



RETI Phase 2 Update Workgroup

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Working Group Meeting

October 1, 2009

RETI Phase 2 Update Workgroup Issues

- Economic Model Update
  - Model review
  - Incentives Assumptions

- Extended Analysis of WECC Resources
  - Introduction
  - Approach

- CREZ and Technology Updates

TBD

- Net Short Update

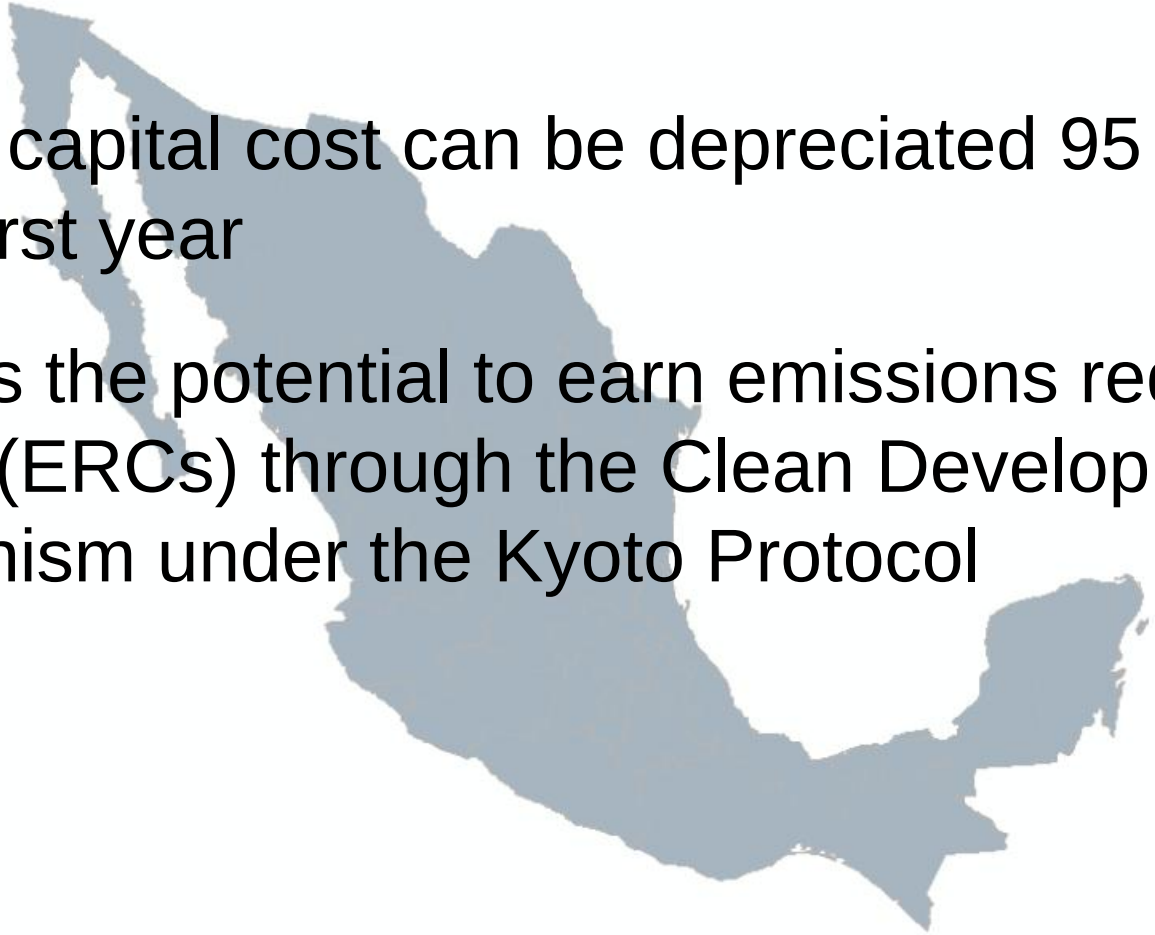
US Incentives: Assume Current Programs Continue

- Determination will be made on a project-by-project basis which is more advantageous (almost always the 30% grant)
  - 30% Grant / Investment Tax Credit
    - Wind, Biomass, Geothermal, Solar
  - $10-21/MWh Production Tax Credit
    - Wind, Biomass, Geothermal

Canadian and Mexican Renewable Energy Incentives

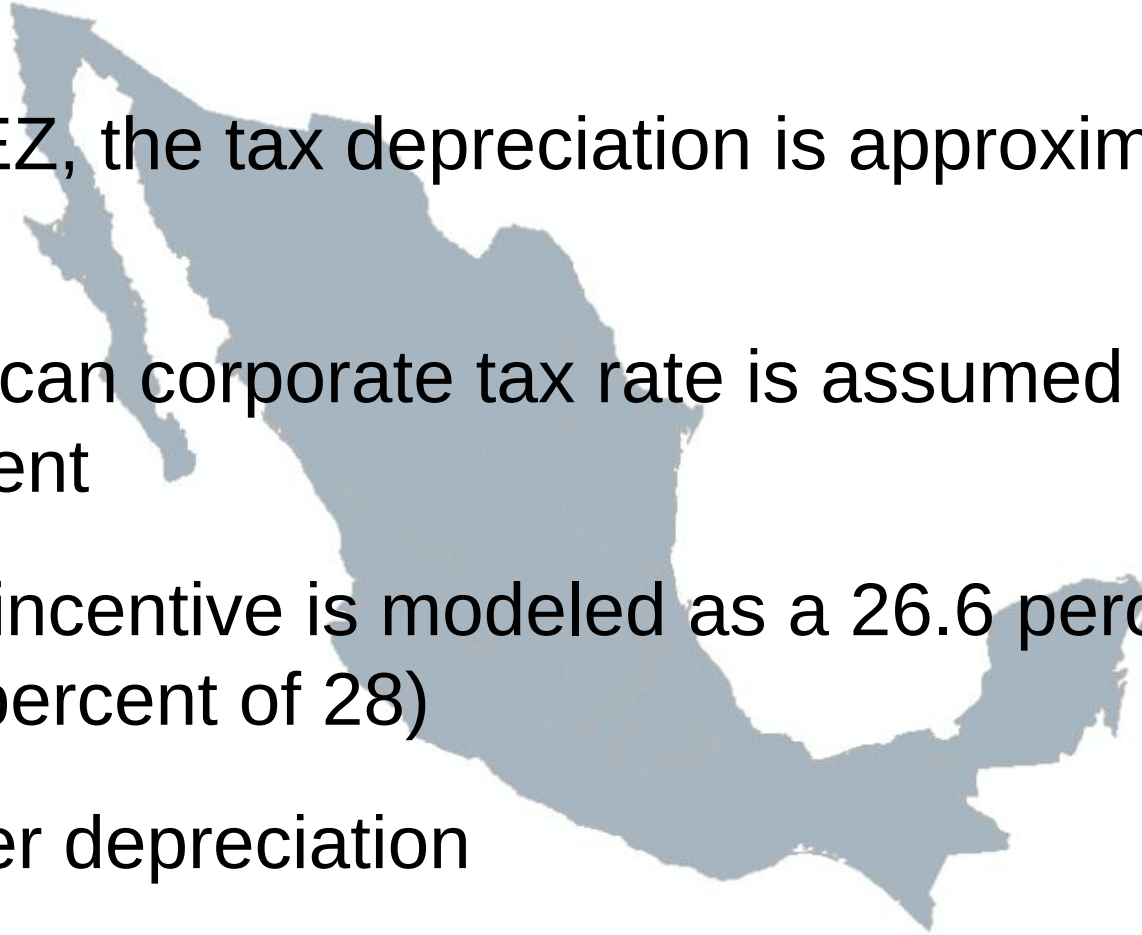
- Canada, Mexico and the US each have different renewable energy incentives
- The levelized cost of energy model was created to model US incentives
- For modeling simplicity the values of Canadian and Mexican incentives were approximated using the US incentive structures
- The Western Renewable Energy Zones (WREZ) project developed methodology

