

RETI Phase 2
Prioritizing Transmission for
Renewable Energy Access
Discussion Draft

RETI SSC Meeting
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Recommending Transmission Projects for Immediate Study

- Statewide renewable transmission plan
 - Identifies transmission projects to:
 - Meet all LSE net short requirements
 - Provide access to all CREZ and out of state areas
 - Capacity = $1.6 \times$ statewide net short ($1.6 \times 59,700$ GWh)
- “Project” = network line segment between two substations

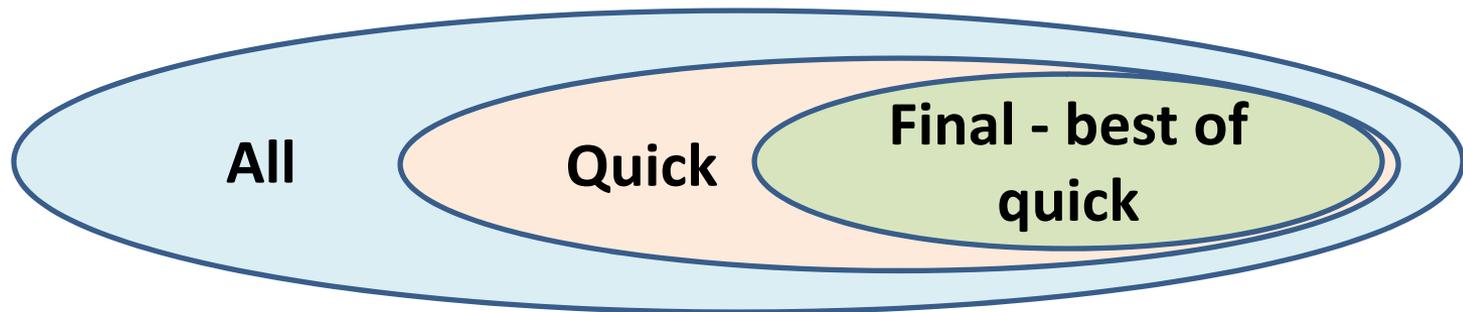
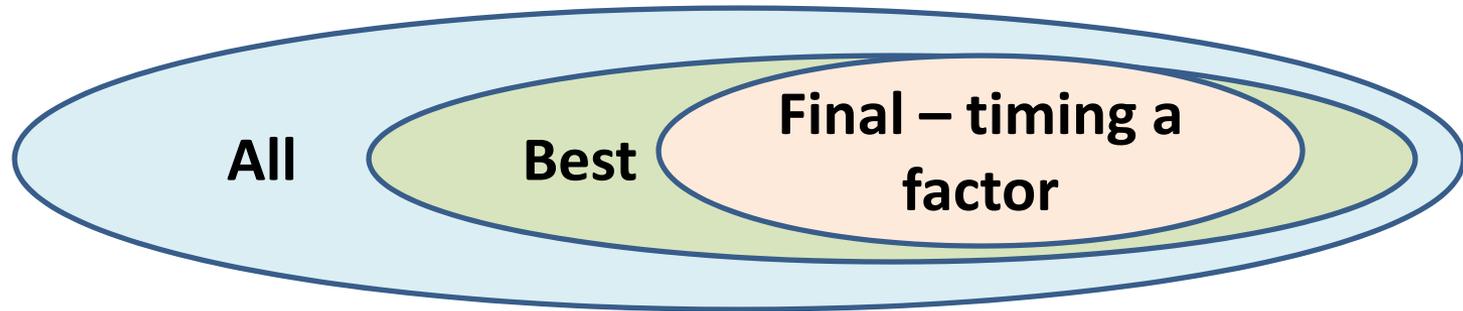
Choosing Projects for Immediate Study

- Develop criteria for RETI recommendations
- Project factors to be considered:
 - Electrical benefits
 - Environmental concerns
 - CREZ & Project Timing

Making the First Cut

- Question – Should longer term projects be studied immediately or not?
- Two options:
 1. Prioritize all projects in statewide plan, then consider ease of permitting & construction;
 2. Prioritize only easiest projects to permit & construct

