.0 Process”
- TTIG is gathering existing studies and data to use to assess in-state resources and import-export paths
  - Generation interconnection studies
  - Transmission planning studies and
  - Any specific 33% RPS or 50% renewable studies
- Use to evaluate “transmission implications” of each Focus Area study range
  - “Tinker toy” infrastructure requirements
  - Identify path-level corridor options
  - Cost and permitting
- Provide initial draft reports to Plenary Group in July

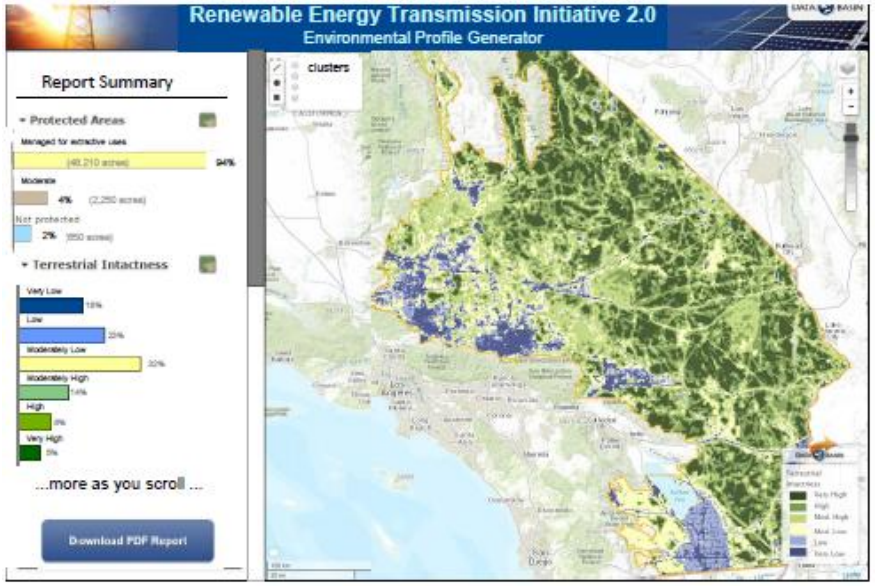


Regional Consultation

- Summarize the existing, planned, and potential capability of the out-of-state transmission network to deliver renewable energy to California, to deliver California excess renewables to western load centers, and to support more renewable energy trade across the west generally.
- RETI 2.0 has requested that Western Interstate Energy Board convene a short "regional consultation"
- RETI 2.0 and WIEB staff will develop a set of questions on expected renewable supply and demand patterns and transmission implications. Example questions:
  - Where is large-scale renewable development (grid storage) likely to occur?
  - Where are markets/load centers for renewable energy around West?
  - How much expansion can be accommodated by existing transmission?
  - What resource/operations changes on existing transmission?
  - What kinds of new transmission might best increase options for access to generation and markets and regional trade?
- Target audience/participants are state officials, utilities, renewables and transmission developers, environmental and other advocates
- Process will take place in July and involve webinar(s), in-person workshop(s), and written comments. WIEB will write report summarizing input for presentation to RETI 2.0 in August