Mexican Renewable Energy Incentives



- Project capital cost can be depreciated 95 percent in the first year
- There is the potential to earn emissions reduction credits (ERCs) through the Clean Development Mechanism under the Kyoto Protocol

Mexican Renewable Energy Incentives



- In WREZ, the tax depreciation is approximated as an ITC
  - Mexican corporate tax rate is assumed to be 28 percent
  - The incentive is modeled as a 26.6 percent ITC (95 percent of 28)
- No other depreciation
- Value of ERCs is not modeled in WREZ

Canadian Renewable Energy Incentives

- Accelerated depreciation is allowed for capital cost of renewable energy assets
  - 30 percent, 10 yr declining balance accelerated depreciation for large hydro*
  - 50 percent, 10 yr declining balance accelerated depreciation for small hydro, wind, geothermal*
- ecoEnergy incentive – CAN$10/MWh payment to renewable energy generators
  - Expired in 2008
  - Canadian WREZ participants advised us that it will probably not be renewed under the new administration

*Note: only one half of the normal rate is allowed in the first year

Canadian Renewable Energy Incentives

- In WREZ the effects of accelerated depreciation schedules are approximated with the US MACRS schedules
  - 30 percent schedule modeled as the 7 yr MACRS depreciation schedule
  - 50 percent schedule modeled as the 5 yr MACRS depreciation schedule
- It was determined that these MACRS schedules have a similar effect on project NPV (and therefore project LCOE) as these Canadian schedules





Out-of-State Resources in RETI

Summary of Recommended Resource Assessments for Use (RETI vs. WREZ) MW Estimates

Re-visit BC conversation in light of other potential OOS sources like Wyoming wind

	CA	OR	WA	NV	AZ	Baja	BC
Bio	1,725 145	454 652	449 101	299	329		1,520 939
PV	27,460			18,960	20,178		
ST	65,200 16,931			7,429 18,960	7,129 20,178	5092	
Wind	16,208 6,042	4,688 2,913	3,762 3,262	1,475 432	3,714	~~5,000~~ 2,963	2,405 13,942
Geo	1,918 1,434	520 832		1,283 1,408			244 340

Economic when combined with wind? To be evaluated

Review estimates based on new lease sales

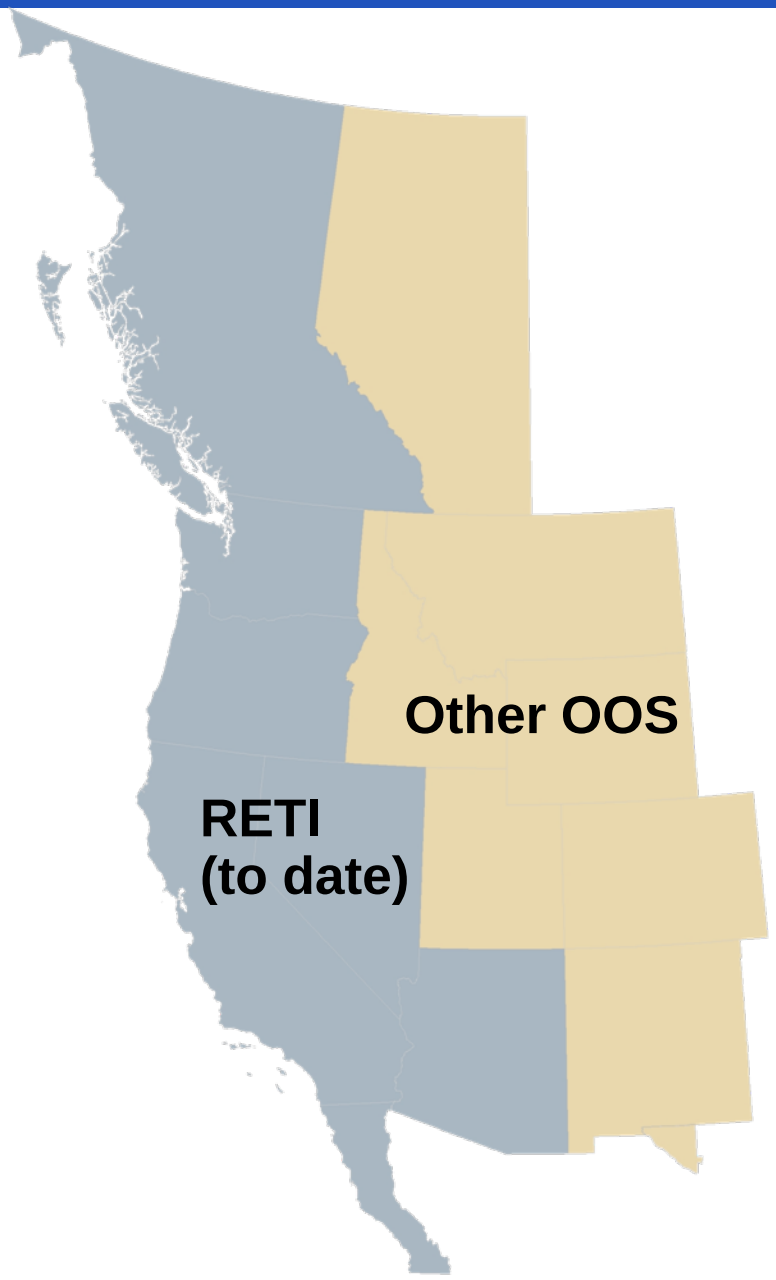
???

