RETI – Phase 2 and Beyond

IEPR Siting Workshop

May 4, 2009

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RETI Phase 1

- Renewable Energy Resource Assessment
  - Identification of “competitive renewable energy zones”, aka CREZ
  - California and neighboring states
  - Energy and capacity potential by technology
  - Economic and environmental ratings
  - Phase 1B report posted January 2009, updated in March
  - http://www.energy.ca.gov/reti/index.html

RETI Phase 2A

- Conceptual transmission planning
  - Transmission access to all CREZ in CA and neighboring states
  - Delivery of renewable energy to CA loads sufficient to meet 33% RPS
    - CA 2020 33% net short ≈ 59,700 GWh
      - ≈ 40% of CREZ energy identified in Phase 1
    - Renewable transmission capacity target ≈ 96,000 GWh
    - About 20,000 and 30,000 MW, depending on technology

RETI Phase 2A

- CREZ Revision
  - Update Phase 1 “proxy” projects in CREZ
    - Land ownership fragmentation
    - BLM development caps
  - Update commercial interest data
  - Update restricted area information
  - Investigate disturbed lands

Conceptual Transmission Plan Goal

- Identify most valuable network transmission line segments providing access to CREZ and delivering renewable energy to load centers.
- Provide needed information to CAISO and POU transmission planners.
- Build public understanding and support for transmission needed to meet renewable goals.

Conceptual Transmission Plan Sample Components

- Loop existing 500 kV Palo Verde-Devers #1 into SCE Midpoint substation creating 500 kV Palo Verde-SCE Midpoint #1 and 500 kV SCE Midpoint-Devers #1
- Build 500 kV SCE Midpoint-Desert Center #1 line (50 miles) on double circuit towers
- Build 500 kV Desert Center-Devers #1 line (68 miles) on double circuit towers
- Rebuild existing 230 kV Julian Hinds-Eagle Mountain #1 line with double circuit 230 kV towers (15 miles)
- Add new 230 kV Julian Hinds-Eagle Mountain #2 line on open side of towers (15 miles)

Line Segment Prioritization

- 115 network line segments plus ancillary facilities
  - POU and IOU facilities
  - Consensus prioritization methodology
- “Foundational” and “Access” line segments
- Sort into 4 levels of value to meeting RPS target
- On line dates and planning status also considered

Conceptual Transmission Plan Prioritization Criteria

- Transparency
- Objective data
  - Line segment utilization for renewable energy
    - Power distribution factors, aka “shift factors”
  - Access to preferred CREZ
    - Most total energy
    - Lower cost and environmental concern
    - Most energy having PPAs or in queues
  - Environmental concerns associated with lines
  - Cost

Line Segment Utilization

- Shift Factors (power distribution factors)
  - Power inserted into grid from any CREZ spreads throughout all WECC network line segments
  - Shift factor = percentage of inserted power flowing in any line segment
  - Provide the basis for evaluating the usefulness of the line segment to accessing CREZ and delivering energy to load centers

Shift Factor Calculations

- Thanks to Jan Strack and John Jontry at SDG&E!
- Start with lines in WECC 2018 heavy summer case
- Add all proposed CA lines and facilities
- Decrease generation in CA load centers proportional to renewable net short
- Insert one megawatt at each CREZ connection
- GridView program computes shift factors

Line Segment Utilization Shift Factor Sample

Line Segment ID →	13	14	15	16	17
CREZ Name ↓	MTPS_BARS_1	BARS_LUGO_1	PISG_LUCV_1	LUCV_LUGO_1	PISG_MIRA_1
Baja	-0.0230	0.0285	-0.1803	-0.1782	0.0080
Barstow	0.0423	0.6328	0.0393	0.0390	0.0458
British Columbia	-0.0219	0.0188	0.0352	0.0348	0.0261
Carrizo North	0.0008	-0.0240	0.0469	0.0460	0.0244
Carrizo South	0.0008	-0.0240	0.0469	0.0460	0.0244
Cuyama	0.0008	-0.0240	0.0469	0.0460	0.0244
Fairmont	0.0324	0.0615	0.0130	0.0125	0.0351

Prioritization Criteria Formulas

- Criterion A – Access to total CREZ energy
- Segment Score =

Σ {segment shift factor for CREZ × CREZ energy} ÷ line segment cost

  - Absolute values of shift factors are used
  - Grid response is assumed linear, independent of CREZ energy
- Criteria B &C are similar

