



## RETI Phase 2 Update Workgroup

**Black & Veatch: Ryan Pletka**

**February 18, 2010**

**CORRECTED – Original version omitted California transmission adder from in-state resources**

**Today's Results are  
Preliminary and Will Change**

## Since the Last Workgroup Meeting (February 4)

- Adjusted out-of-state transmission financing assumptions
- Verified Mexican / Canadian Incentive Treatment
- Added in-state California resources
- Included in-state transmission adder
- Included transmission losses
- Made additional CREZ refinements
- Have updated base capacity value to \$153/kW-yr
  - RETI Phase 1B used \$204, sensitivity of \$102
  - WREZ used about \$150/kW-yr

# Capacity Changes Relative to Phase 2A (July 20, 2009)

|                         | Capacity (MW) |            |              |                | Capacity Total | Notes  |
|-------------------------|---------------|------------|--------------|----------------|----------------|--|
|                         | Biomass       | Geothermal | Solar        | Wind           |                |  |
| Barstow                 | -             | -          | -            | -              | -              | No changes   |
| Carrizo North           | -             | -          | -            | -              | -              | No changes   |
| Carrizo South           | -             | -          | (877)        | -              | (877)          | Revised solar to 1B values, which were correct.                            |
| Cuyama                  | -             | -          | (400)        | -              | (400)          | Revised solar to 1B values, which were correct.                            |
| Fairmont                | -             | -          | (200)        | (668)          | (868)          | Cut wind projects due to CREZ refinement. Solar project due th CA DPA      |
| Imperial East           | -             | -          | -            | -              | 0              | No changes   |
| Imperial North-A        | -             | -          | -            | -              | -              | No changes   |
| Imperial North-B        | -             | -          | -            | -              | -              | No changes   |
| Imperial South          | -             | -          | -            | -              | -              | No changes   |
| Inyokern                | -             | -          | -            | -              | -              | No changes   |
| Iron Mountain           | -             | -          | (50)         | -              | (50)           | Small discrepancy due to Trilobite capacity assumption (moved in Phase 2A) |
| Kramer                  | -             | -          | -            | -              | -              | No changes   |
| Lassen North            | -             | -          | -            | -              | -              | No changes   |
| Lassen South            | -             | -          | -            | -              | -              | No changes   |
| Mountain Pass           | -             | -          | -            | (700)          | (700)          | Cut wind projects due the CA DPA   |
| Owens Valley            | -             | -          | 3,600        | -              | 3,600          | Added 3600 MW of solar   |
| Palm Springs            | -             | -          | -            | (437)          | (437)          | Cut wind projects due to CREZ refinement.                                  |
| Pisgah-A                | -             | -          | (350)        | -              | (350)          | Cut half of Trilobite project due the CA DPA                               |
| Riverside East          | -             | -          | -            | -              | -              | No changes   |
| Round Mountain-A        | -             | -          | -            | -              | -              | No changes   |
| Round Mountain-B        | (55)          | -          | -            | (0)            | (55)           | Biomass project dropped since resource already in use in Shasta County     |
| San Bernardino - Baker  | -             | -          | (320)        | -              | (320)          | Cut solar projects due to CA DPA   |
| San Bernardino - Lucern | -             | -          | (800)        | -              | (800)          | Cut solar projects due to CA DPA   |
| San Diego North Central | -             | -          | -            | -              | -              | No changes   |
| San Diego South         | -             | -          | -            | -              | -              | No changes   |
| Santa Barbara           | -             | -          | -            | -              | -              | No changes   |
| Solano                  | -             | -          | -            | -              | -              | No changes   |
| Tehachapi               | -             | -          | -            | (412)          | (412)          | Cut wind projects due to CREZ refinement.                                  |
| Twentynine Palms        | -             | -          | -            | -              | -              | No changes   |
| Victorville             | -             | -          | -            | -              | -              | No changes   |
| Westlands               | -             | -          | 5,000        | -              | 5,000          | Added 5000 MW of solar   |
| <b>Total</b>            | <b>(55)</b>   | <b>-</b>   | <b>5,603</b> | <b>(2,217)</b> | <b>3,332</b>   |  |

Note: also completely cut the Needles CREZ due to the CA DPA (261 MW wind). This left one solar project at 200 MW, below the minimum CREZ size (250 MW)