Environmental and Land Use Technical Group

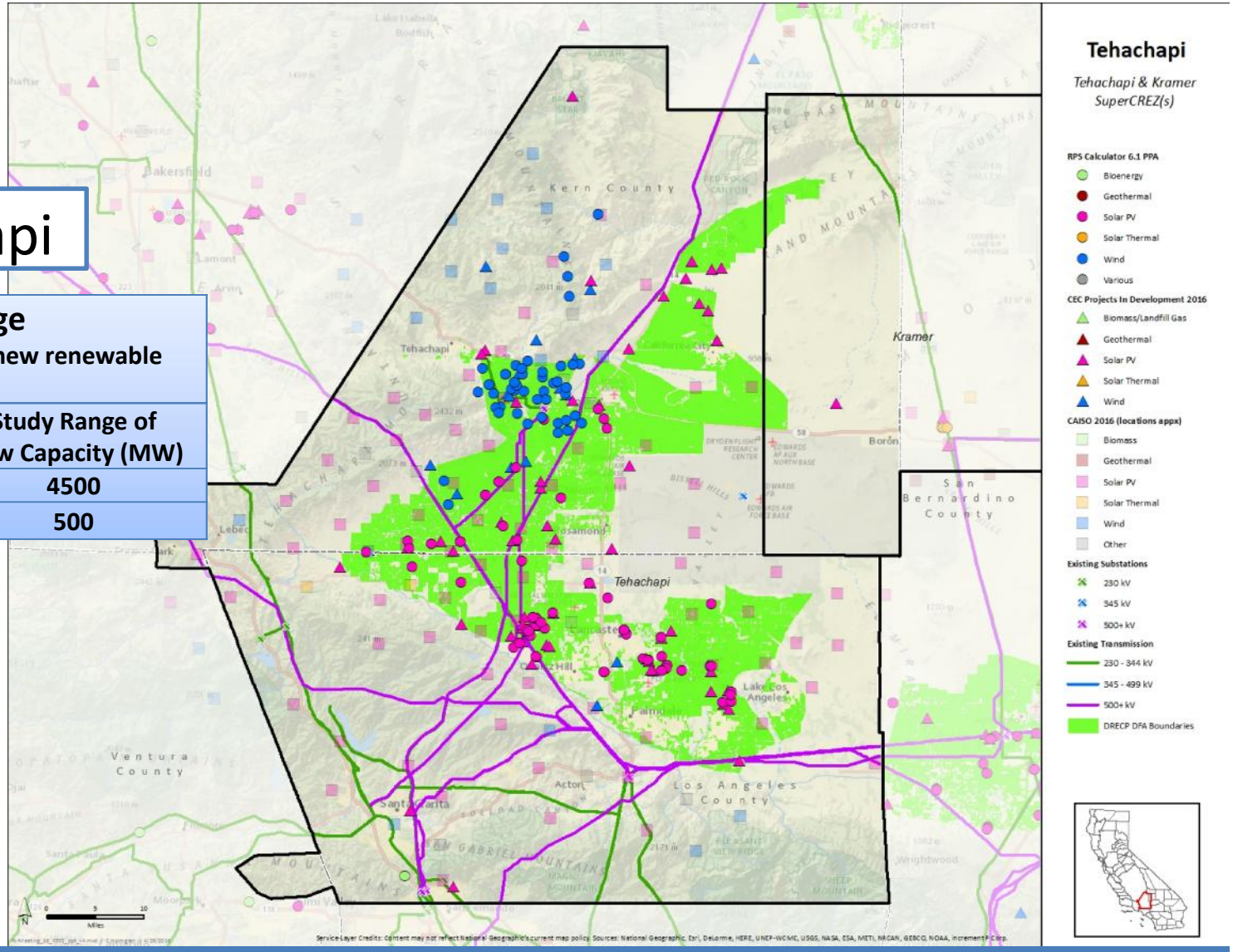
- ELUTG is collecting a database of available datasets and studies in a publicly-accessible online tool DataBasin: https://reti.databasin.org/
- ELUTG is preparing a standard Environmental Profile Report to summarize available data and data gaps
- Working iteratively with the Plenary Group and TTIG, ELUTG will utilize these tools to evaluate the environmental and land use implications of each Focus Area study range, and to make recommendations for further work where necessary
- Provide initial draft reports to Plenary Group in July



Focus Areas Summary

Tehachapi

Study Range Hypothetical additions of new renewable resources	
Resource	**Study Range of New Capacity (MW)**
Solar	**4500**
Wind	**500**



