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# Summary of RETI process for the Energy Commission Workshop on Electricity System Implications of 33 Percent Renewables

**June 29, 2009**

**Black & Veatch**

**Ryan Pletka**

# Important Information

- **RETI** – Renewable Energy Transmission Initiative
- **CREZ** – Competitive Renewable Energy Zone
- www.energy.ca.gov/reti

- *My opinions only today*
- *Focus on Phase 1*

# What is The California Renewable Energy Transmission Initiative?

**RETI is a statewide planning process to identify transmission projects needed to accommodate California's renewable energy goals.**

- California law requires 20% of retail energy sales to come from renewable sources by 2010. The state has also adopted the goal of 33% by 2020.
- Development of renewable generation has slowed in CA. **Transmission is a limiting factor.**
- RETI will facilitate planning and permitting for competitive renewable energy zones (CREZs)

# What is a Renewable Energy Zone?

- A group of relatively dense renewable resources that when combined have improved economics (ie, Economies-of-scale)
- *Also -*
  - Common transmission interconnection
  - Similar development timeframe

# RETI stakeholders

The following are members of the Stakeholder Steering Committee:

**Transmission Providers/LSEs:**
- CAISO
- PG&E
- SDG&E
- SCE
- IID
- LADWP
- SMUD
- NCPA
- SCPPA

**Generators:**
- Biomass Industry
- Geothermal Industry
- Solar Industry
- IEP
- Wind Industry

**Public Interest / Consumers:**
- NRDC
- Sierra Club
- DRA
- Farm Bureau
- Native American Tribes

**Permitting Agencies:**
- BLM
- DFg
- USFS
- US Military
- CSAC
- RCRC
- CPUC
- CEC

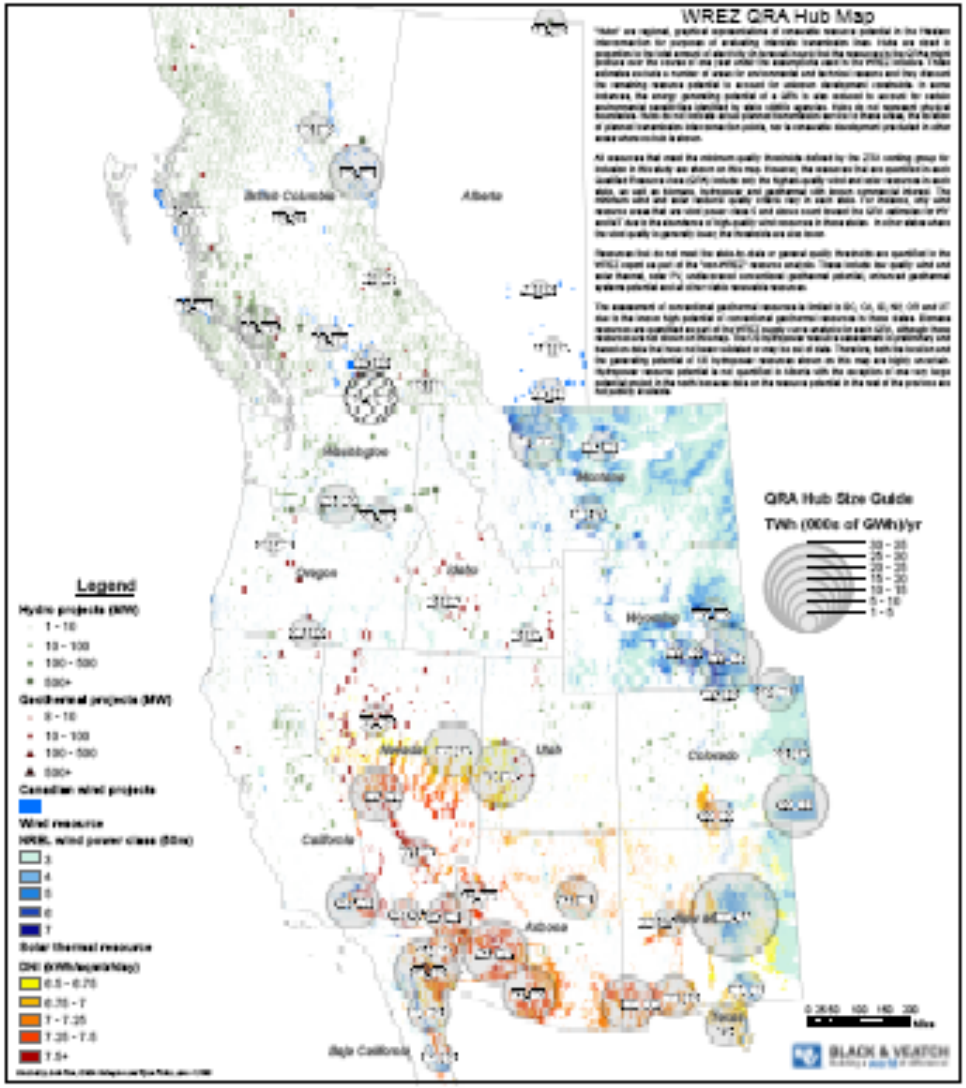
# RETI Phases

- Phase 1: Identify and rank CREZs
  **(DONE)**
- Phase 2: Develop statewide conceptual transmission plans
  (Phase 2A Draft Report out for comment)
- Phase 3: Prepare detailed plans of service for priority components of the plan applications

# RETI Phase 1 Study Area

# Commercial: Western Renewable Energy Zones Covers Rest of WECC

- www.westgov.org/wga/initiatives/wrez/




## Notes on Each State/Province

**Alberta:** Wildlife and landuse concerns are addressed on a project-specific basis through the environmental impact assessment process.

**Arizona:** Arizona's hubs* represent areas of high-quality renewable energy resources for purposes of evaluating interstate transmission lines. This representation is not intended to suggest that renewable development should occur solely within these "hubs". Power site selection for renewable energy generation facilities and associated transmission lines public and outside these "hubs" should include consultation with the Arizona Game and Fish Department and other relevant agencies for wildlife and environmental information. Stakeholders are participating in Arizona's Renewable Transmission Task Force (RTTF) process to more precisely evaluate identified renewable energy zones and develop appropriate transmission plans. Further information is available at http://www.azrttf.gov/documents/meetings/default.asp.

**British Columbia:** British Columbia's map includes 10 hubs, representing the province's 10 Qualified Resource Areas. British Columbia's map also includes a separate hub on the British Columbia-Washington border that represents a 10,000 gigawatt-hour shaped energy product. The inclusion of this additional hub and associated cost curve is not to represent a specific project shaped to data in the border, but to illustrate the opportunity of a shaped and timed bi-directional energy product in and across border zone locations. The hubs in British Columbia do not include environmental issues beyond the criteria applied to data in the WREZ process, and have not been approved by the Premier of British Columbia because the province has been in an election campaign. As such, the hubs and exclusions are subject to change.