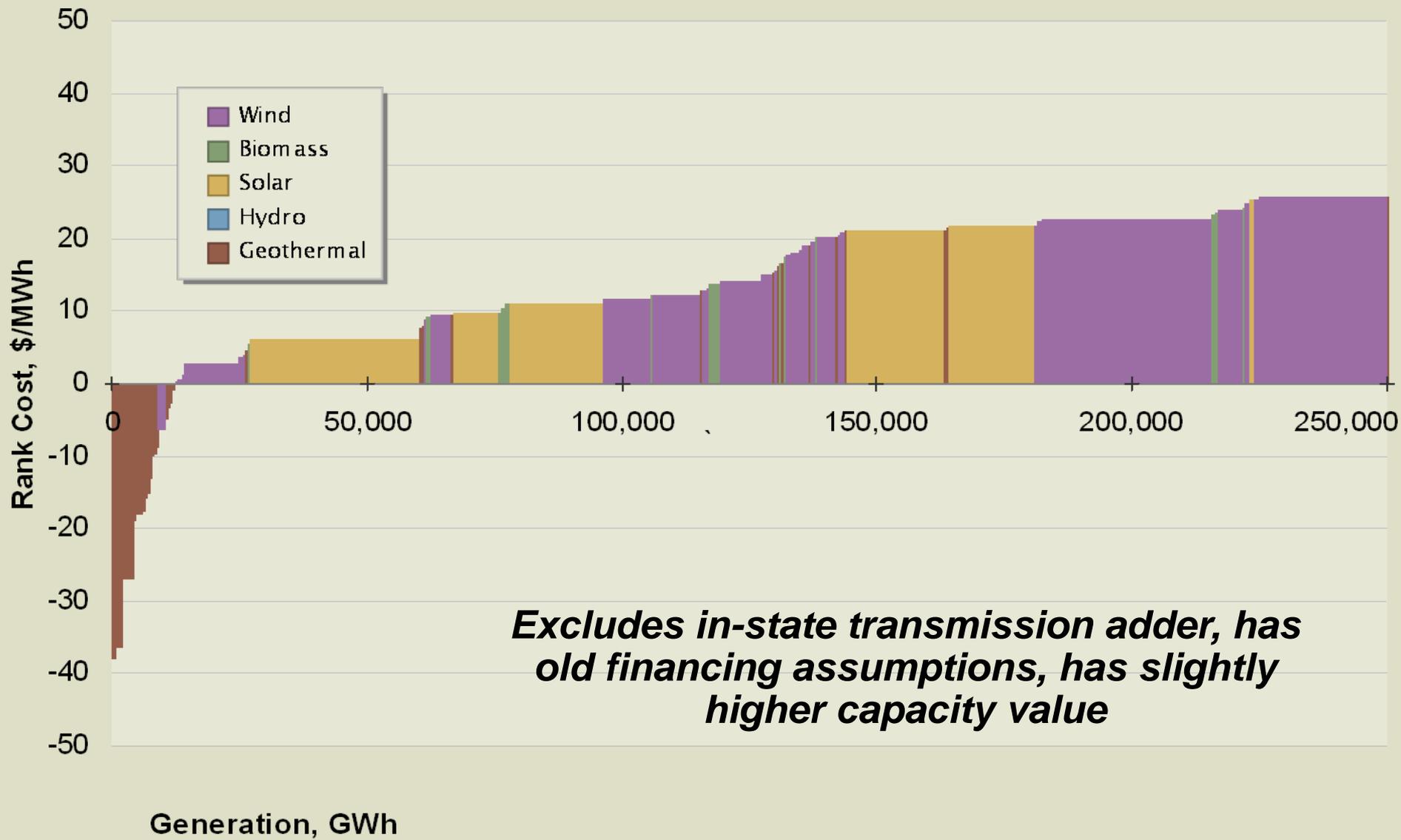
# Final Proposed California CREZ Capacity