STATE OF CALIFORNIA resources AGENCY

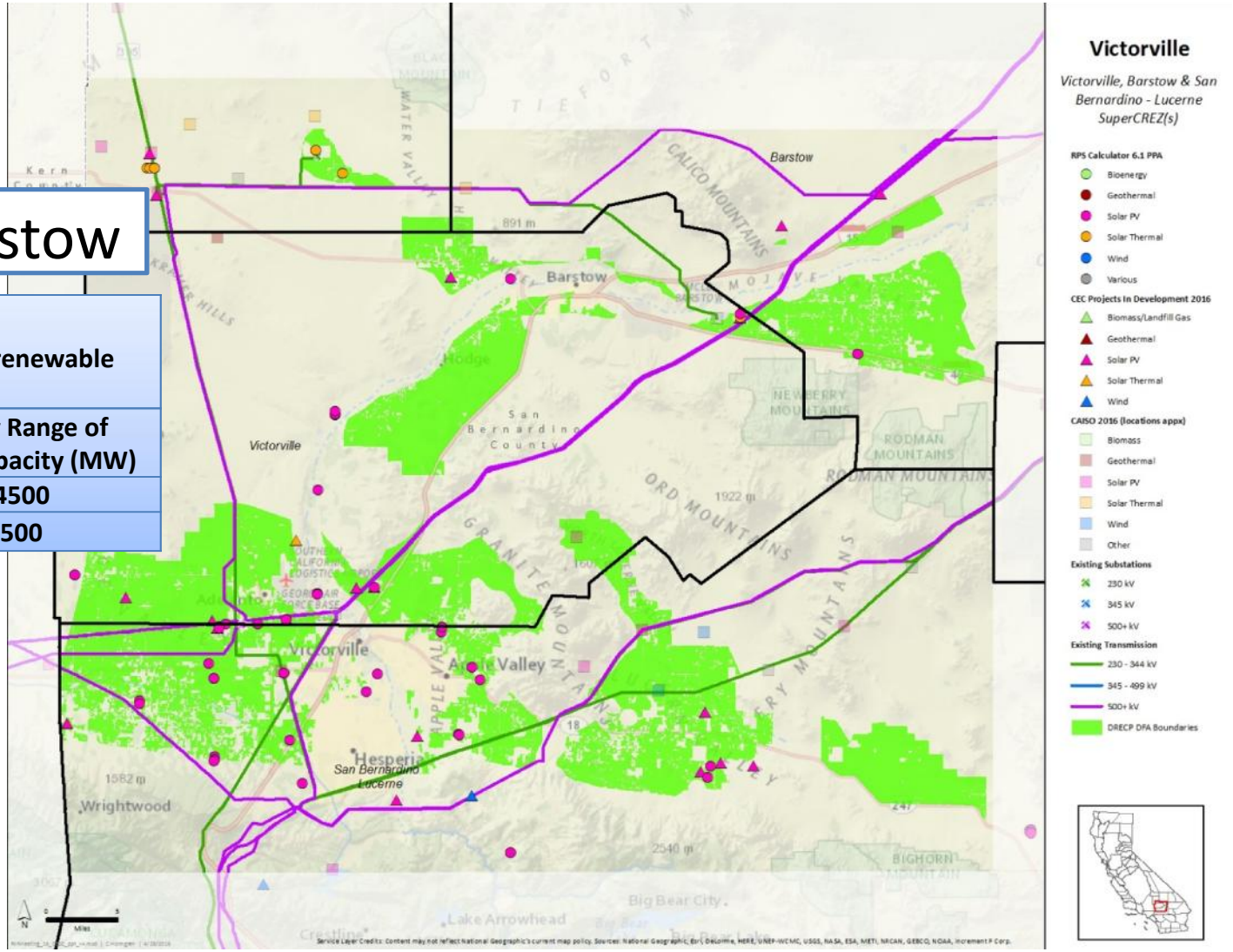
California Public Utilities Commission

California Energy Commission

California ISO

Victorville/Barstow

Study Range Hypothetical additions of new renewable resources	
Resource	**Study Range of New Capacity (MW)**
Solar	**4500**
Wind	**500**