Perform new detailed analysis, coordinate with EWG

Notes: PV and ST not differentiated in WREZ, assumed all ST

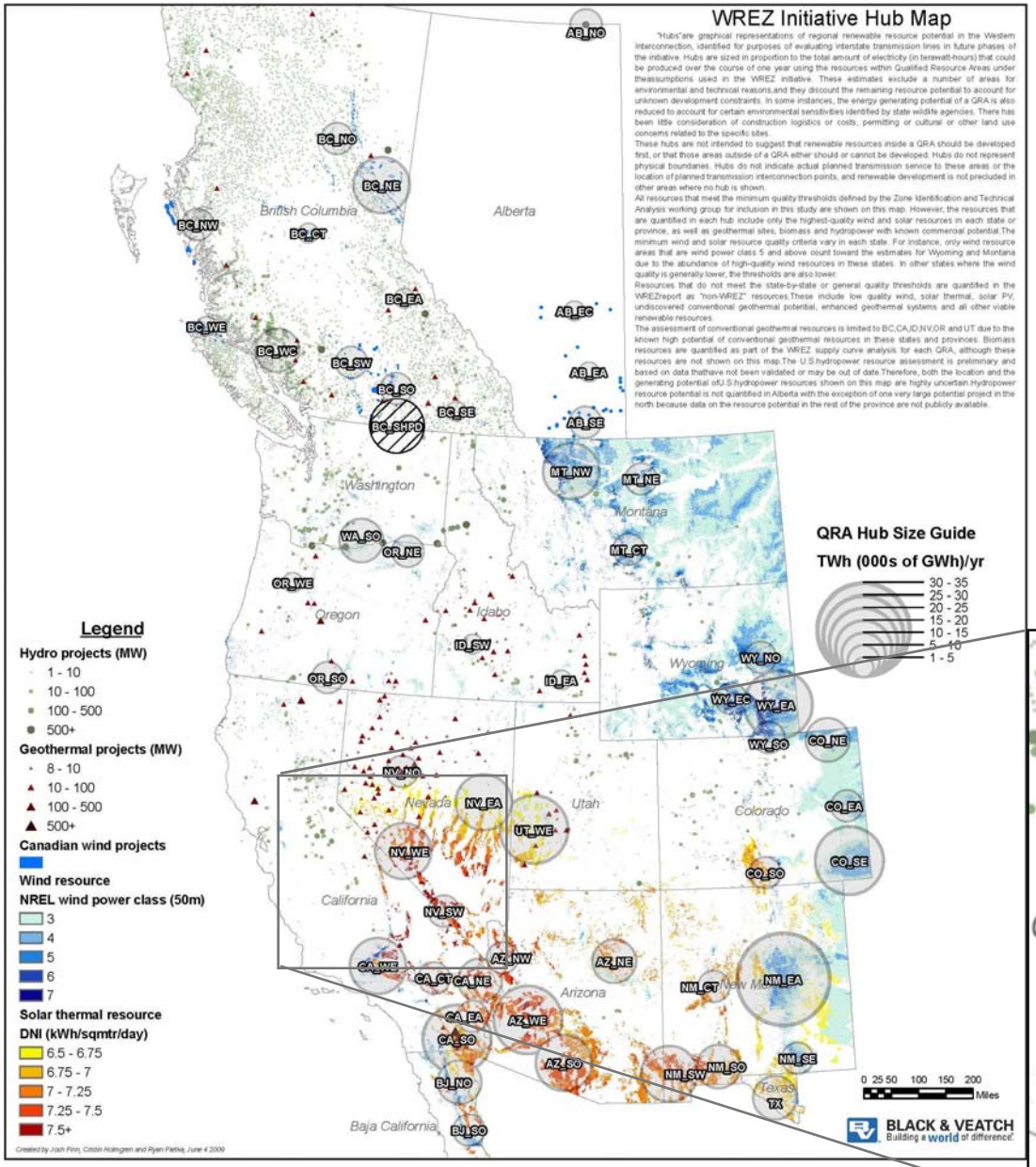
Consideration of Other Out-of-State Resources

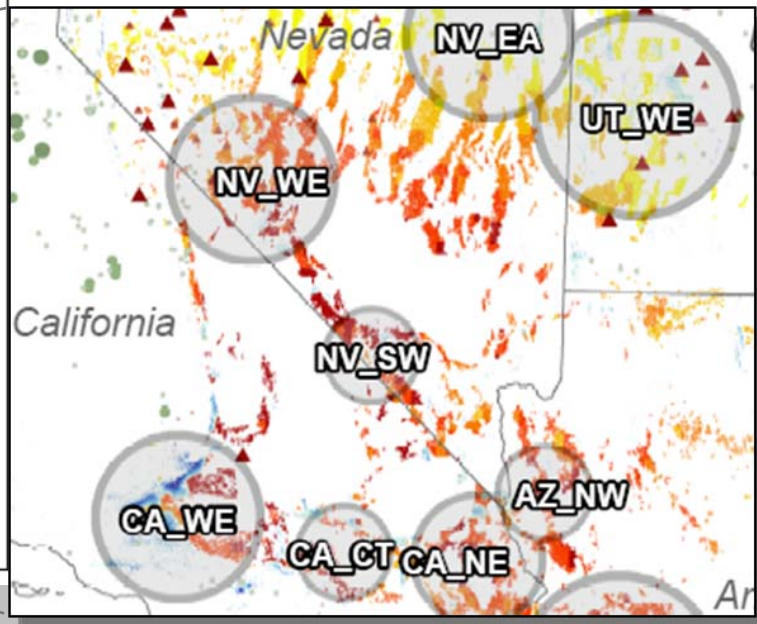
Results from WREZ Model



WREZ Resource Assessment

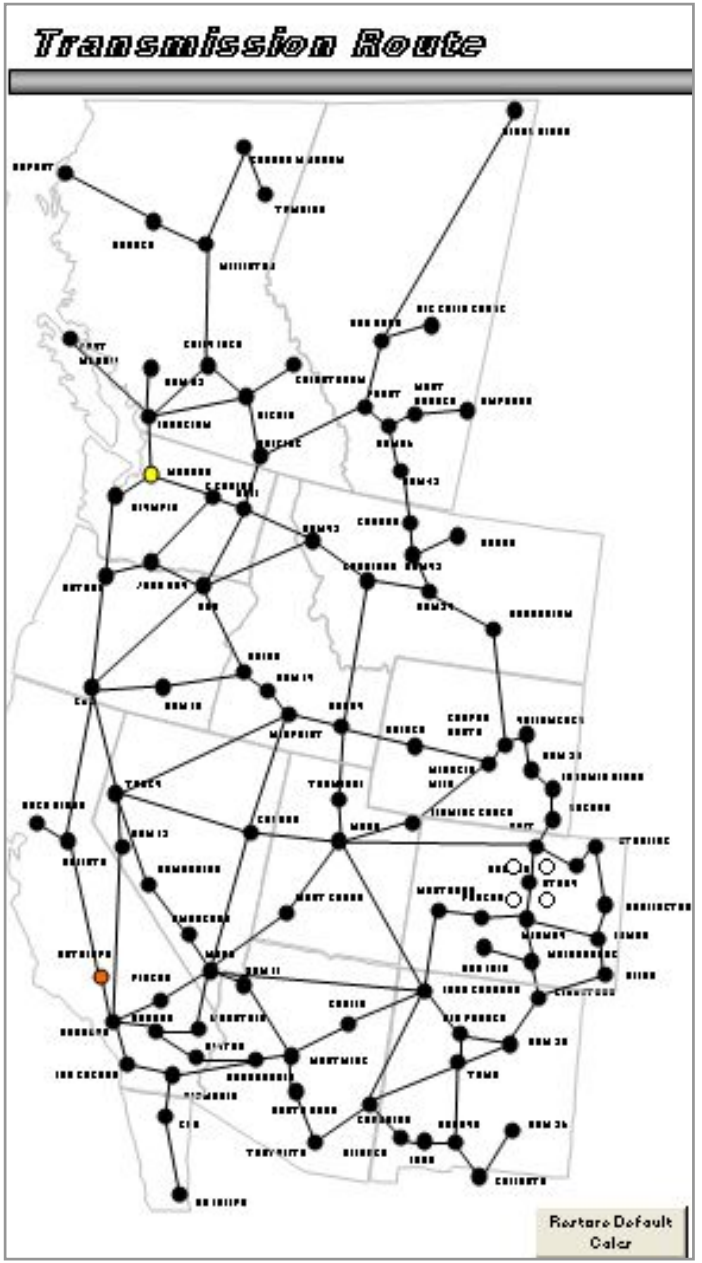
- Estimates resource potential at a particular price point in each “hub”