| CREZ_NAME                | Sum of Capacity, MW |              |               |               | Total Sum of Capacity, MW |
|--------------------------|---------------------|--------------|---------------|---------------|---------------------------|
|                          | Biomass             | Geothermal   | Solar Thermal | Wind          |                           |
| Barstow                  |                     |              | 1,400         | 936           | 2,336                     |
| Carrizo North            |                     |              | 1,600         |               | 1,600                     |
| Carrizo South            |                     |              | 3,000         |               | 3,000                     |
| Cuyama                   |                     |              | 400           |               | 400                       |
| Fairmont                 | 138                 |              | 1,800         | 712           | 2,650                     |
| Imperial East            |                     |              | 1,500         | 123           | 1,623                     |
| Imperial North-A         |                     | 1,370        |               |               | 1,370                     |
| Imperial North-B         | 30                  |              | 1,800         |               | 1,830                     |
| Imperial South           | 36                  | 64           | 3,570         | 45            | 3,715                     |
| Inyokern                 |                     |              | 2,145         | 287           | 2,432                     |
| Iron Mountain            |                     |              | 4,800         | 62            | 4,862                     |
| Kramer                   |                     | 24           | 6,185         | 203           | 6,412                     |
| Lassen North             |                     |              |               | 1,467         | 1,467                     |
| Lassen South             |                     |              |               | 410           | 410                       |
| Mountain Pass            |                     |              | 780           | 178           | 958                       |
| Owens Valley             |                     |              | 5,000         |               | 5,000                     |
| Palm Springs             |                     |              |               | 333           | 333                       |
| Pisgah                   |                     |              | 2,200         |               | 2,200                     |
| Riverside East           |                     |              | 10,550        |               | 10,550                    |
| Round Mountain-A         |                     | 384          |               |               | 384                       |
| Round Mountain-B         |                     |              |               | 132           | 132                       |
| San Bernardino - Baker   |                     |              | 3,350         |               | 3,350                     |
| San Bernardino - Lucerne | 91                  |              | 1,540         | 599           | 2,230                     |
| San Diego North Central  |                     |              |               | 281           | 281                       |
| San Diego South          |                     |              |               | 678           | 678                       |
| Santa Barbara            |                     |              |               | 433           | 433                       |
| Solano                   |                     |              |               | 894           | 894                       |
| Tehachapi                | 37                  |              | 7,195         | 3,193         | 10,425                    |
| Twentynine Palms         |                     |              | 1,805         |               | 1,805                     |
| Victorville              |                     |              | 1,200         | 436           | 1,636                     |
| Westlands                |                     |              | 5,000         |               | 5,000                     |
| <b>Grand Total</b>       | <b>332</b>          | <b>1,842</b> | <b>66,820</b> | <b>11,403</b> | <b>80,396</b>             |

# Out-of-state Transmission Financing Assumptions

|                   | Federal | IOU (UREZ) | Blended          | Current |
|-------------------|---------|------------|------------------|---------|
| Economic Life     | 40      | 20         | 40               | 40      |
| Debt Percentage   | 100%    | 60%        | <del>60%</del>   | 50%     |
| Debt Term         | 30      | 20         | 30               | 30      |
| Interest Rate     | 5.0%    | 7.0%       | 6.0%             | 6%      |
| Equity Cost       | –       | 11.0%      | <del>11.0%</del> | 13%     |
| Tax Life          | –       | 15         | 15               | 15      |
| Discount Rate     | 5.0%    | 8.6%       | <del>7.5%</del>  | 7.625%  |
| Tax Rate          | –       | 38%        | <del>38%</del>   | 40%     |
| Non-Capital Costs | 3%      | 3%         | 3%               | 3%      |