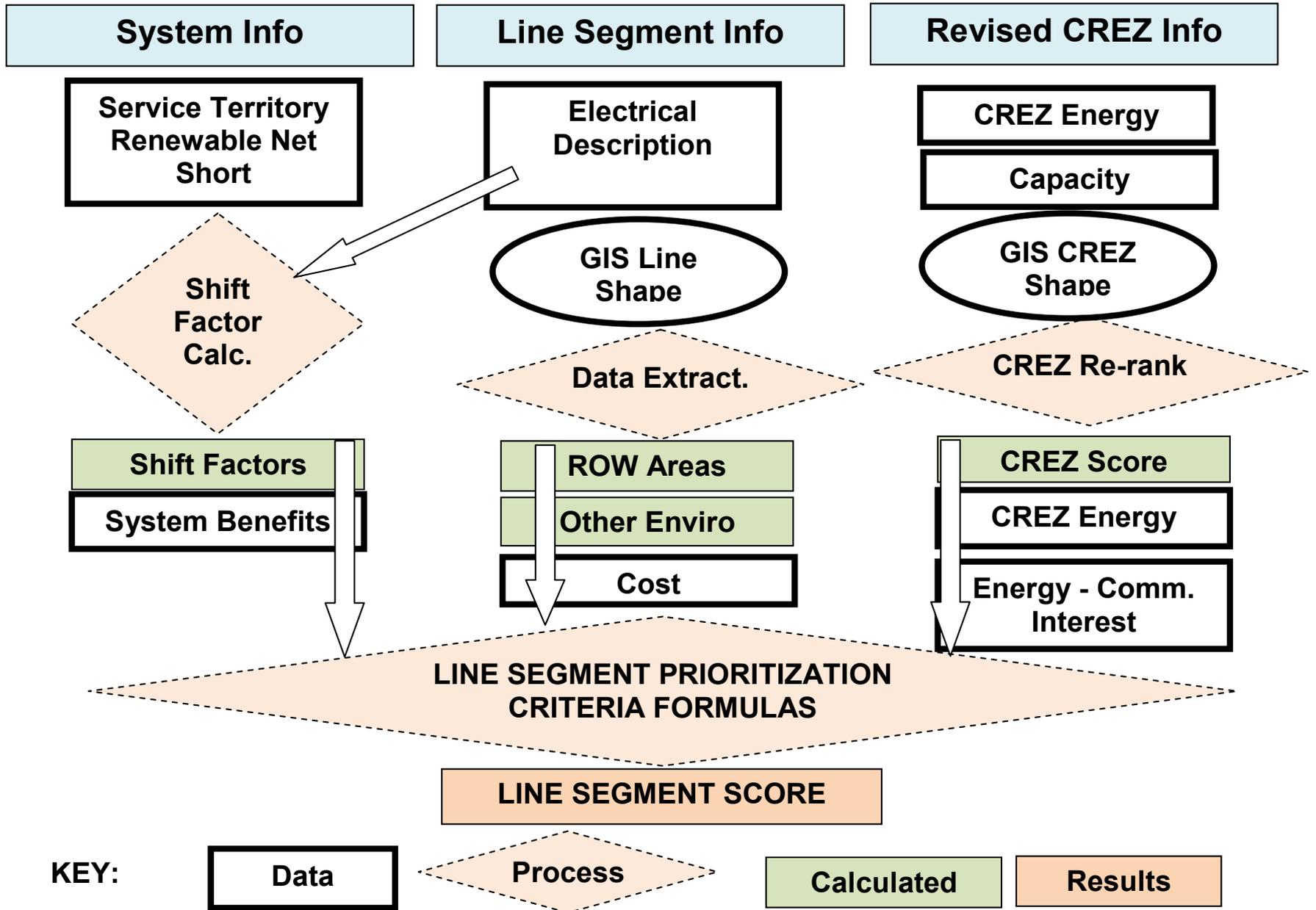
Timing Options for Immediate Study



Proposed Factors for Project Prioritization

- Ability to deliver renewables to loads
 - Measured by generation “shift factors”
- Ranking scores of CREZ provided access by segment
- Energy of CREZ provided access
- Commercial interest in CREZ provided access
- ROW and other environmental concerns
- Cost
- System benefits

RETI TRANSMISSION LINE SEGMENT PRIORITIZATION



Generation Shift Factors (aka Distribution Factors)

- Shift factor (a,b) is a measure of usefulness of line segment (a) to carry energy from CREZ (b) to loads.
- GSF(a,b) is the percentage of incremental energy from CREZ (b) carried on line segment (a).
- Assumptions:
 - Renewable net short loads of all California LSEs are being met;
 - All line segments in statewide plan are in place.
- Calculations via GridView.