WREZ Generation and Transmission Model

- Models cost of delivering energy from any resource area to each load center
- Models major transmission paths, not specific transmission lines
- Assumes all incremental transmission – default is 500 kV (user may change)



WREZ Supply Curve Assumptions

- Delivered to either N. CA or S.CA, based on lowest cost import path for the state
- Transmission cost assumptions:
  - 500 kV AC single circuit
  - Financed by federal government
  - Line utilization equal to resource capacity factor
- IPP financing assumptions for generation
- Solar resources assumed to be fixed tilt thin film PV, was the least expensive solar technology
- Includes large hydro in Canada, and upgrades to existing large hydro in US

WREZ Economic Metric – Adjusted Delivered Cost

Adjusted Delivered Cost =

+ Generation Cost

+ Transmission Cost

+ Integration Cost

- Energy Value

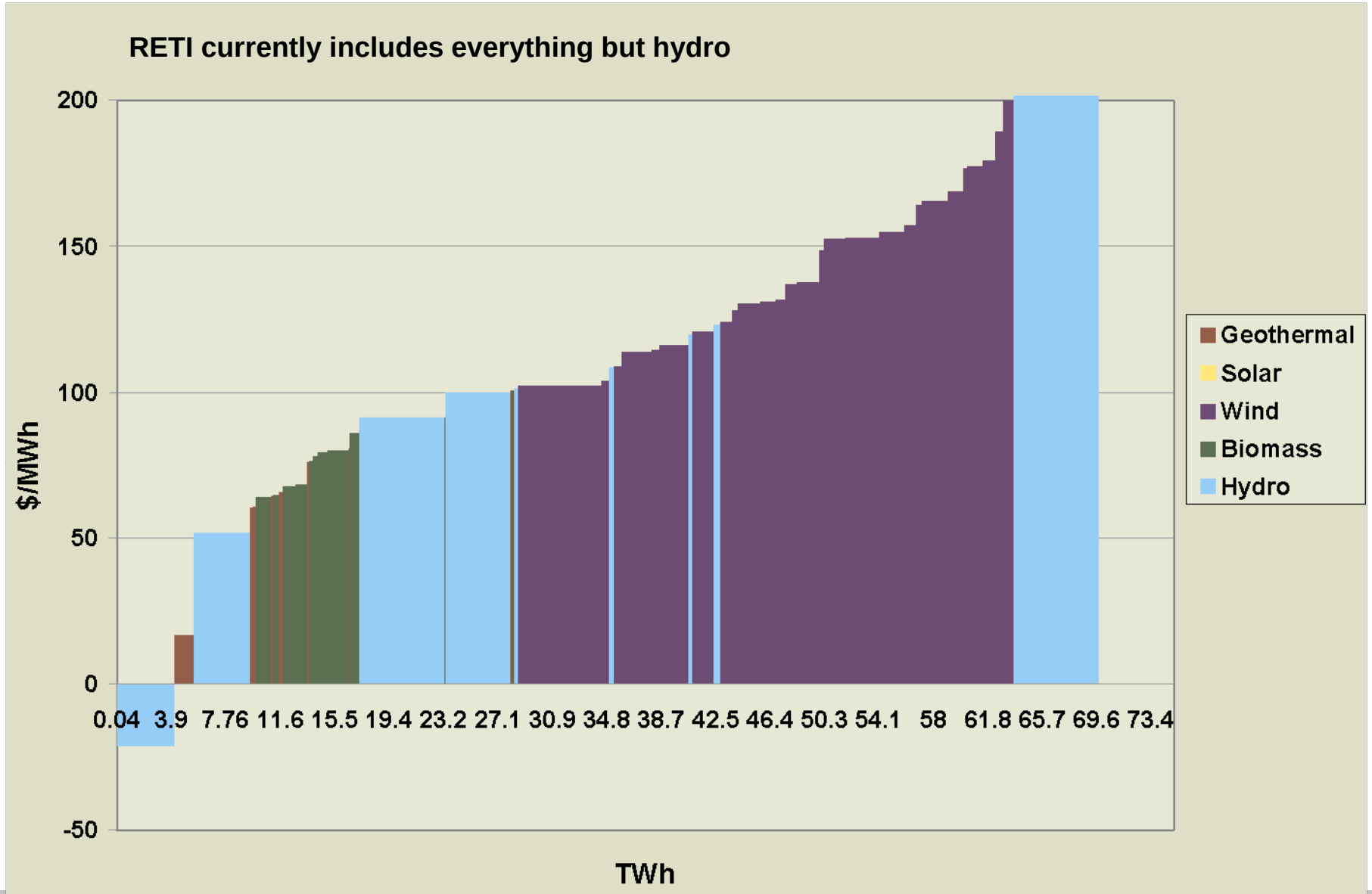
- Capacity Value

Similar concept as RETI, but numbers not directly comparable

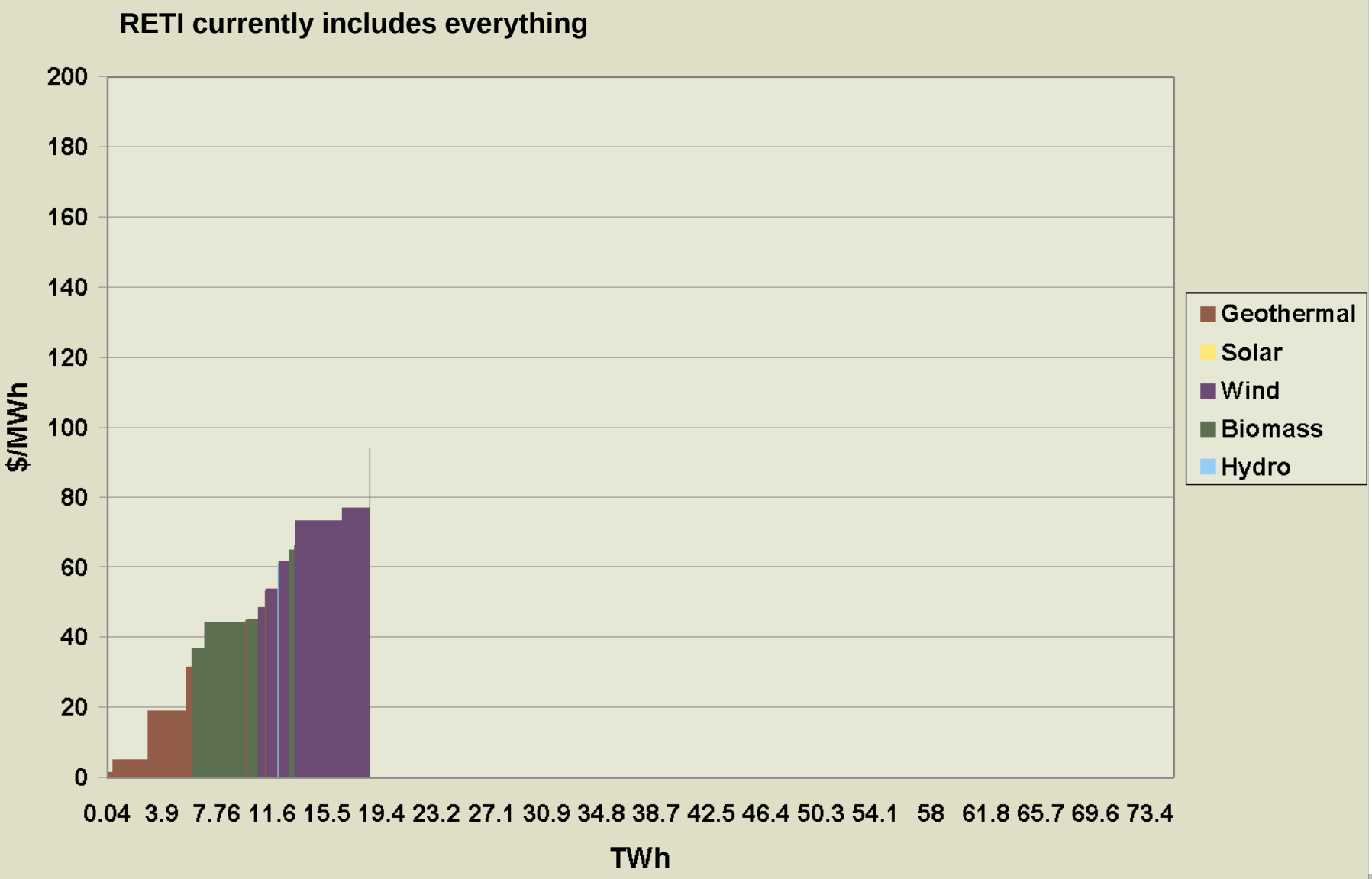