STATE OF CALIFORNIA resources AGENCY

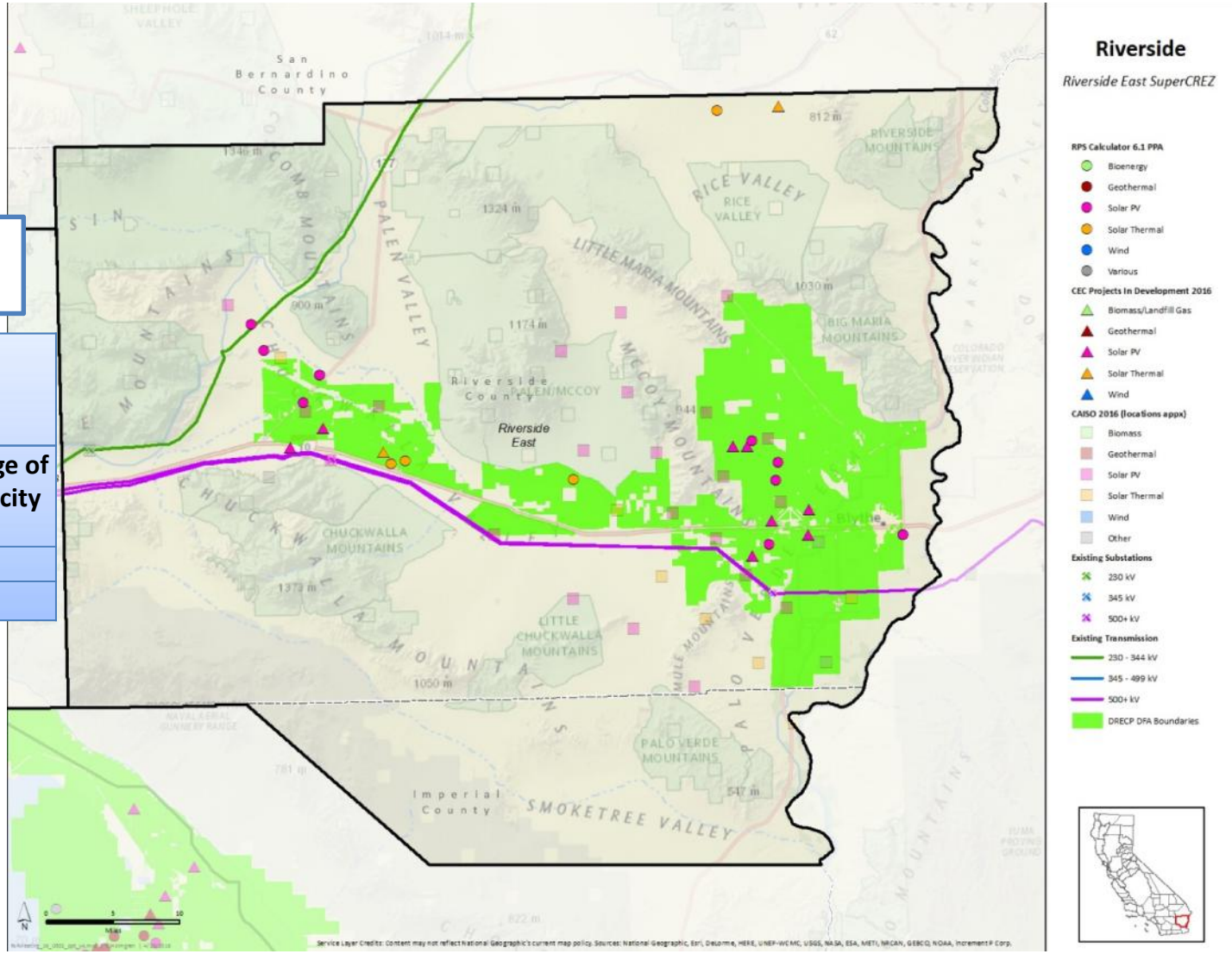
California Public Utilities Commission

California Energy Commission

California ISO

Riverside East

Study Range Hypothetical additions of new renewable resources	
Resource	**Study Range of New Capacity (MW)**
Solar	**4,000**
Wind	**1000**