Proposed Prioritization Criteria- Energy Access

- Effectiveness score for line segment (a) =
 $\text{Sum} \{ \text{GSF}(a,i) \times \text{GWH}(i) / \text{Cost}(a) \}$
 - Summation over all CREZ(i)
 - GWH(i) = renewable energy potential of CREZ(i)
 - Cost(a) = estimated cost of line segment (a)

Proposed Prioritization Criteria- CREZ Score

- Effectiveness score for line segment (a) =
$$\text{Sum} \{ \text{GSF}(a,i) \times \text{CREZscore}(i) / \text{Cost}(a) \}$$
 - Summation over all CREZ(i)
 - CREZscore(i) = combined revised CREZ economic & environmental scores
 - Cost(a) = estimated cost of line segment (a)

Proposed CREZ Scoring

- Using revised CREZ economic & enviro ranking:
- Score = 1.4 – below average econ & enviro
- Score = 1.0 – above average econ & enviro
- Score = 1.2 – above average econ, below average enviro and reverse
- OOS CREZ to be given average CA enviro score
 - OOS CREZ Score = 1.1 or 1.3 depending on econ score

Proposed Prioritization Criteria- Commercial Interest Score

- Effectiveness score for line segment (a) =
$$\text{Sum} \{ \text{GSF}(a,i) \times [\text{GWHPPA}(i) \times 2 + \text{GWHQUE}(i) + \text{GWHSITE}(i)] / \text{Cost}(a) \}$$
 - Summation over all CREZ(i)
 - GWHPPA(i) = energy of projects in CREZ(i) having signed PPAs
 - GWHQUE(i) = energy of projects in CREZ(i) in ISO& POU queues
 - GWHSITE(i)] = energy of projects in CREZ(i) having site control

Proposed Prioritization Criteria- System Benefits Score

- Effectiveness score for line segment (a) = $\frac{[\Sigma \text{CAPPATH}(a) + \Sigma \text{CAPINT}(a) + \Sigma \text{CAPOSR}(a)]}{\text{TLSC}(a)}$
 - $\Sigma \text{CAPPATH}(a)$ = ability of segment (a) to relieve constraints on existing paths
 - $\Sigma \text{CAPINT}(a)$ = ability of segment (a) to increase interchange capacity between balancing areas
 - $\Sigma \text{CAPOSR}(a)$ = ability of segment (a) to provide access to distant renewable resources

Proposed Prioritization Criteria- ROW Concern Score

- Effectiveness score for line segment (a) =

Inverse of

$$\text{Sum}\{\text{ROW}(a)+\text{ROWNEW}(a)+\text{ROWCORR}(a)+\text{ROWYEL}(a)+\text{ROWURB}(a)\} / \text{SUM}\{\text{GFS}(a,i)?\}$$

- ROW(a) = Total ROW for line segment (a)
- ROWNEW(a) = New ROW
- ROWCORR(a) = New ROW outside existing corridors
- ROWYELL(a) = ROW in yellow areas
- ROWURB(a) = ROW in urban areas

Proposed Prioritization Criteria- Other Enviro Concern Score

- Effectiveness score for line segment (a) = ?
 - Birds
 - Species
 - Visual
 - Cultural
 - Special areas
 - Other ????

Proposed Prioritization Scores

- Individual prioritization scores are obtained from the individual criterion scores on a quartile basis
 - Score of 4 = top 25%
 - Score of 1 = bottom 25%
- Total prioritization score = sum of individual scores

Proposed Timing Considerations

- Project on line before 2014? 2017? 2020?
- Commercial interest (eg queue positions)
- Ease of permitting & construction
 - CPCN or PTC required?
 - Enviro issues?
 - New ROW?
- Other????

Conclusions

- **TIME IS OF THE ESSENCE!**
- **Draft report due 3/31**
- Huge amount of data required
- Shift factor calculations
- CREZ data revision & CREZ re-ranking
- Line segment shape files
- Line segment data
- Timing data