# Out-of-State Supply Curve by Technology (Feb 4)

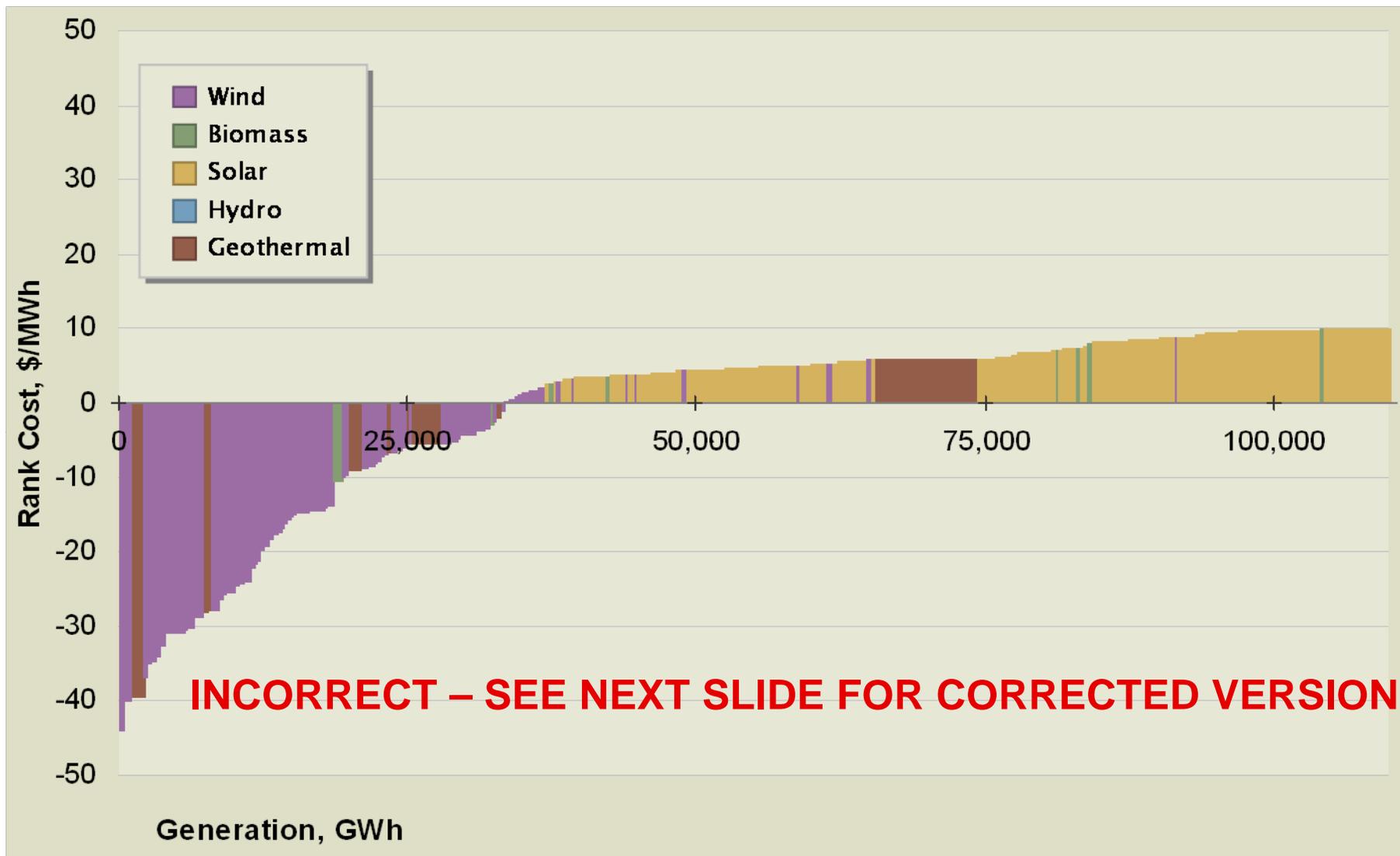


*Excludes in-state transmission adder, has old financing assumptions, has slightly higher capacity value*

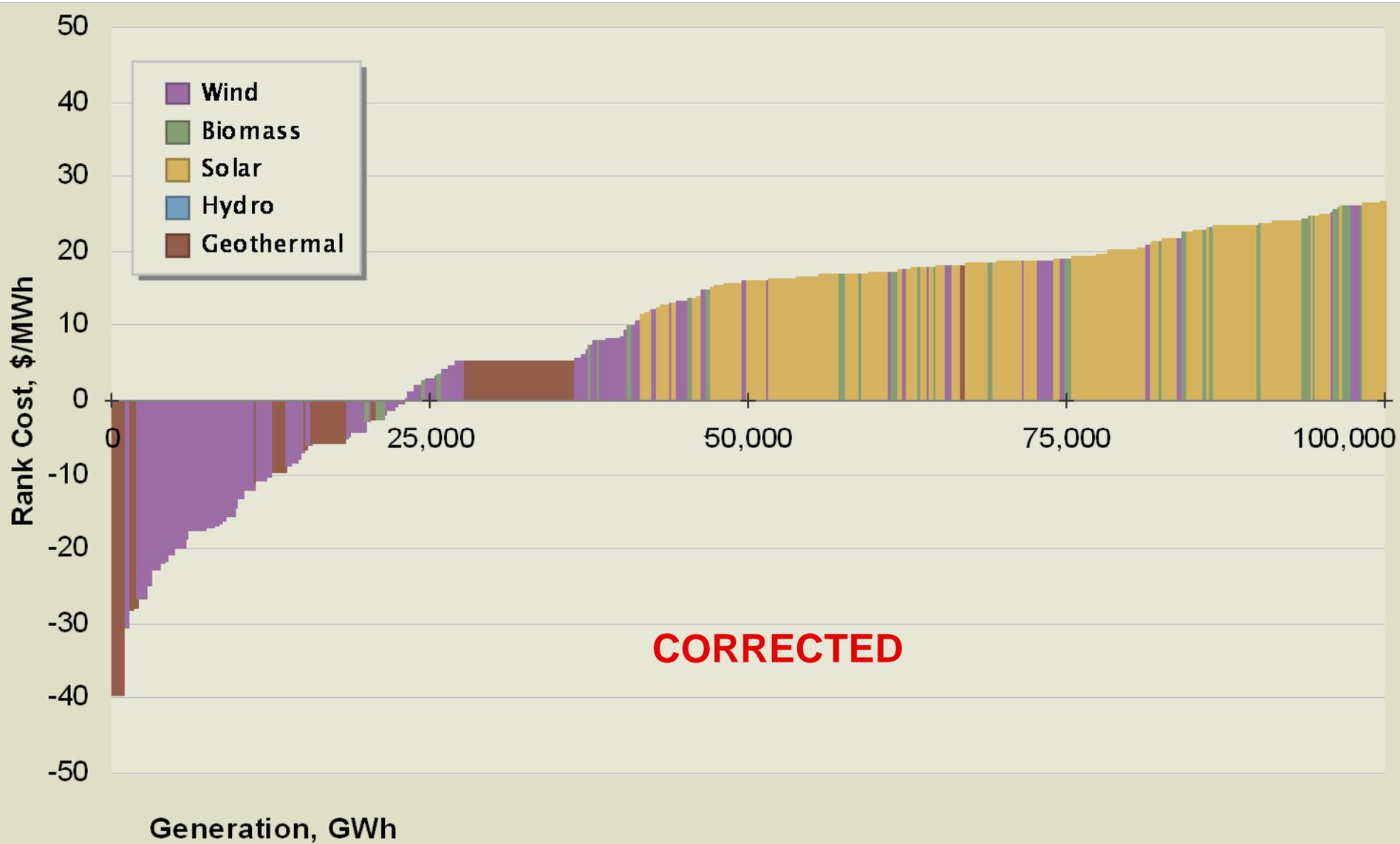
# Out-of-State Supply Curve by Technology (Feb 18)