**California:** Stakeholders led by previously active California Renewable Energy Transmission Initiative (RETI) to more precisely identify renewable development potential in renewable-rich areas, environmental concerns, and transmission plans of service for these areas. Please refer to the RETI website at http://www.energy.ca.gov/reti/ for additional information about renewable development potential in and around California, and the transmission planning efforts underway.

**Colorado:** The Colorado hubs represent the results of the Colorado Governor's Energy Office New Energy Economy Transmission Study. Further information on the Qualified Resource Areas and wildlife data are available on the Western Governors' Wildlife Council web site.

**Idaho:** The Idaho hubs are based on those portions of the Qualified Resource Areas (QRAs) in Idaho as defined by the Western Governors Association that can provide for renewable energy development with fewer impacts to old and near-virgin range, sage grouse and historic species of greatest conservation need. These hubs are not meant to indicate that renewable energy will be developed at or near these locations. There has been little consideration of construction logistics or costs, permitting or cultural or other land use concerns raised by the specific sites, except for wildlife problems which may have high sensitivity.

**Montana:** Montana's hubs will be currently drafted and may be changed in the printed report. Footnote forthcoming.

**Nevada:** Footnote forthcoming.

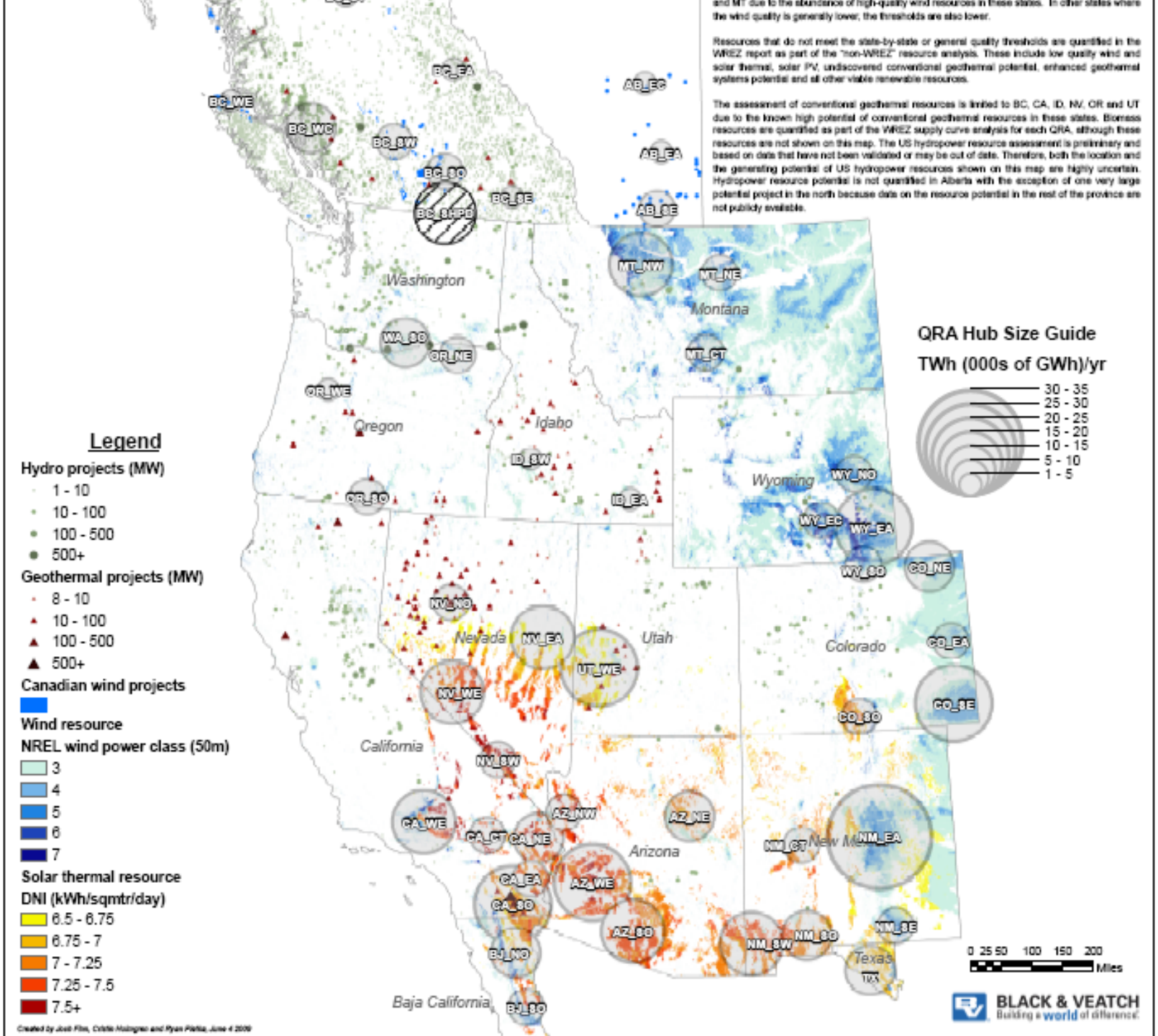
**New Mexico:** New Mexico's five study-area high-quality renewable energy resource hubs identified using the criteria applied to data in the WREZ process. Anyone interested in these areas for development purposes should also take all information available on wildlife sensitivity within the Qualified Resource Areas on the Western Governors' Wildlife Council web site. Proper site selection of renewable energy generation facilities and associated transmission lines should include certain planning to avoid, minimize or mitigate impacts to crucial wildlife habitats and connectivity corridors anticipated in the wildlife sensitivity information.

**Oregon:** Solid-white hub represents high-quality renewable energy resource identified after screening for environmental and wildlife concerns, including key sage and sage-grouse migratory corridors, habitat for deer, pronghorn and elk herds, Oregon sage-grouse habitat, and transmission opportunity zones (zones) identified in the Oregon Conservation Strategy. Within each of the hubs, there remains some overlap with Bonneville Power Administration (BPA) transmission planning zones. Although areas meeting this greatest impacts have been avoided, BPA's plan for wildlife to guide project siting and offer opportunity to direct mitigation efforts. Fine-scale information on all of the hubs is available for consultation at the project scoping phase, and full information on the Qualified Resource Areas and wildlife sensitivity is available on the WGA web site.