STATE OF CALIFORNIA resources AGENCY

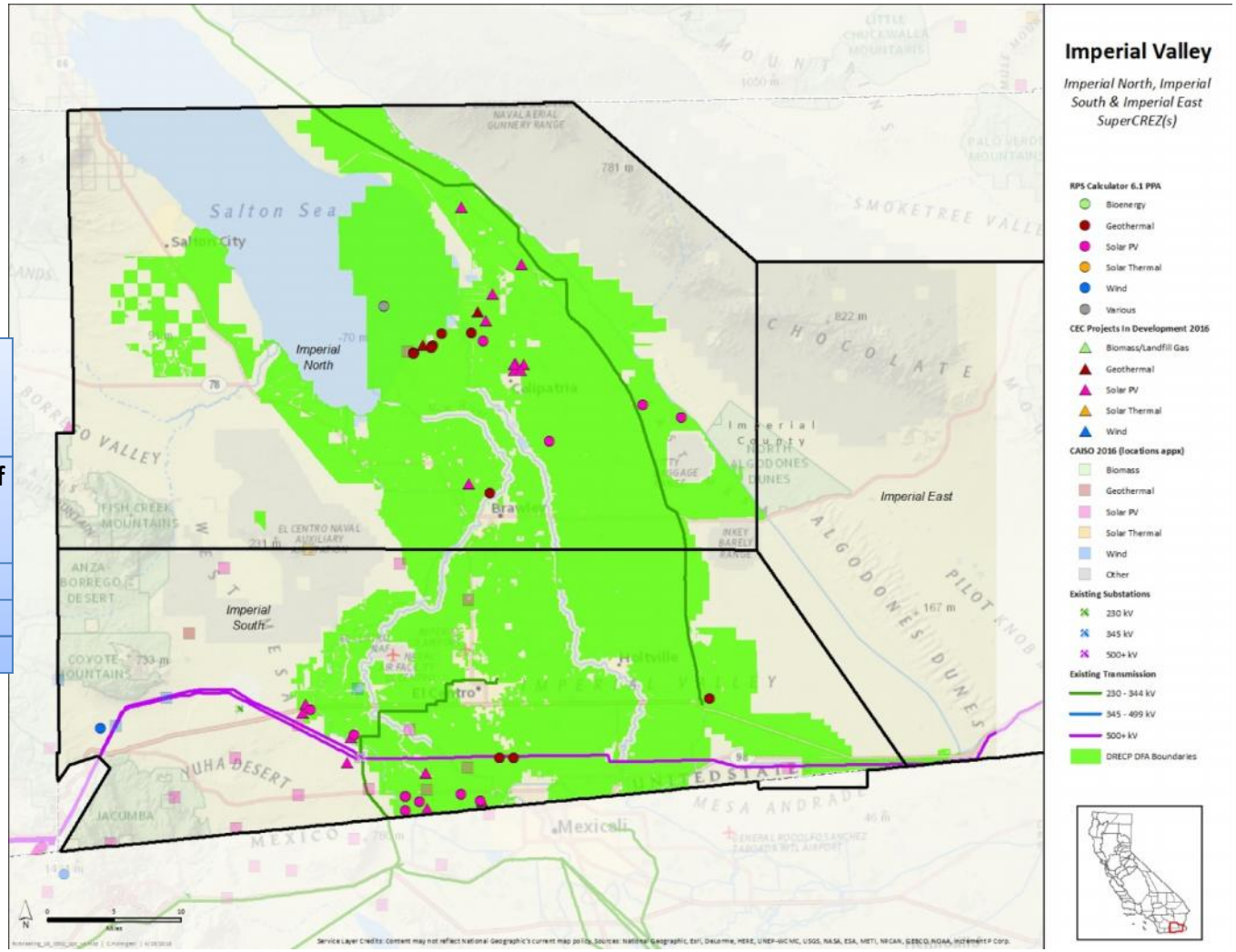
California Public Utilities Commission

California Energy Commission

California ISO

Imperial Valley

Study Range Hypothetical additions of new renewable resources	
Resource	**Study Range of New Capacity (MW)**
Solar	**3500**
Wind	**500**
Geothermal	**1000**