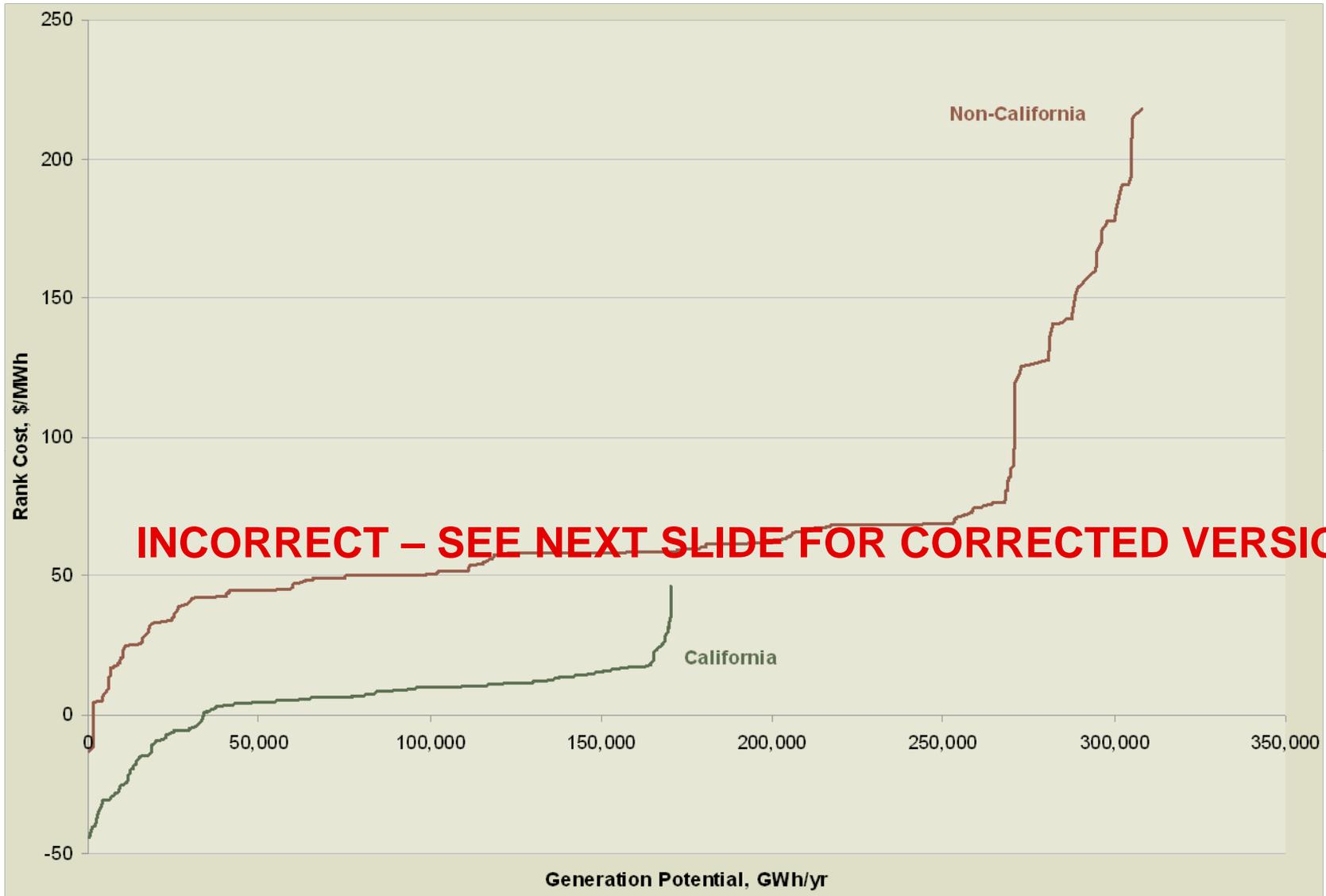
# In-State – Supply Curve of Best Resources