Supply Curves

1. Current RETI states and provinces
2. Additional out-of-state areas

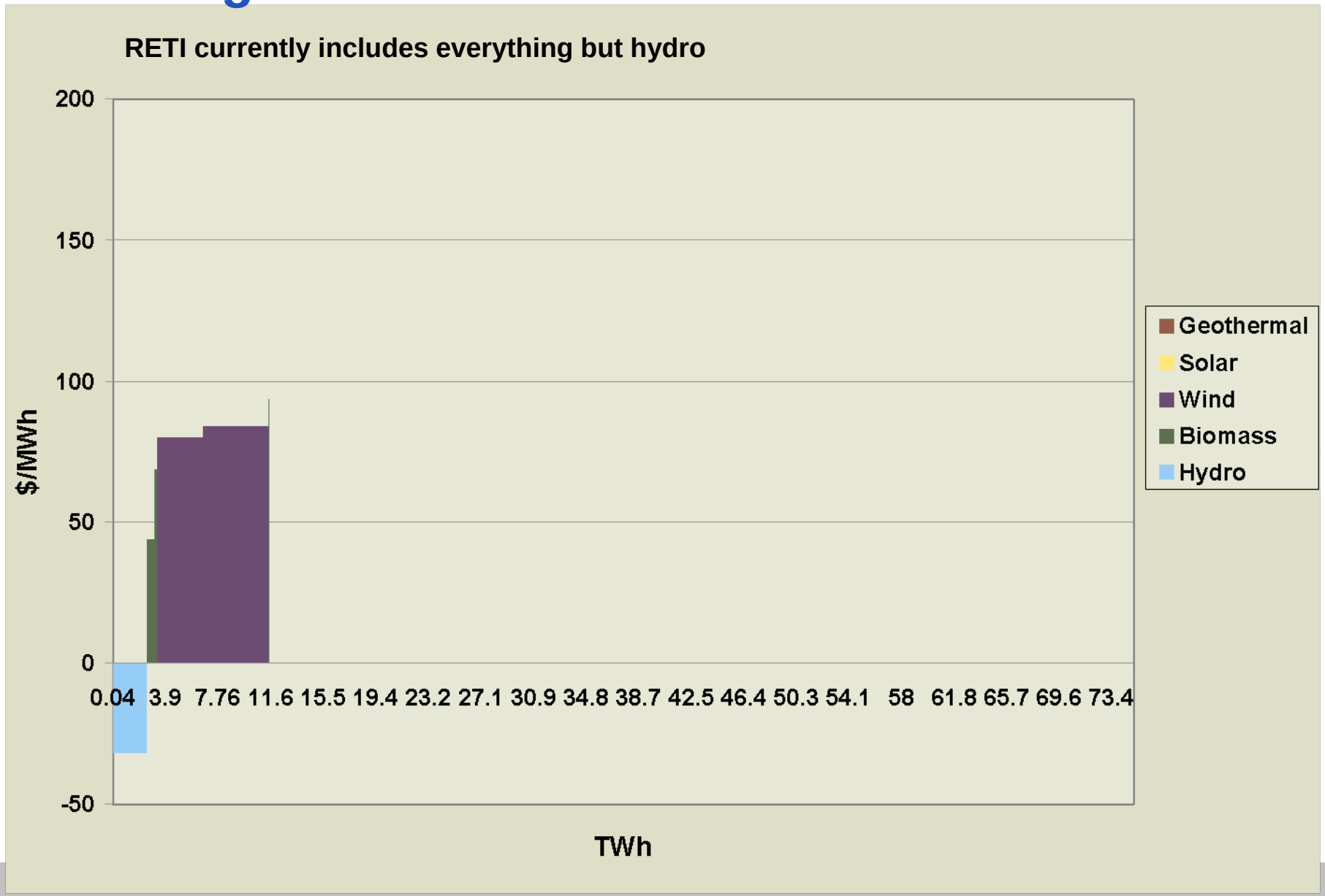
British Columbia to Northern California



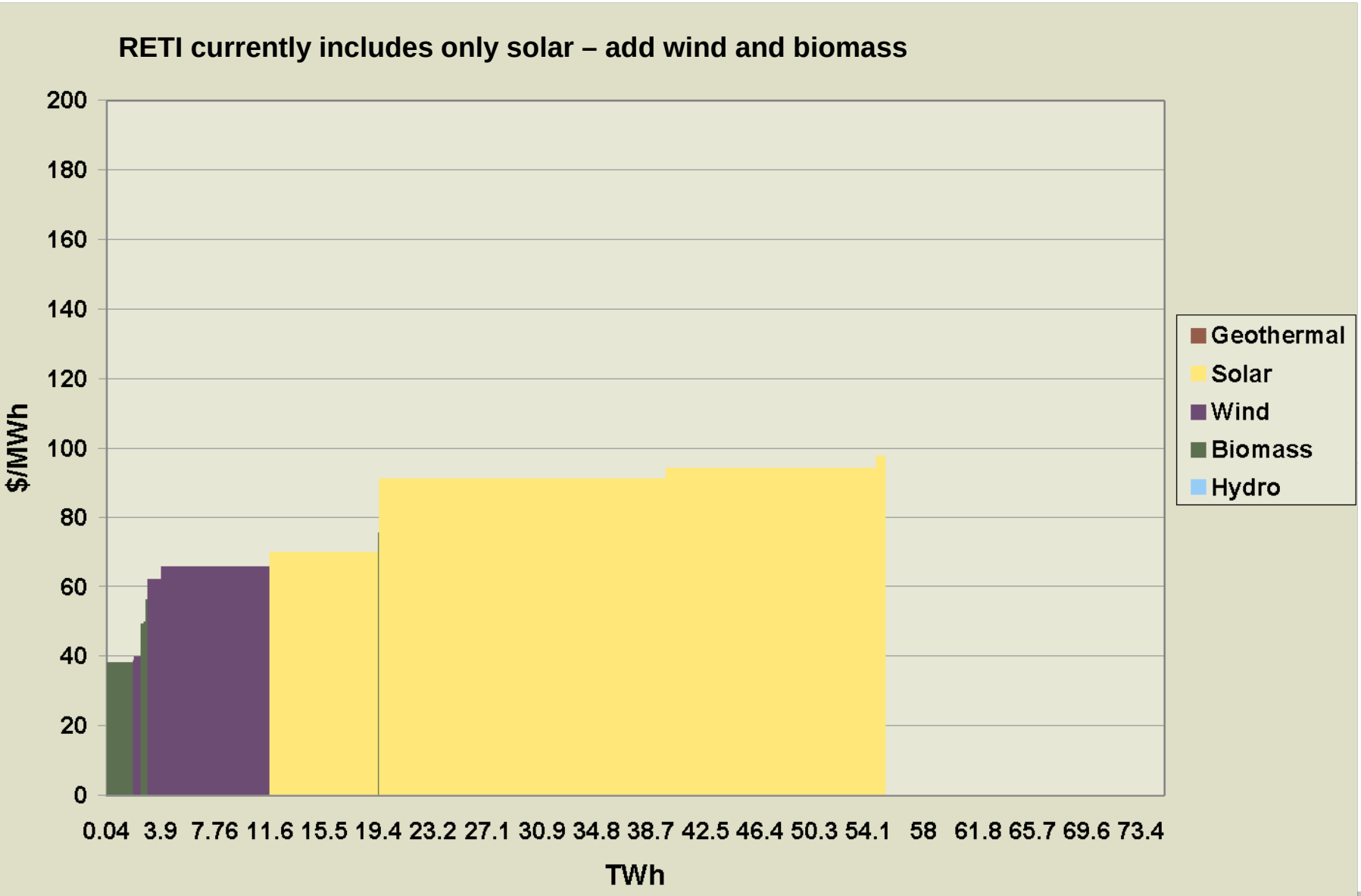
Oregon to Northern California



Washington to Northern California

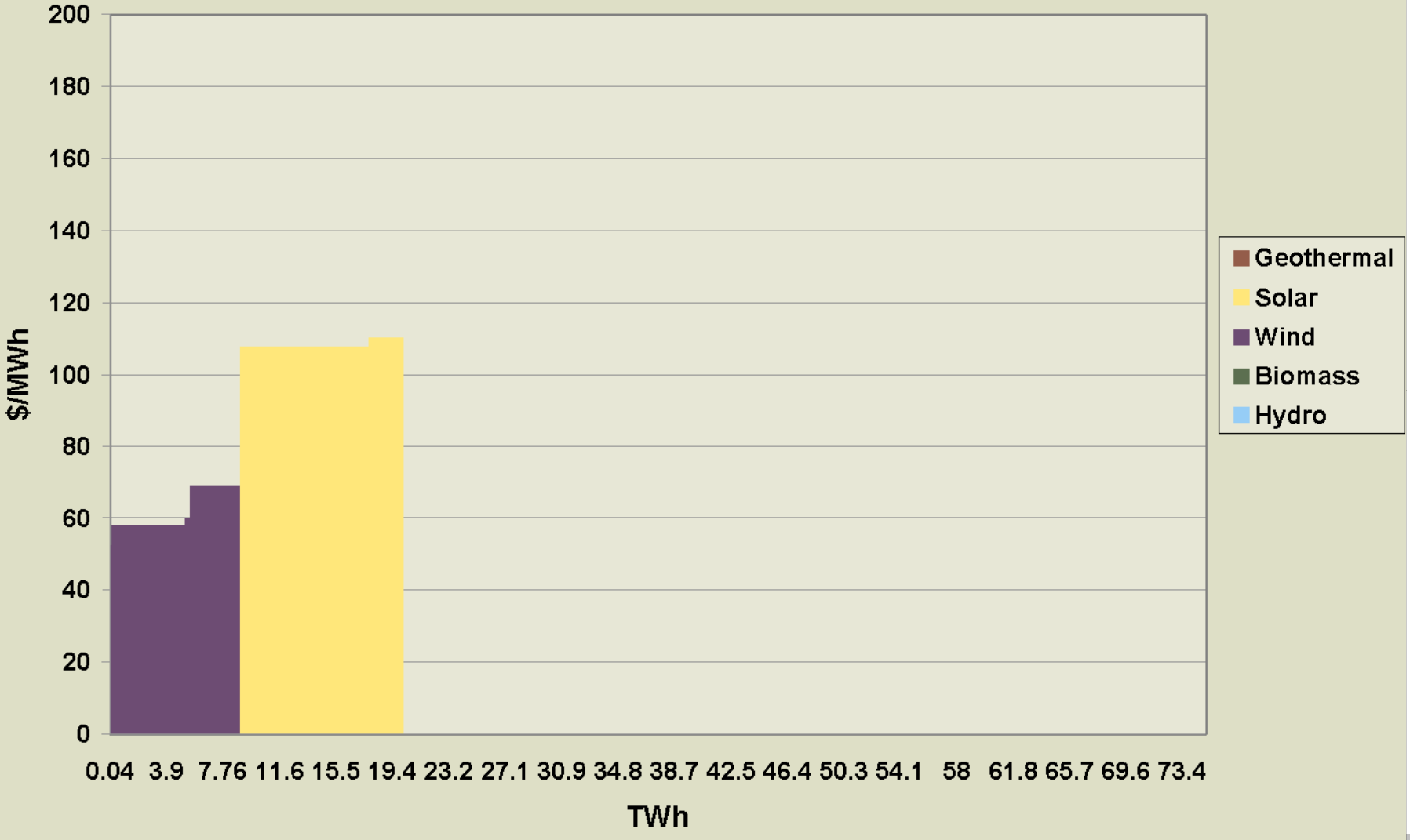


Arizona to Southern California



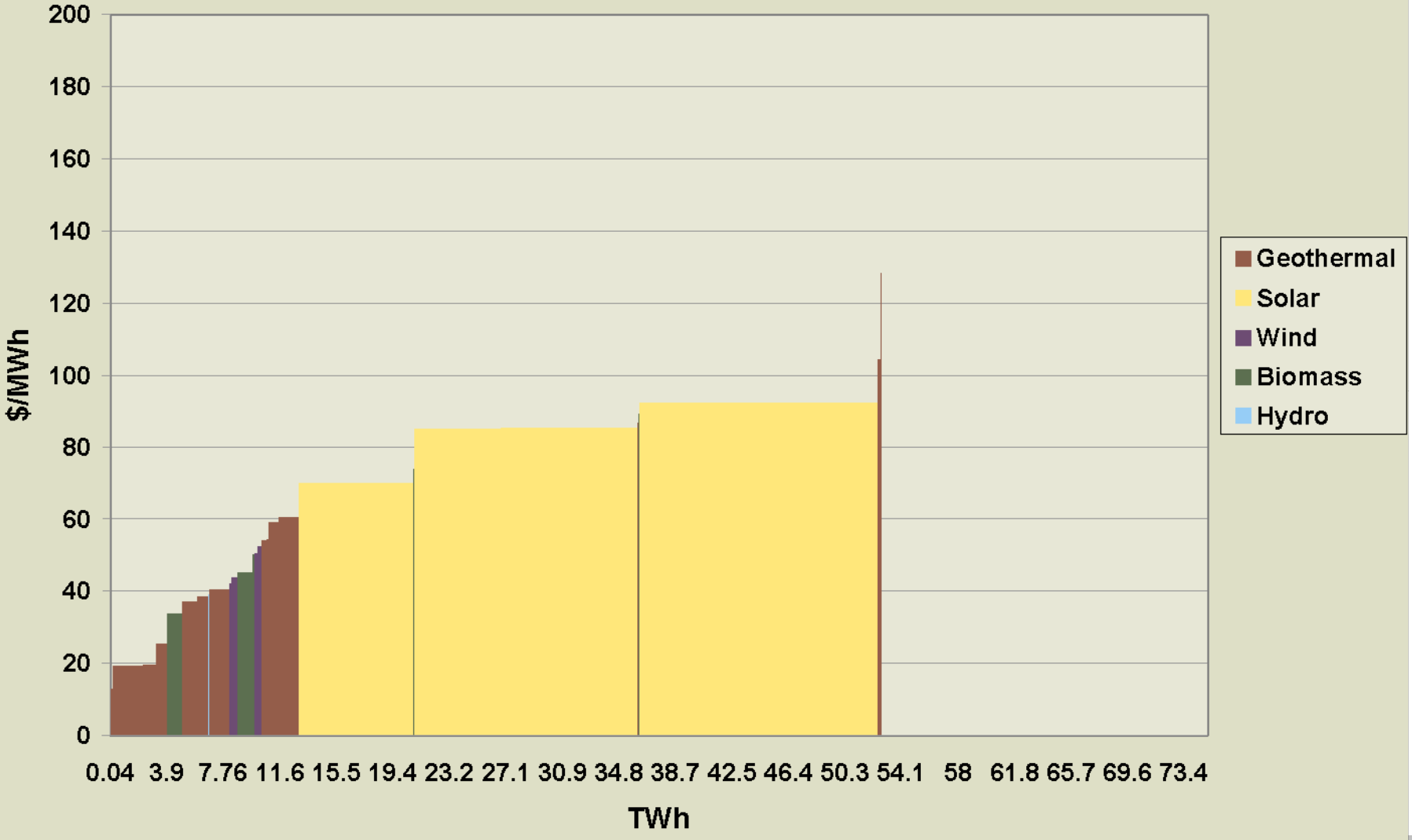
Baja to Southern California

RETI currently includes only wind – solar is not included as it is ~$40/MWh more expensive than CA