STATE OF CALIFORNIA resources AGENCY

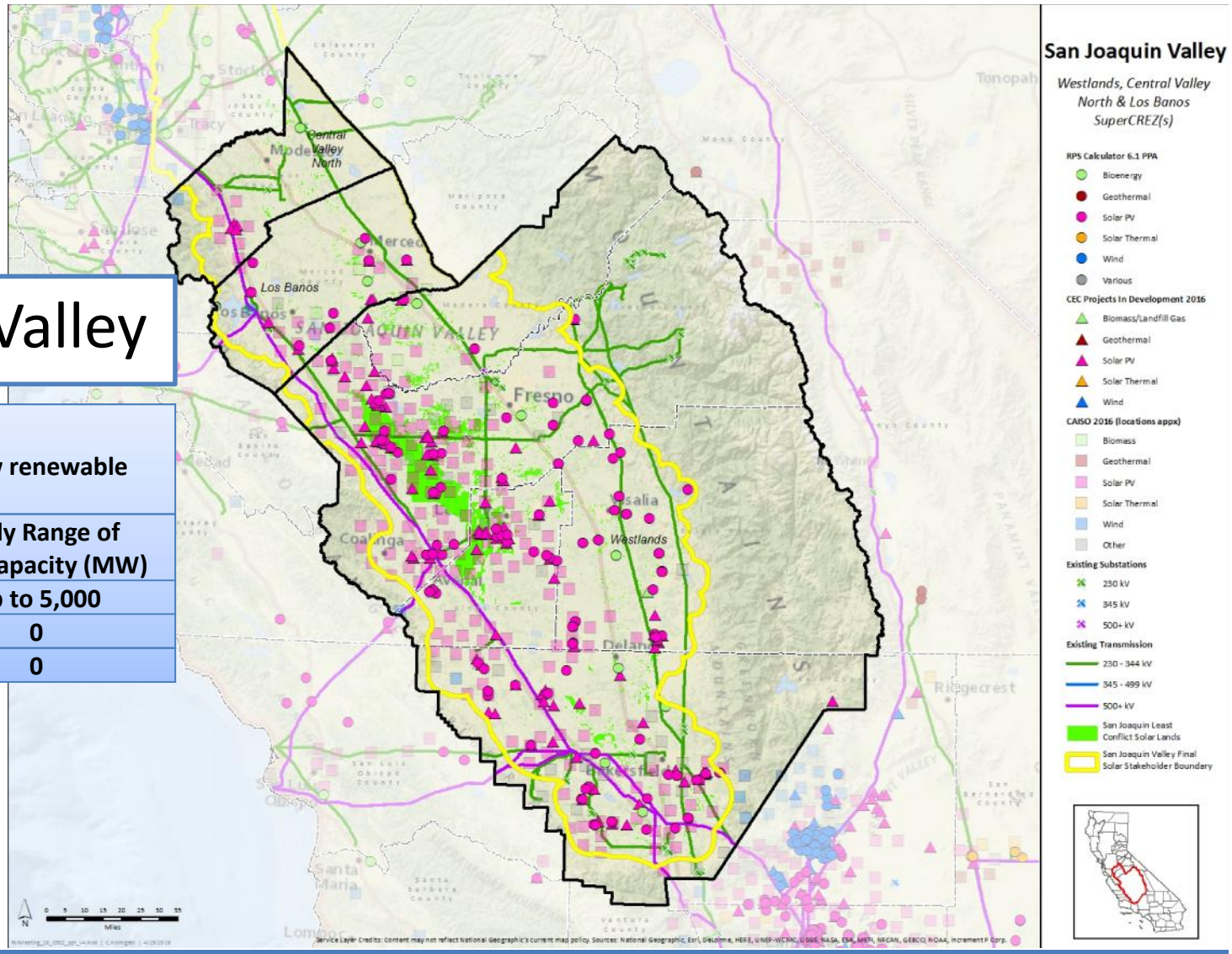
California Public Utilities Commission

California Energy Commission

California ISO

San Joaquin Valley

Study Range Hypothetical additions of new renewable resources	
Resource	**Study Range of New Capacity (MW)**
Solar	**Up to 5,000**
Wind	**0**
Geothermal	**0**