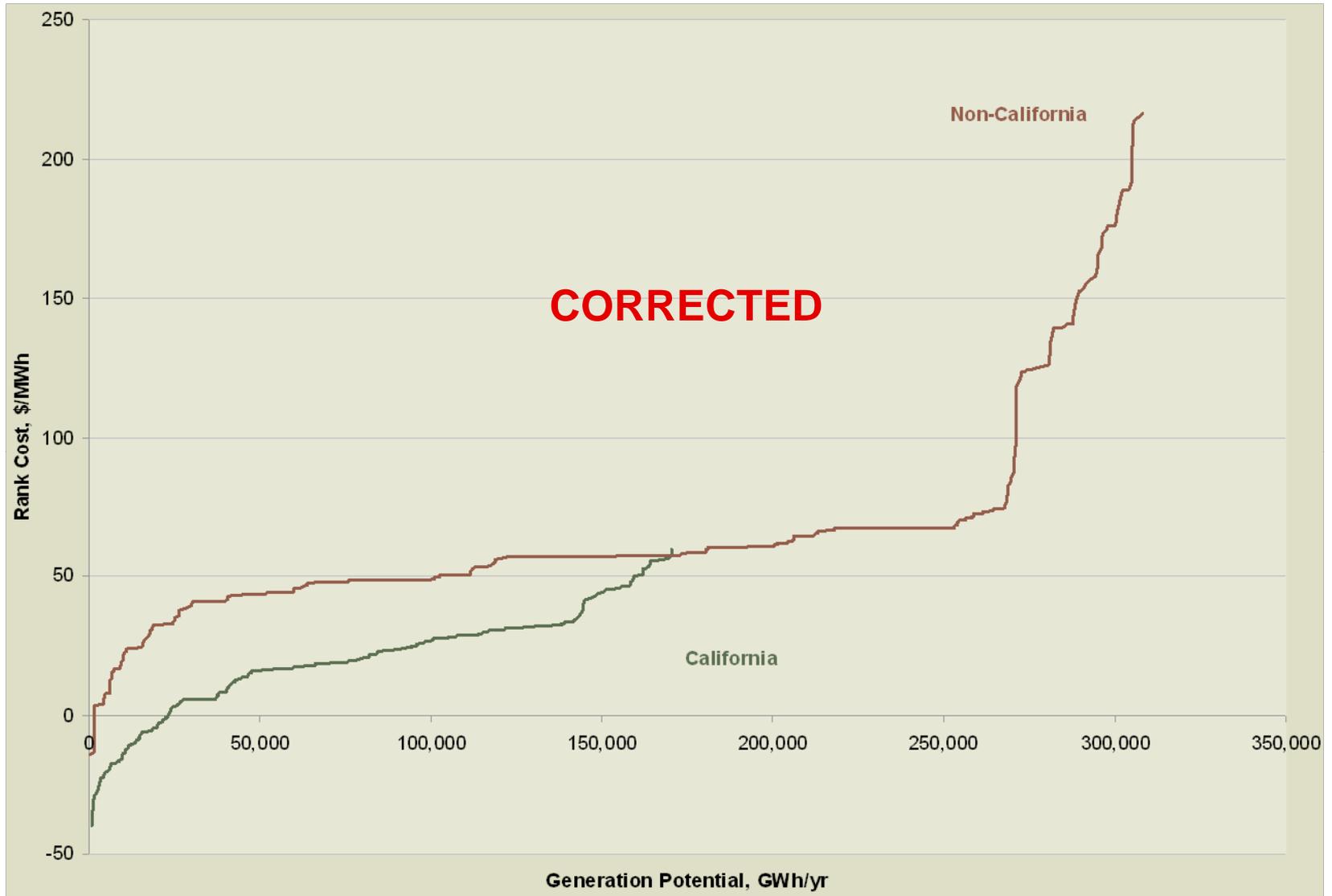
# In-State – Supply Curve of Best Resources