**Utah:** Footnote forthcoming.

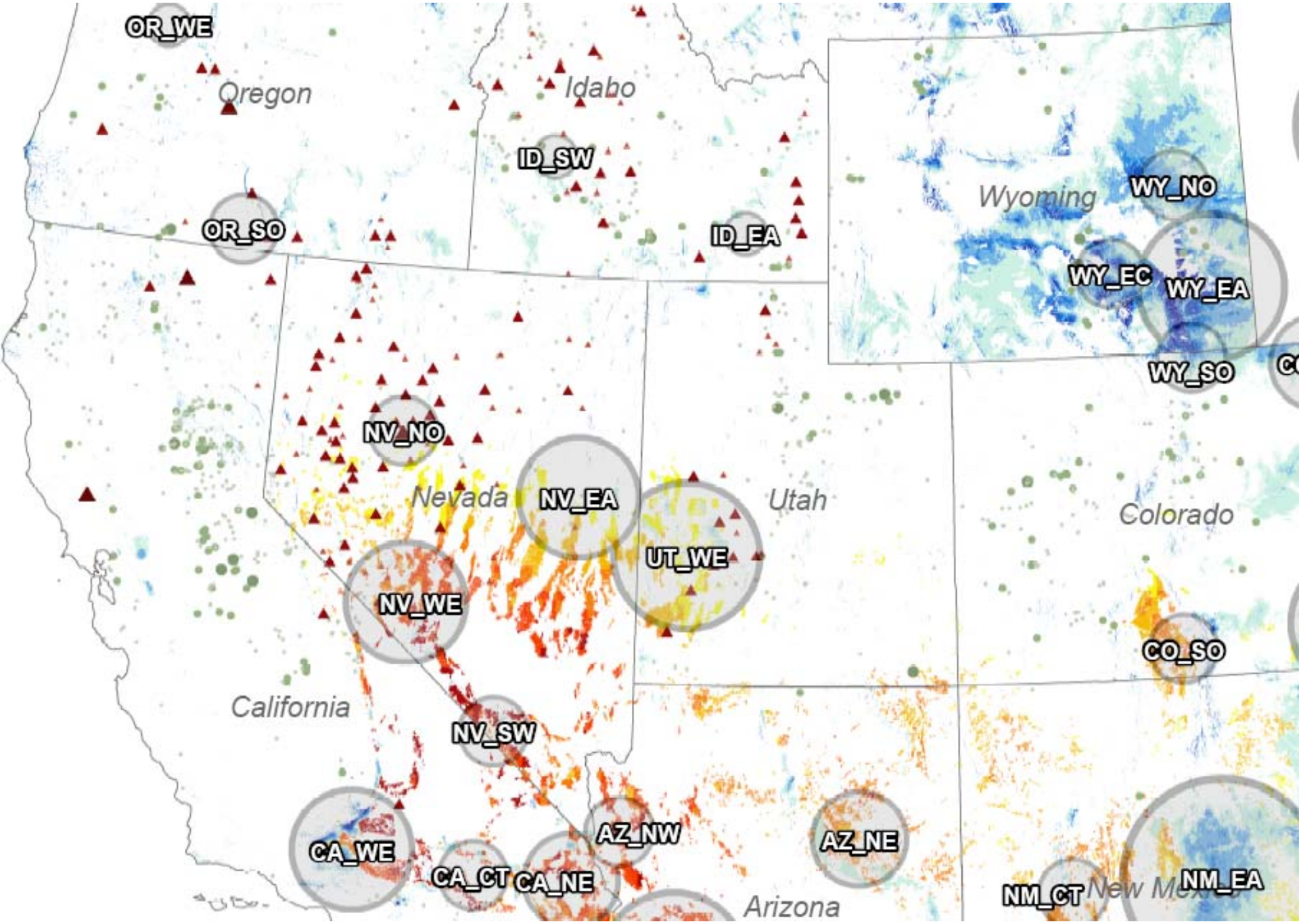
**Washington:** Hubs reflect the high-quality renewable energy resources identified after screening for environmental and wildlife concerns. Full information on the Qualified Resource Areas and wildlife sensitivity is available on the WGA web site. Washington may revise this map after public review and comments.

**Wyoming:** Wyoming has not established MW hubs or QRAs. Renewable project proposals and transmission will be evaluated on a case-by-case basis. Wyoming's hubs represent areas of high-quality wind resources and are designated solely for purposes of modeling the cost of delivered electricity to load centers. This representation is not intended to suggest that renewable development should be precluded elsewhere in the state or that significant wildlife issues occur in the vicinity of the Wyoming hubs.




Resources that do not meet the state-by-state or general quality thresholds are quantified in the WREZ report as part of the "non-WREZ" resource analysis. These include low quality wind and solar thermal, solar PV, undiscovered conventional geothermal potential, enhanced geothermal systems potential and all other viable renewable resources.

The assessment of conventional geothermal resources is limited to BC, CA, ID, NV, OR and UT due to the known high potential of conventional geothermal resources in these states. Biomass resources are quantified as part of the WREZ supply curve analysis for each QRA, although these resources are not shown on this map. The US hydropower resource assessment is preliminary and based on data that have not been validated or may be out of date. Therefore, both the location and the generating potential of US hydropower resources shown on this map are highly uncertain. Hydropower resource potential is not quantified in Alberta with the exception of one very large potential project in the north because data on the resource potential in the rest of the province are not publicly available.