STATE OF CALIFORNIA resources AGENCY

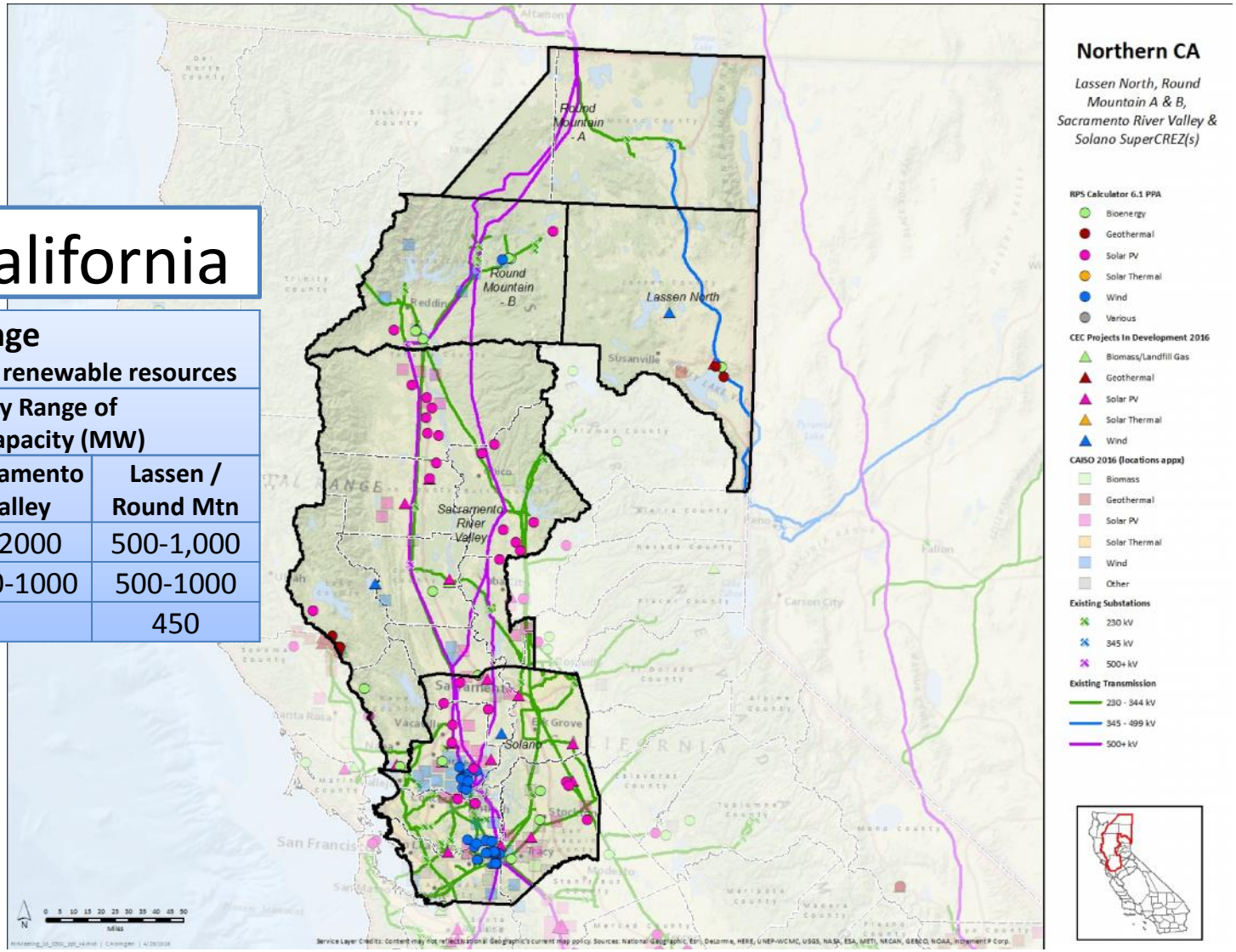
California Public Utilities Commission

California Energy Commission

California ISO

Northern California

Study Range Hypothetical additions of new renewable resources			
Resource	**Study Range of New Capacity (MW)**		
	Solano	**Sacramento Valley**	**Lassen / Round Mtn**
Solar	1-2,000	1-2000	500-1,000
Wind	500-1000	500-1000	500-1000
Geo			450



STATE OF CALIFORNIA resources AGENCY

California Public Utilities Commission

California Energy Commission

California ISO

Draft questions for counties

- What is the status of land use planning for utility-scale renewable energy in the county?
- Are there exclusion areas for renewable energy or transmission development?
- Are there preference areas for renewable energy or transmission development?
- Are there technology-specific restrictions (e.g. wind)?
- What's the status of environmental planning (e.g. sensitive species or critical habitat) that could affect RE or Tx development?
- Are there planning efforts with other government entitites (e.g. tribes, military) potentially affecting RE/Tx that we should be aware of?
- Are there geographic (GIS) data layers for any of the above that you can share with us?

Next Steps

- Revised questions for counties
- Stakeholder workshop on July 21 to review early information
- RETI 2.0 Executives' Workshop mid-August
- Plenary workshop mid-September
- Draft report early October