# In-state versus Out-of-state



# In-state versus Out-of-state



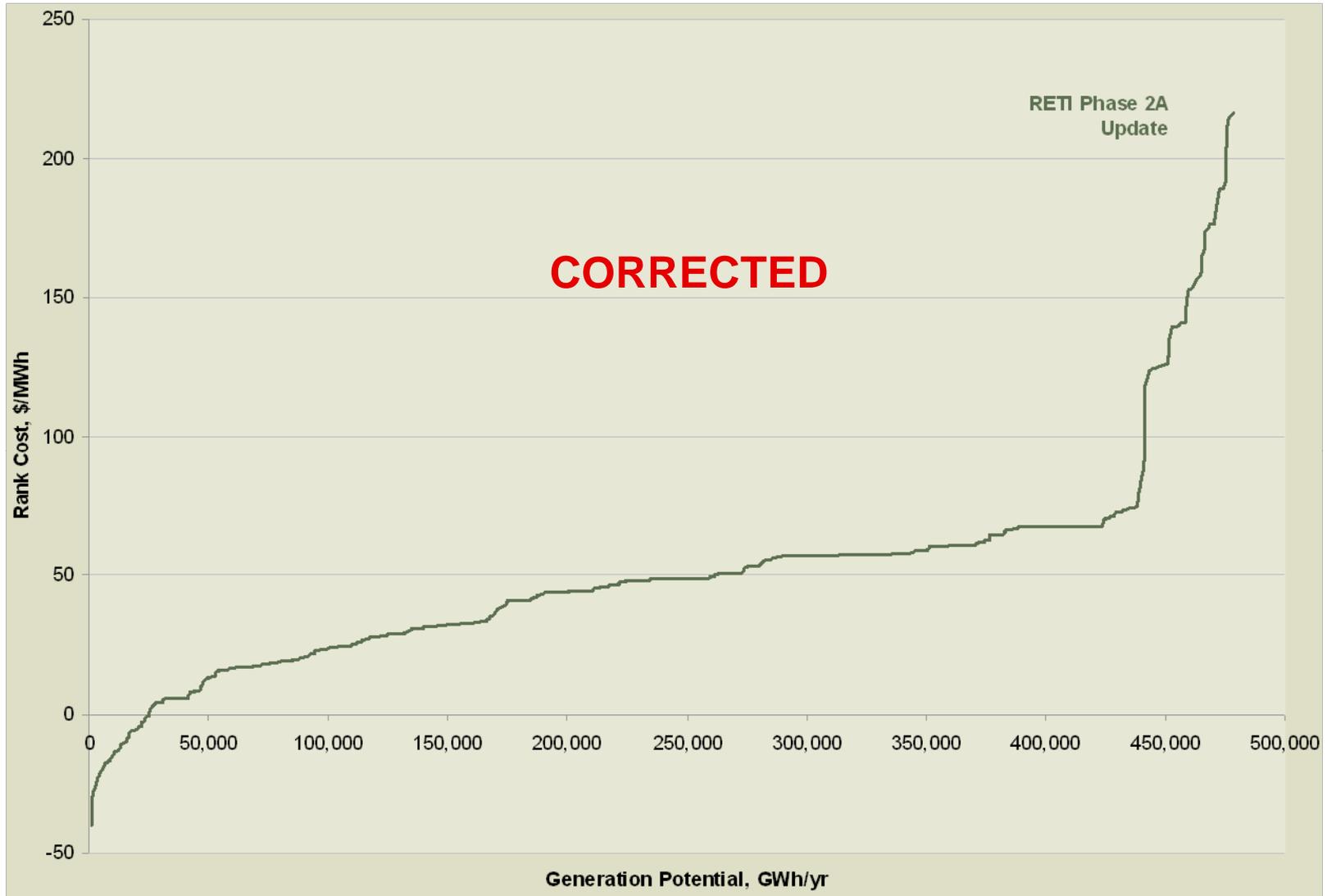
# RETI Phase 2A Update Overall Supply Curve