OR_WE
Oregon
Idaho
ID_SW
OR_SO
ID_EA
Wyoming
WY_NO
WY_EC
WY_EA
WY_SO
NV_NO
Nevada
NV_EA
Utah
Colorado
UT_WE
NV_WE
CO_SO
California
NV_SW
AZ_NW
AZ_NE
CA_WE
CA_CT
CA_NE
NM_CT
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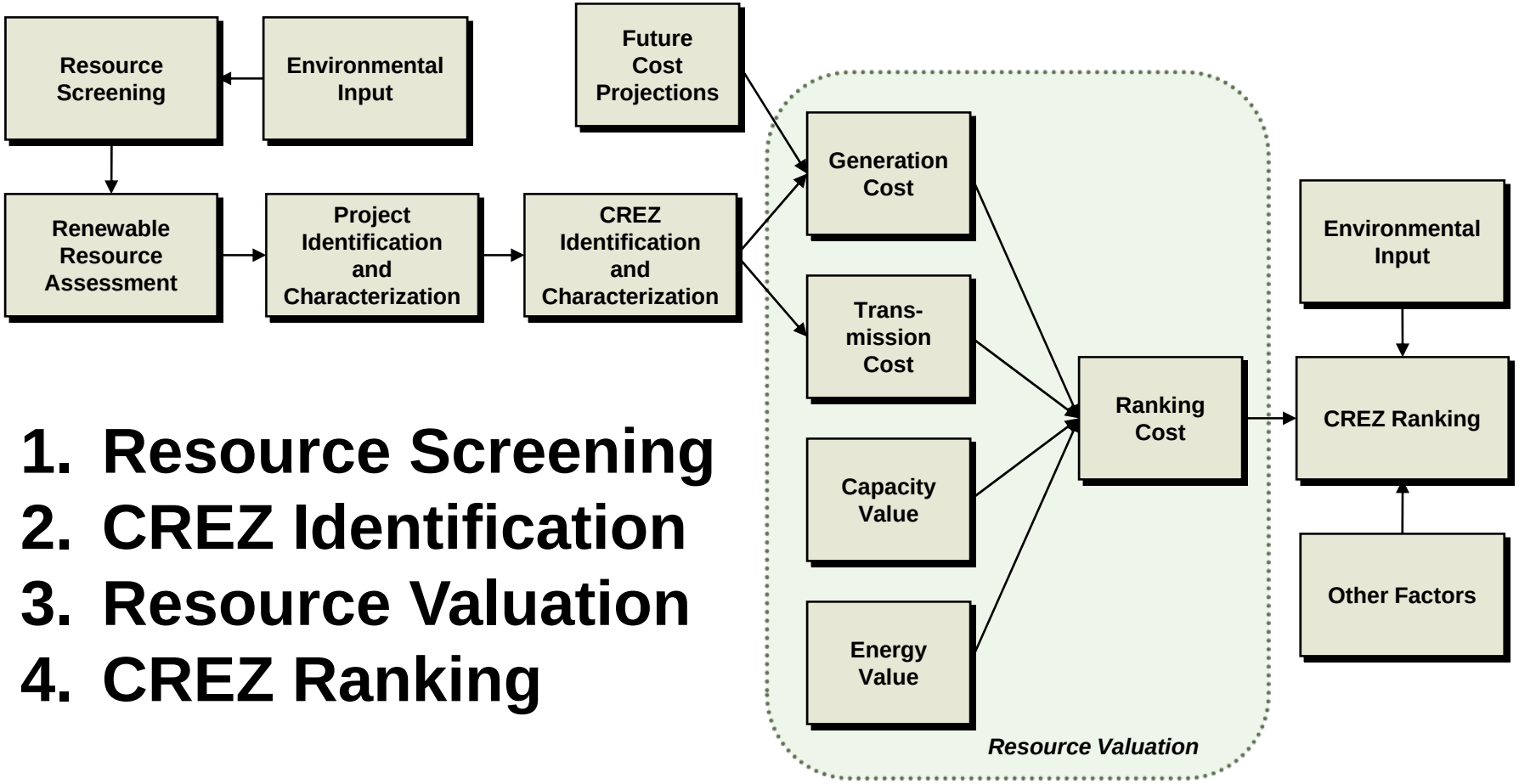
Arizona

# Phase 1 RETI Methodology Overview

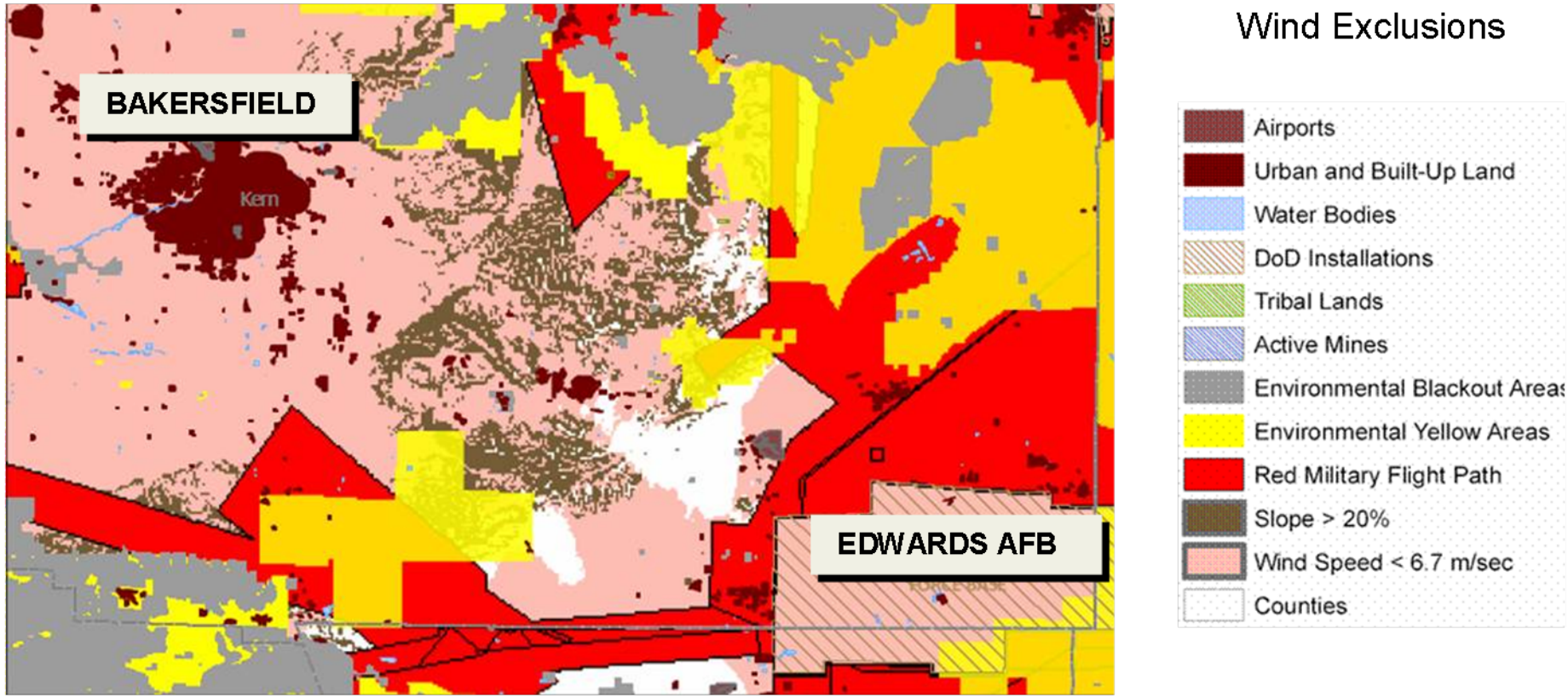



1. **Resource Screening**
2. **CREZ Identification**
3. **Resource Valuation**
4. **CREZ Ranking**