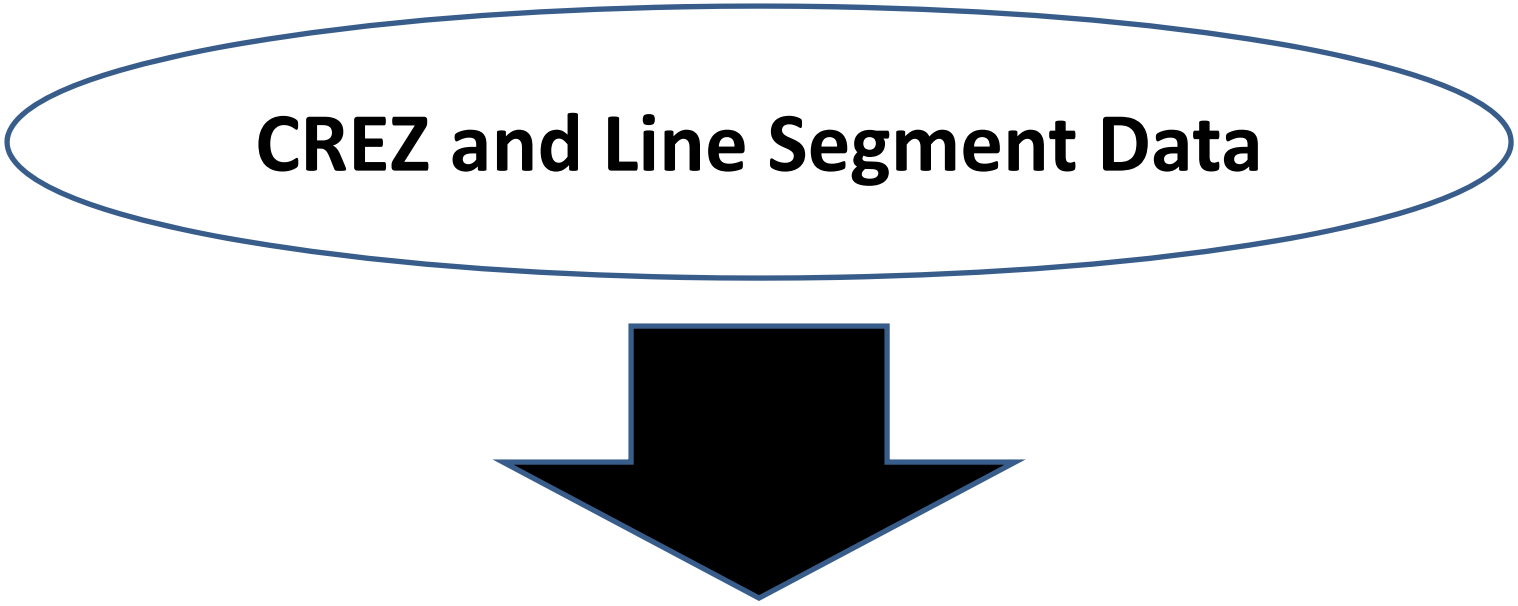
Prioritization Criteria Formulas

- Criterion D – Environmental Concern
- Segment Score =

{Environmental rating} × Σ {segment shift factor for CREZ × CREZ energy}

- Environmental rating involves:
  - Length of line segment
  - Type of right of way and construction required
  - Expert opinion of environmental issues

Prioritization Challenge



Phase 2A Tentative Completion Schedule

- Draft Report sent to SSC- late May.
- SSC meeting to review Draft Report- late May.
- Post Draft Report- early June.
- Public meetings to take comments- June.
- Public comment period ends- Late June.
- SSC meeting to accept Final Report- Early July.
- Post Phase 2A Final Report- Early to Mid-July.

Phase 2B

- Update CA CREZ data
- Update OOS data
- Identify near term measures to access CREZ
- Refine conceptual plan
  - Identify redundant line segments
  - Recalculate shift factors for Bin #1 line segments without others
  - Revise phasing options
  - Power flow analysis

Phase 3 and Beyond

- Support detailed planning of priority renewable transmission projects.
- Continual update of data and conceptual plans.
- Resolution of generation siting issues.
- Support designation of renewable transmission corridors.