## Individual Project Basis



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## Individual Project Basis



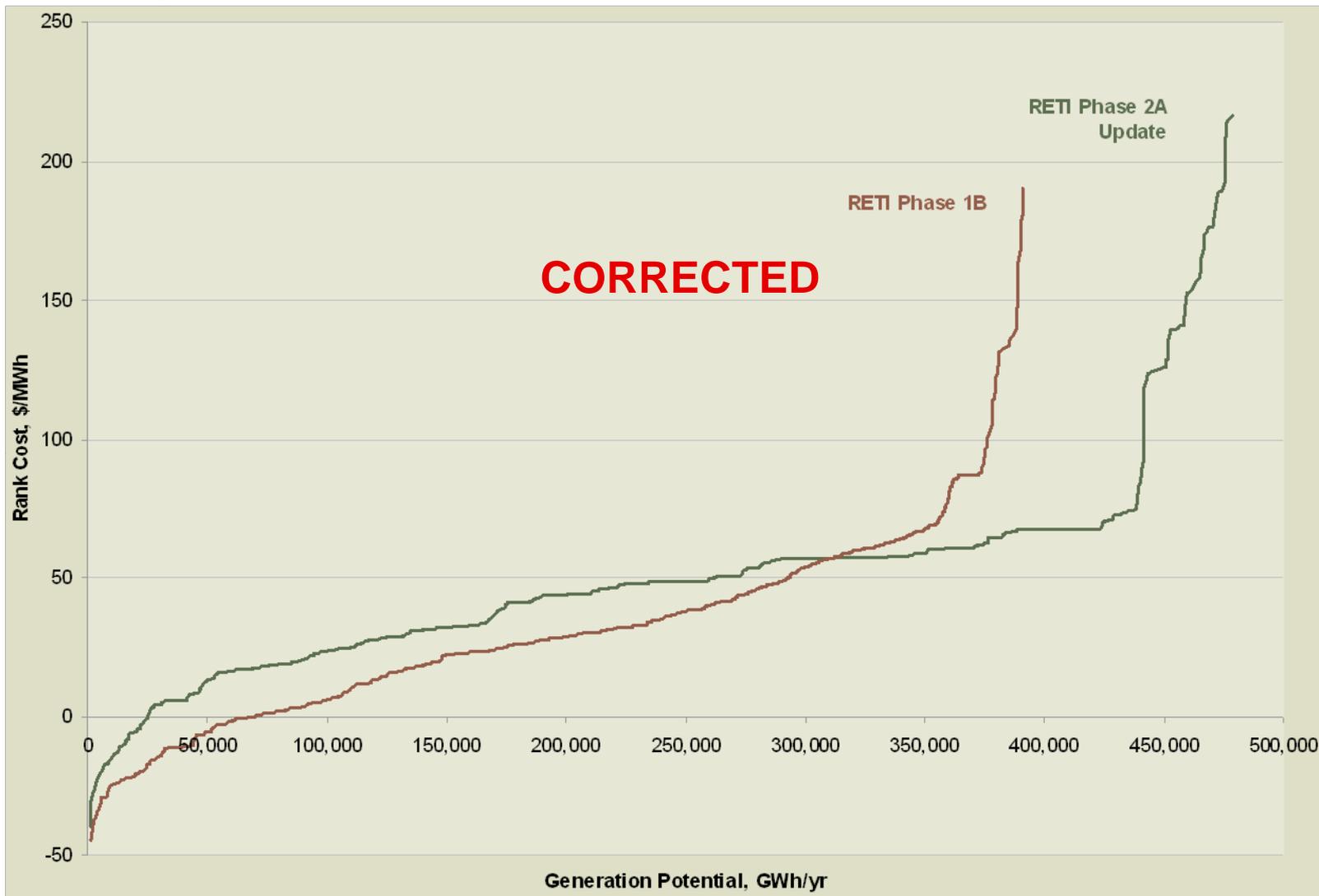
# RETI Phase 2A Update Overall Supply Curve

## Individual Project Basis



# RETI Phase 2A Update Overall Supply Curve

## Individual Project Basis



# To Complete

- Investigate solar PV performance for out-of-state
- “Chunking”
  - In-state by CREZ
  - Out-of-state in 1500 MW blocks
- Incorporate “20 MW” distributed PV projects? Recommend defer to other projects
- Bubble chart
- Perform sensitivity and uncertainty analysis
  - Uncertainty Analysis
    - Same approach as RETI Phase 1
  - Sensitivity: BC Shaped Product
  - Sensitivity: Advanced Solar Technologies

# Thank You!

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