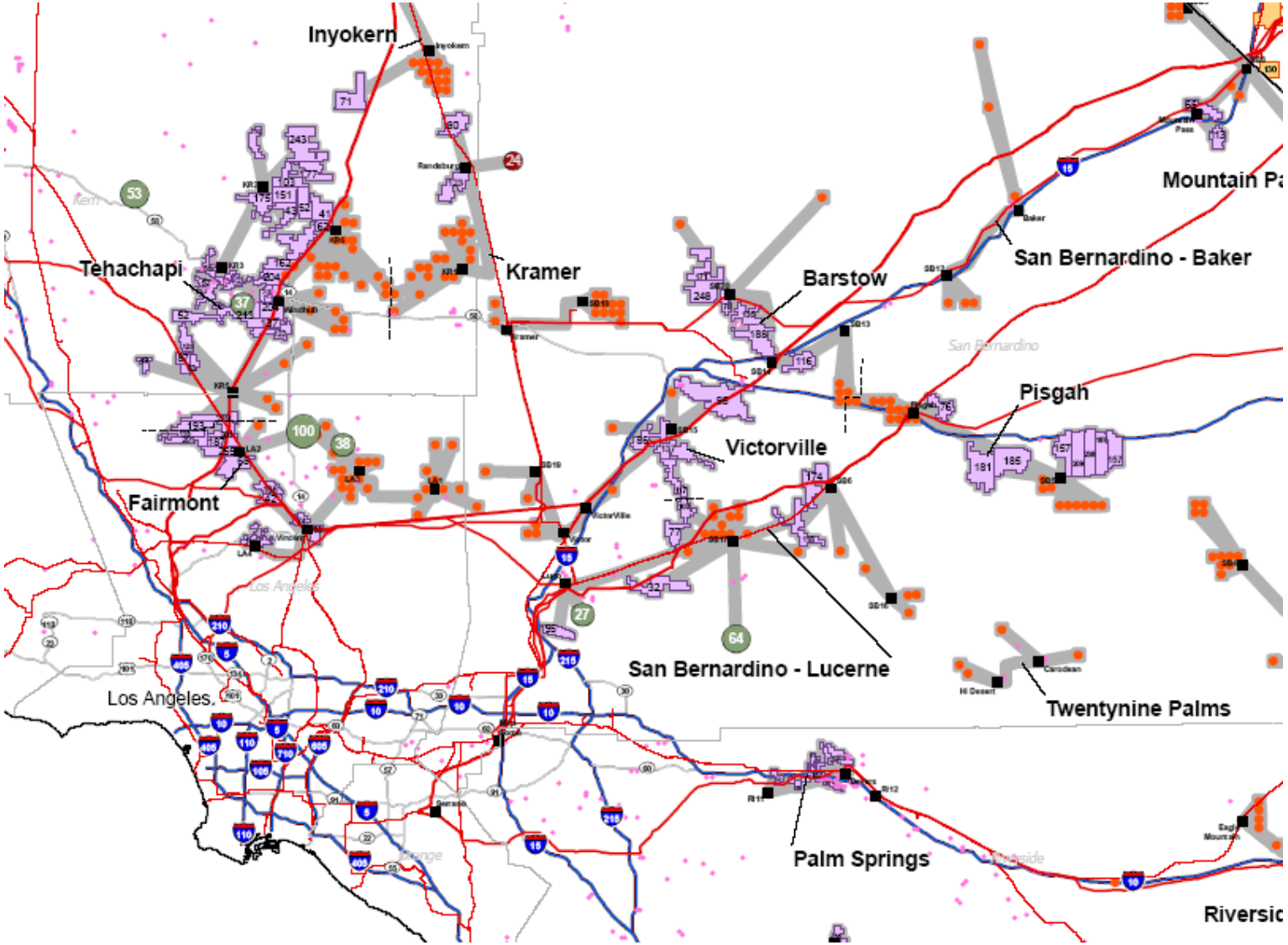
# RETI "Net Short"

- Assessment of renewables needed to meet 33% target
  - Focus on the incremental requirements for new large scale transmission
- *RETI Net Short (GWh) =*
  *{(California LSE Sales) x (Annual % RPS Requirement)}*
  *- {(Operating Resources)*
  *+ (Under Construction and Pre-Construction Resources)*
  *+ (Go Solar California Contribution)*
  *+ (Other Renewables Contribution)}*
- 2020 RETI NET SHORT = 59,710 GWh/yr
- Phase 2 targets 160% of the Net Short