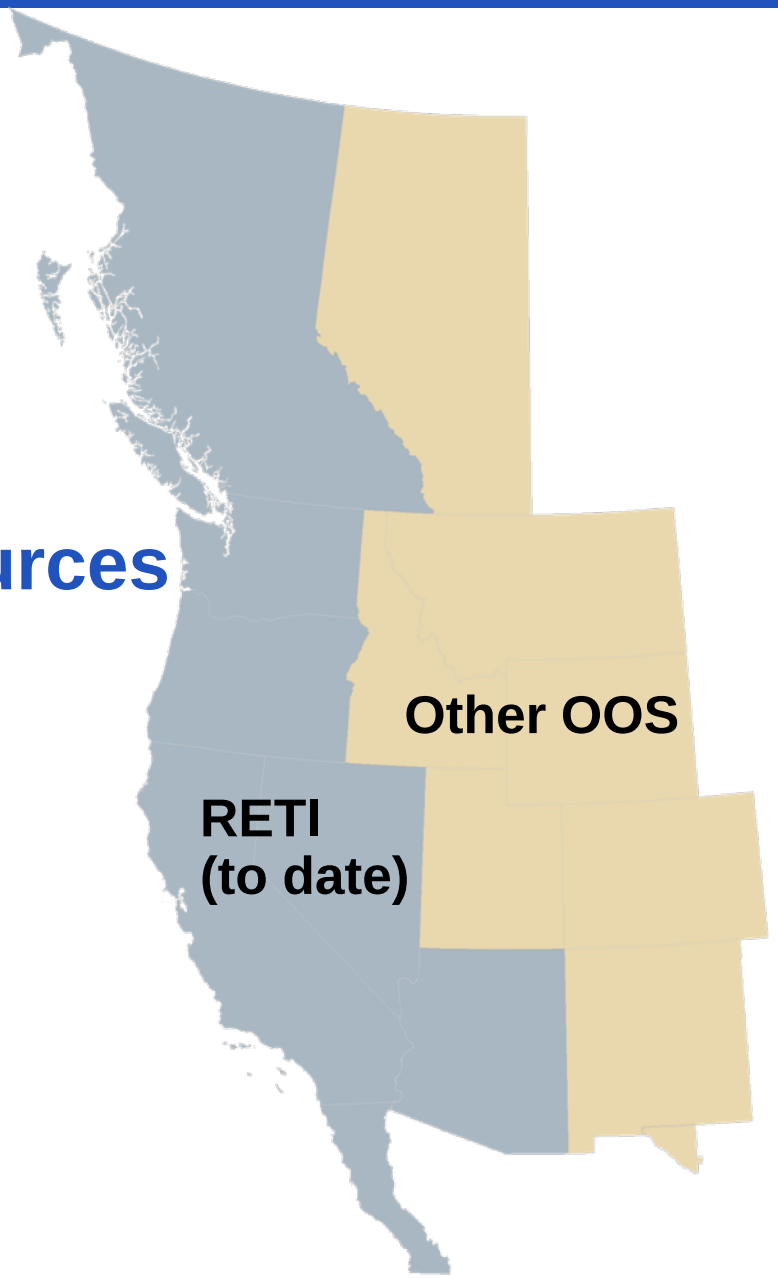


Nevada to Southern California

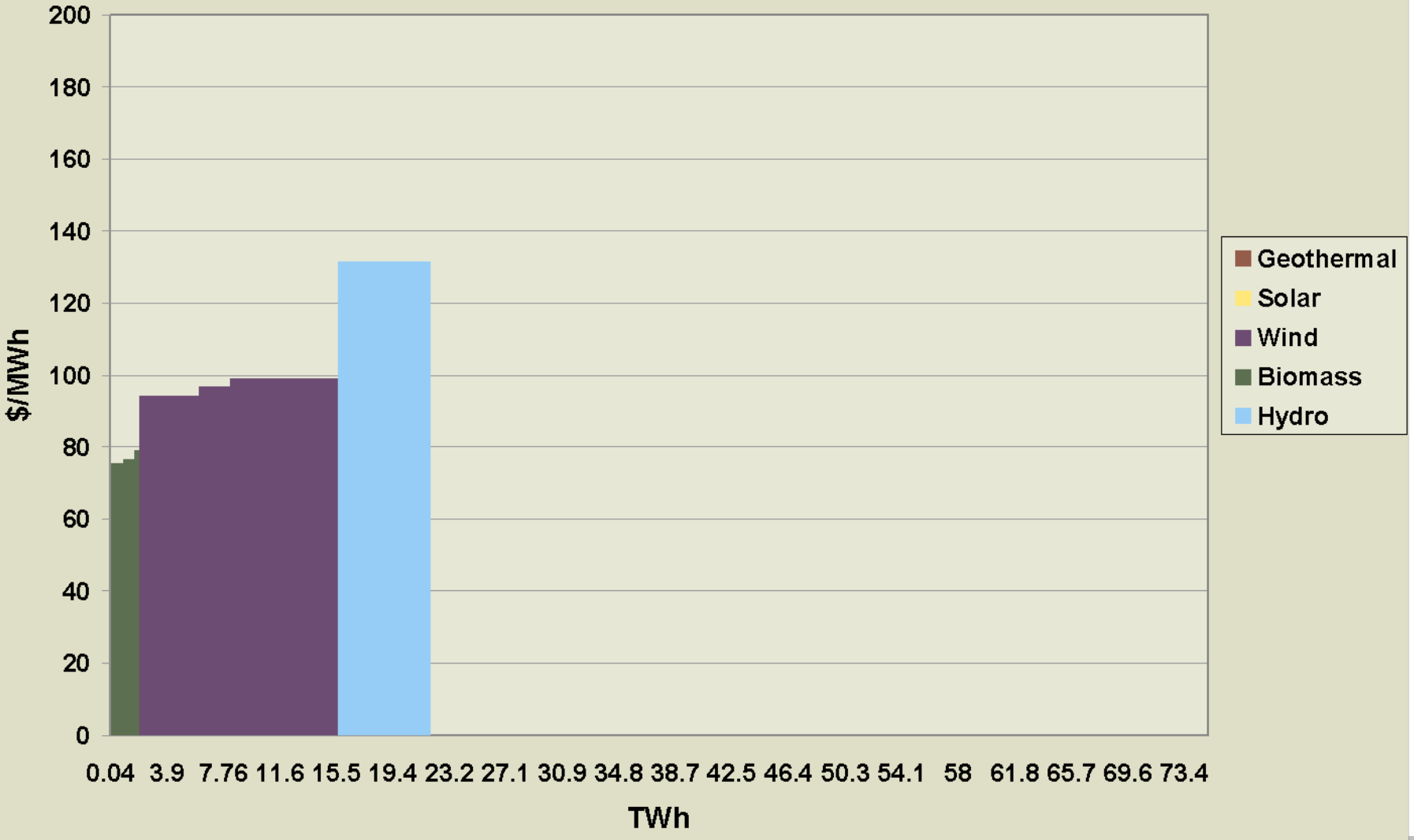
RETI currently includes geothermal plus solar