# Detailed Technical and Environmental Screening



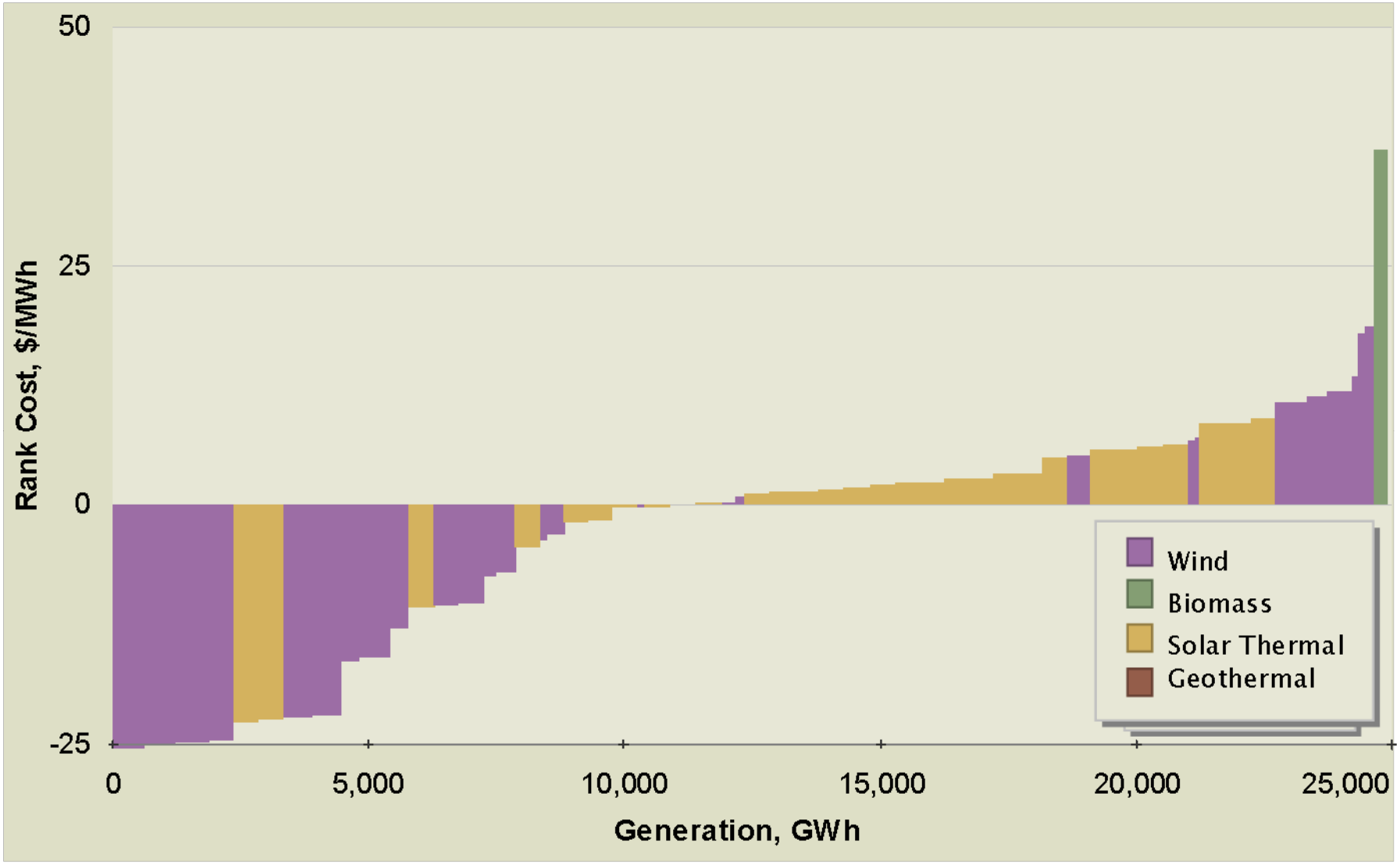
# Project and CREZ Identification



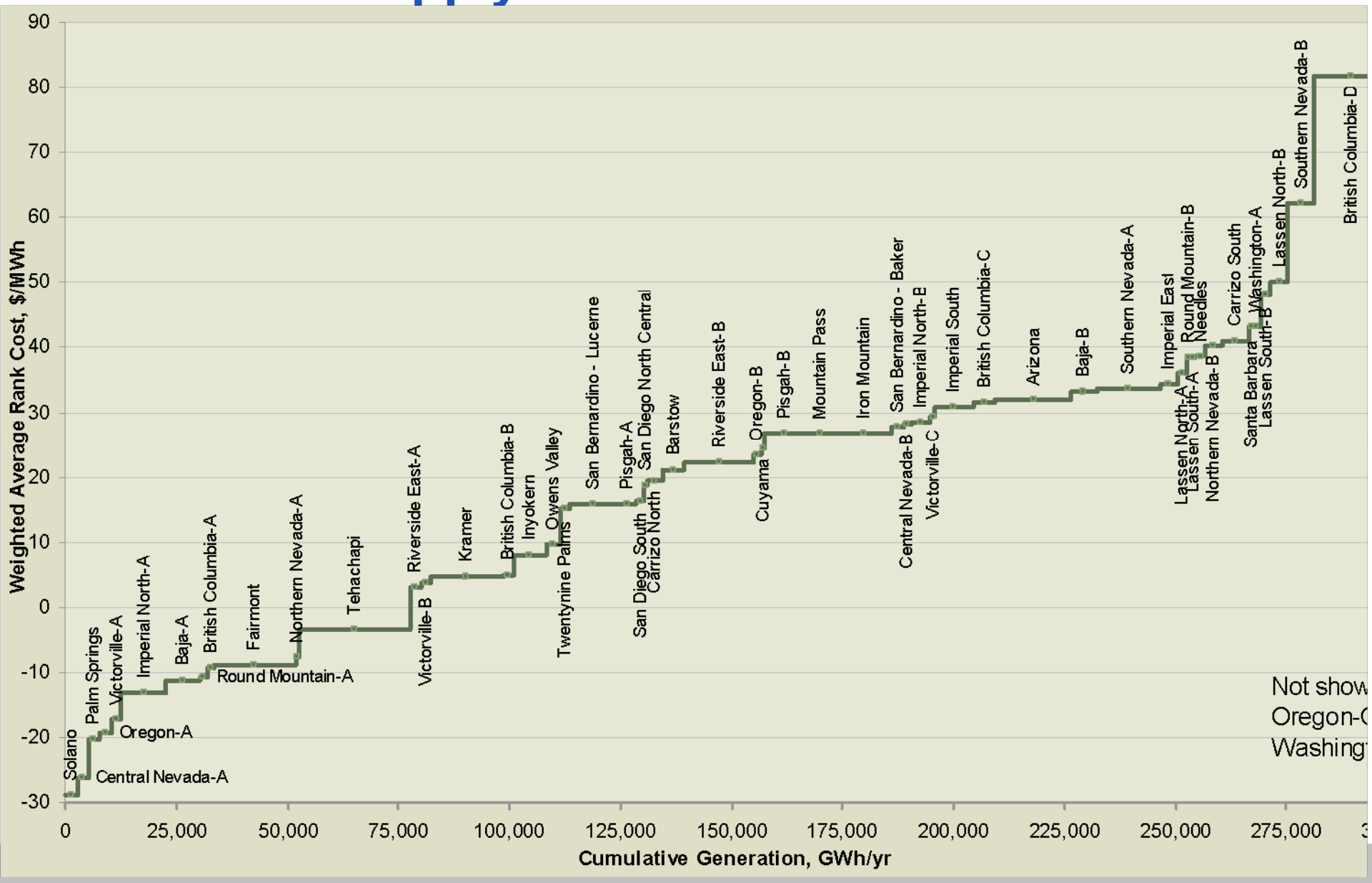
# Tehachapi California Area Wind Resources

Wind Power Density at 50m (Source: AWS)

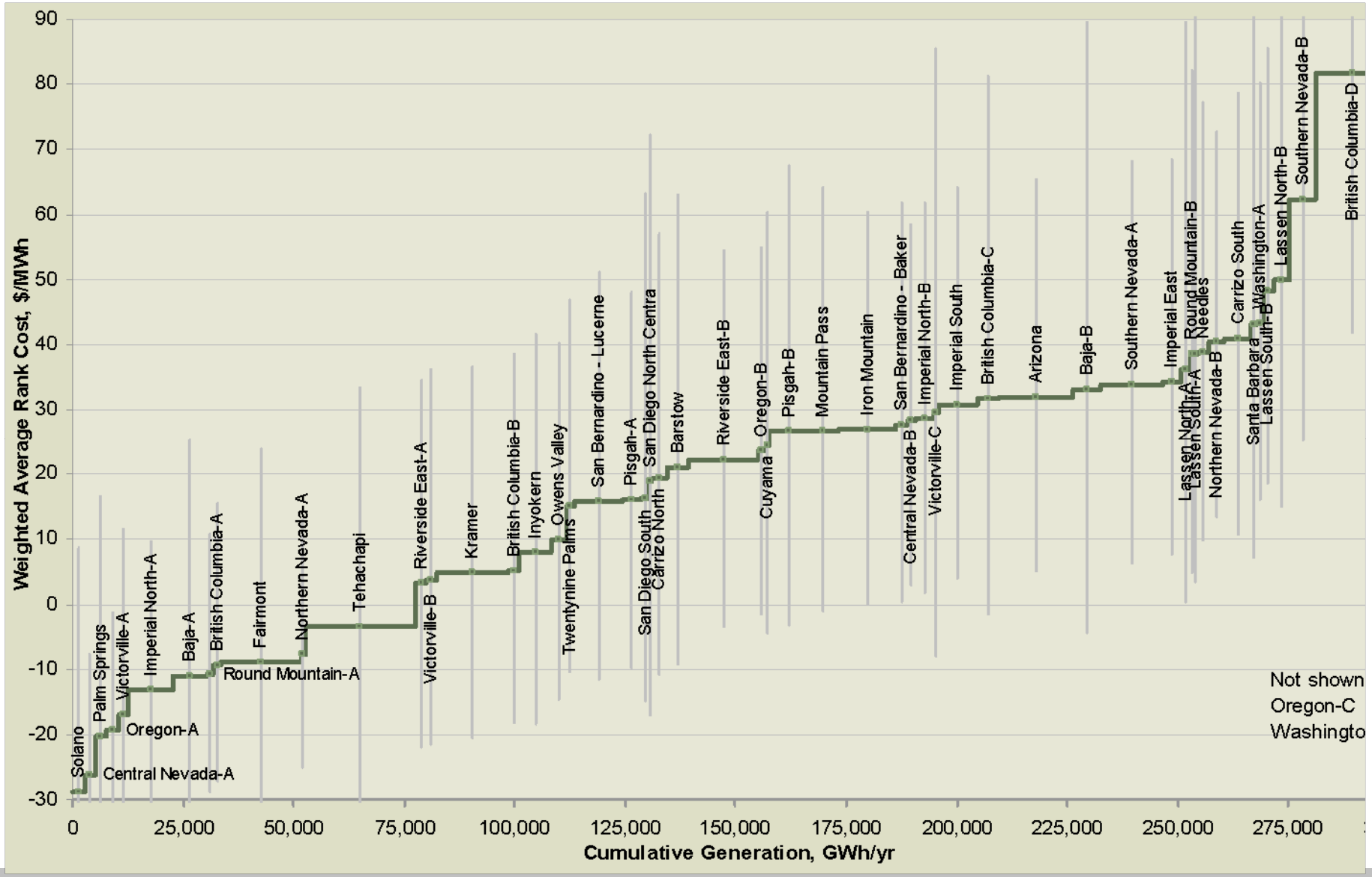
# Tehachapi Supply Curve



# RETI Zonal Supply Curve

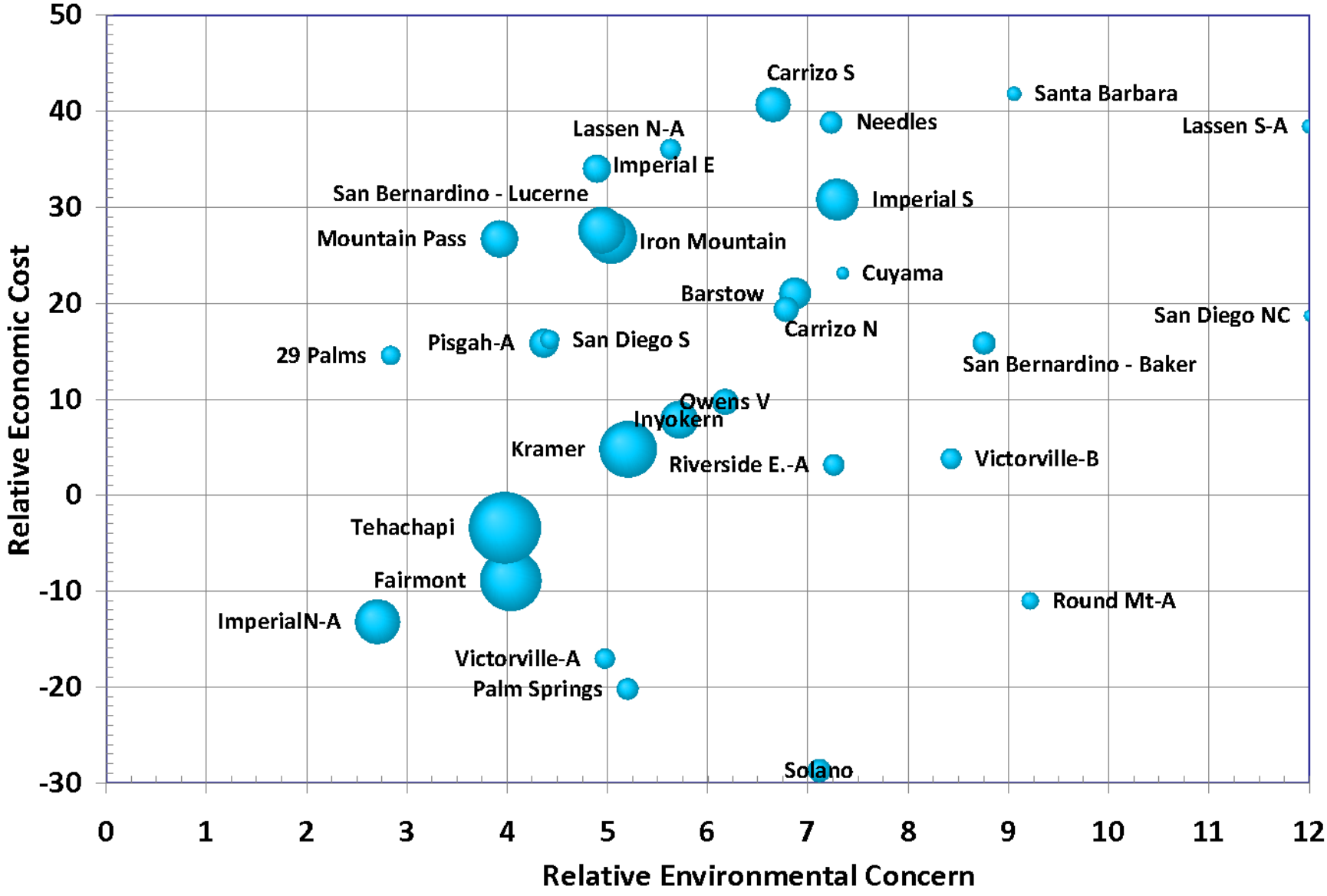


# CREZ Ranks with Uncertainty Shown



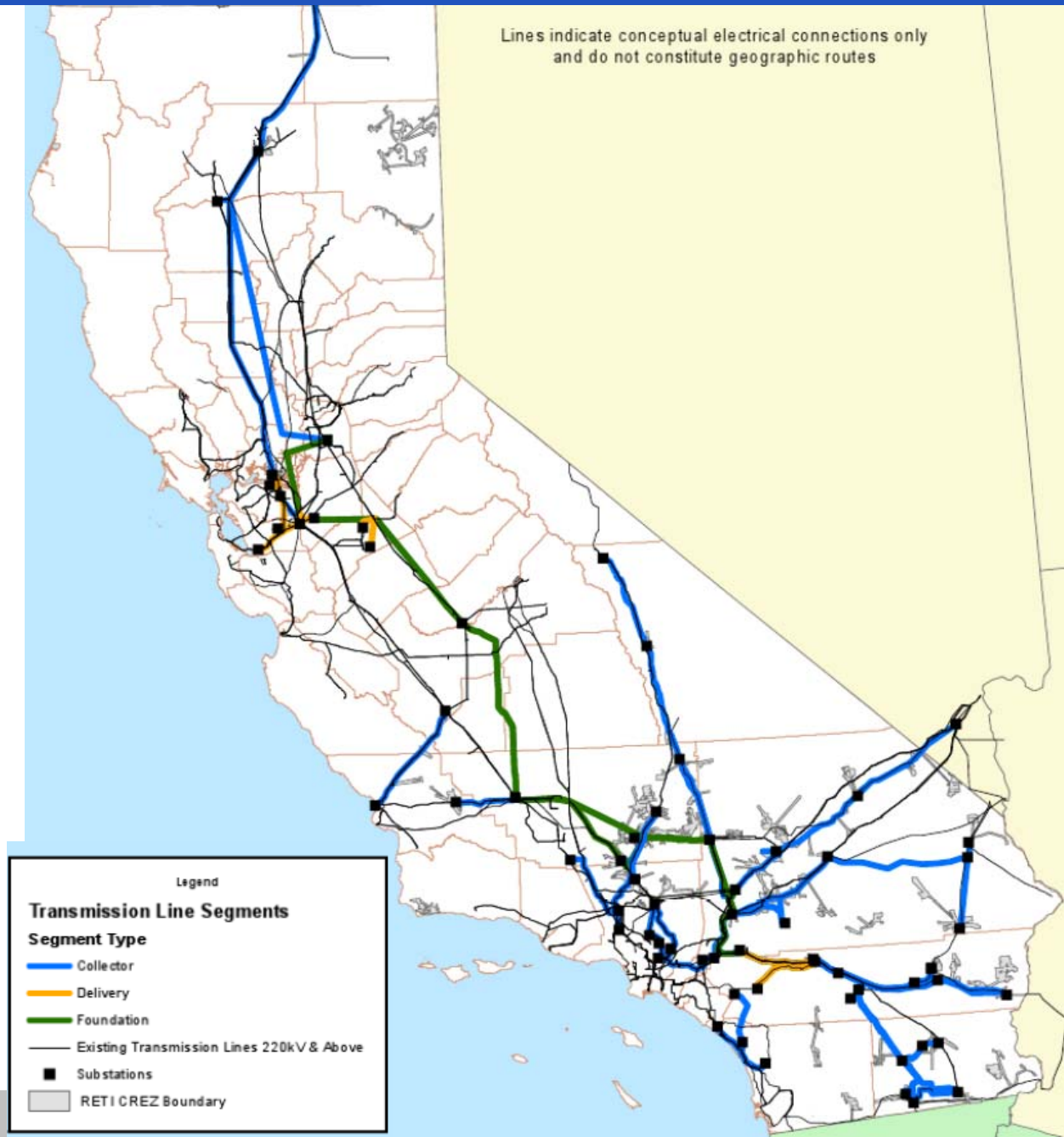
# RETI Phase 1 Environmental and Economic Ranks

## Circle size proportional to CREZ energy (GWh/yr)



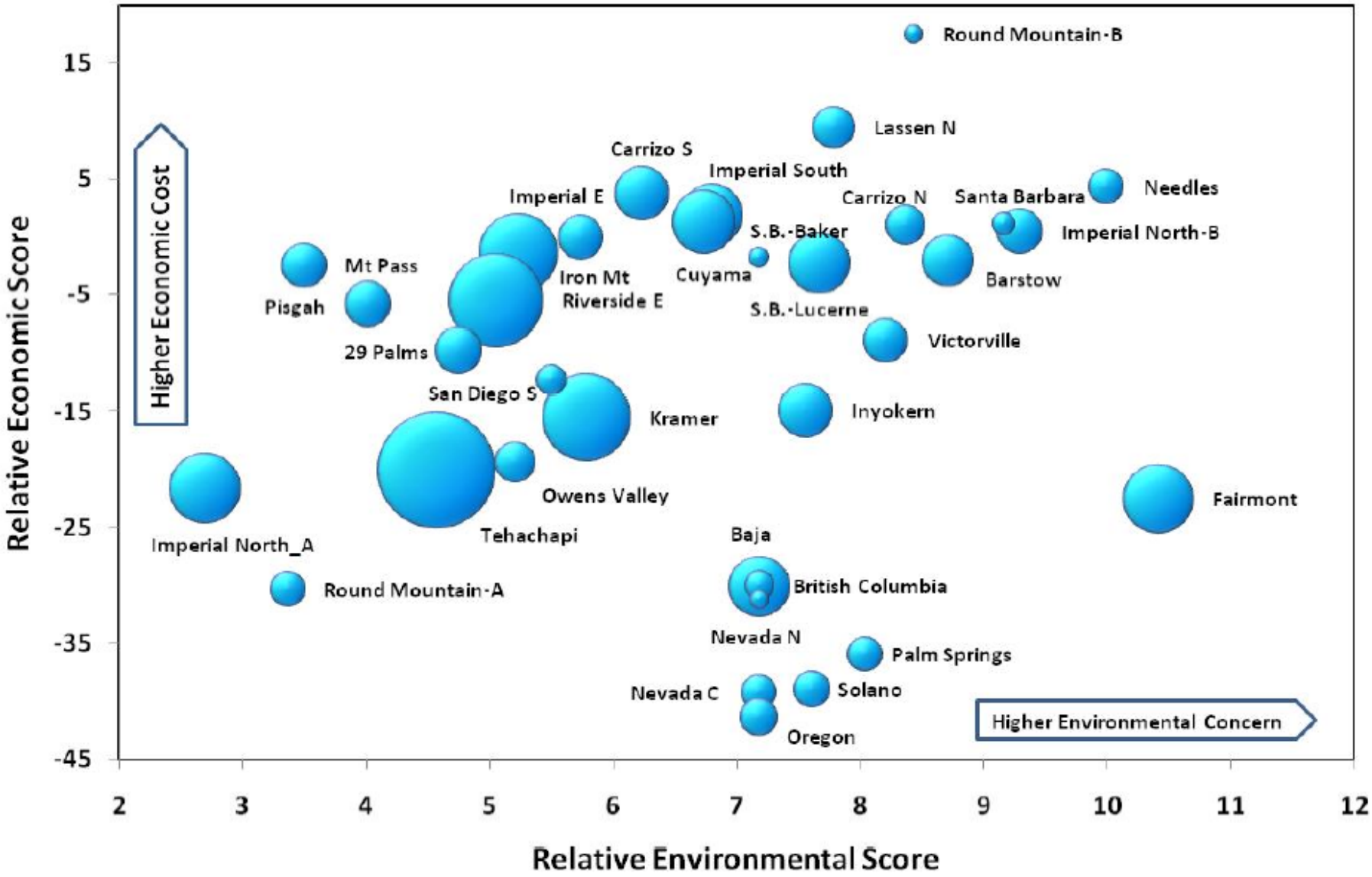
# Phase 2A Draft Report Available for Comment Now

- Transmission Segments Identified:
  - **Foundation**
  - **Delivery**
  - **Collector**



# RETI Phase 2A DRAFT Environmental and Economic Ranks

*See important notes in draft report*



# Thank You

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