and wind in southern NV. Add all other resources?
NV RPS demand is about 10 TWh



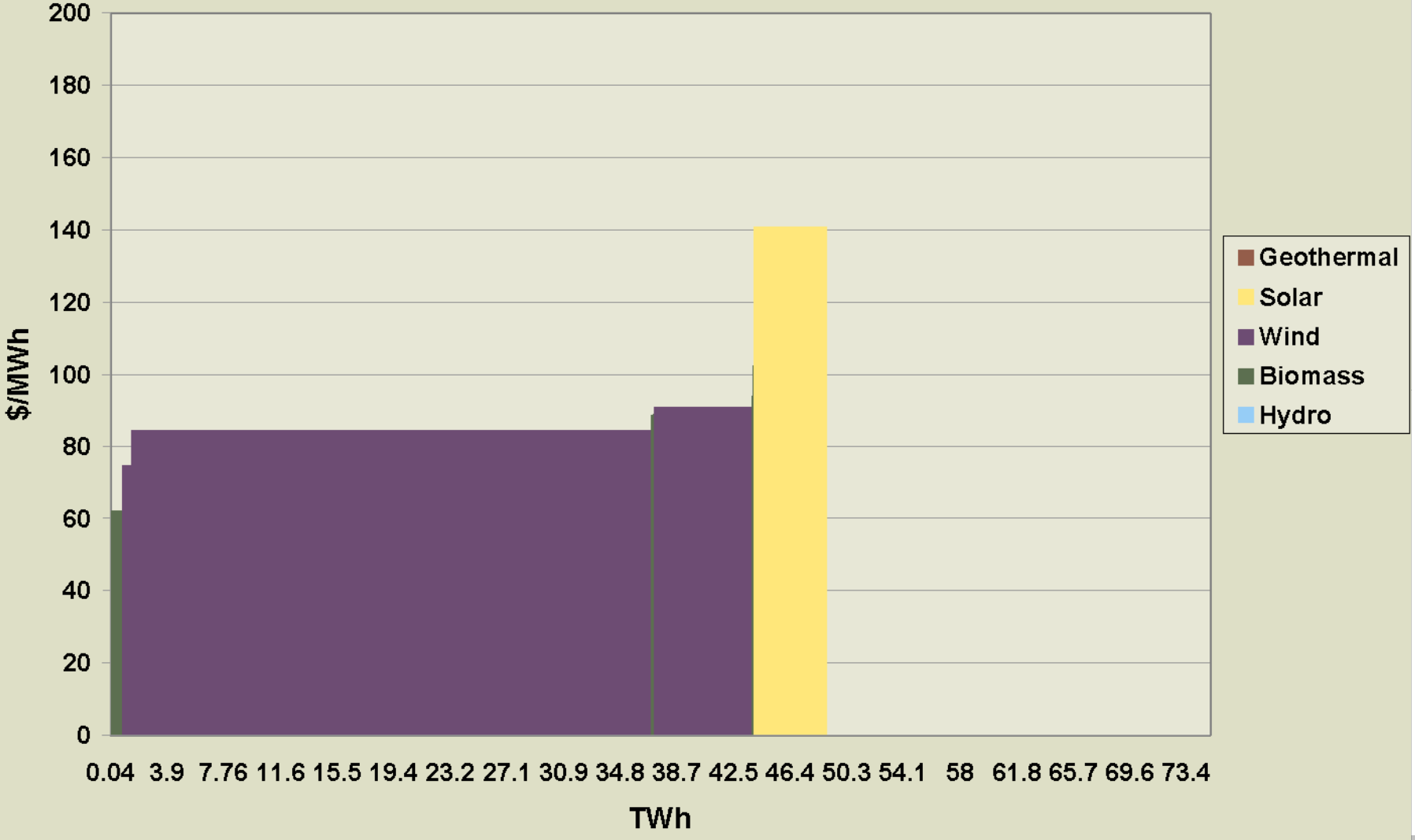
Other Out-of-State Resources



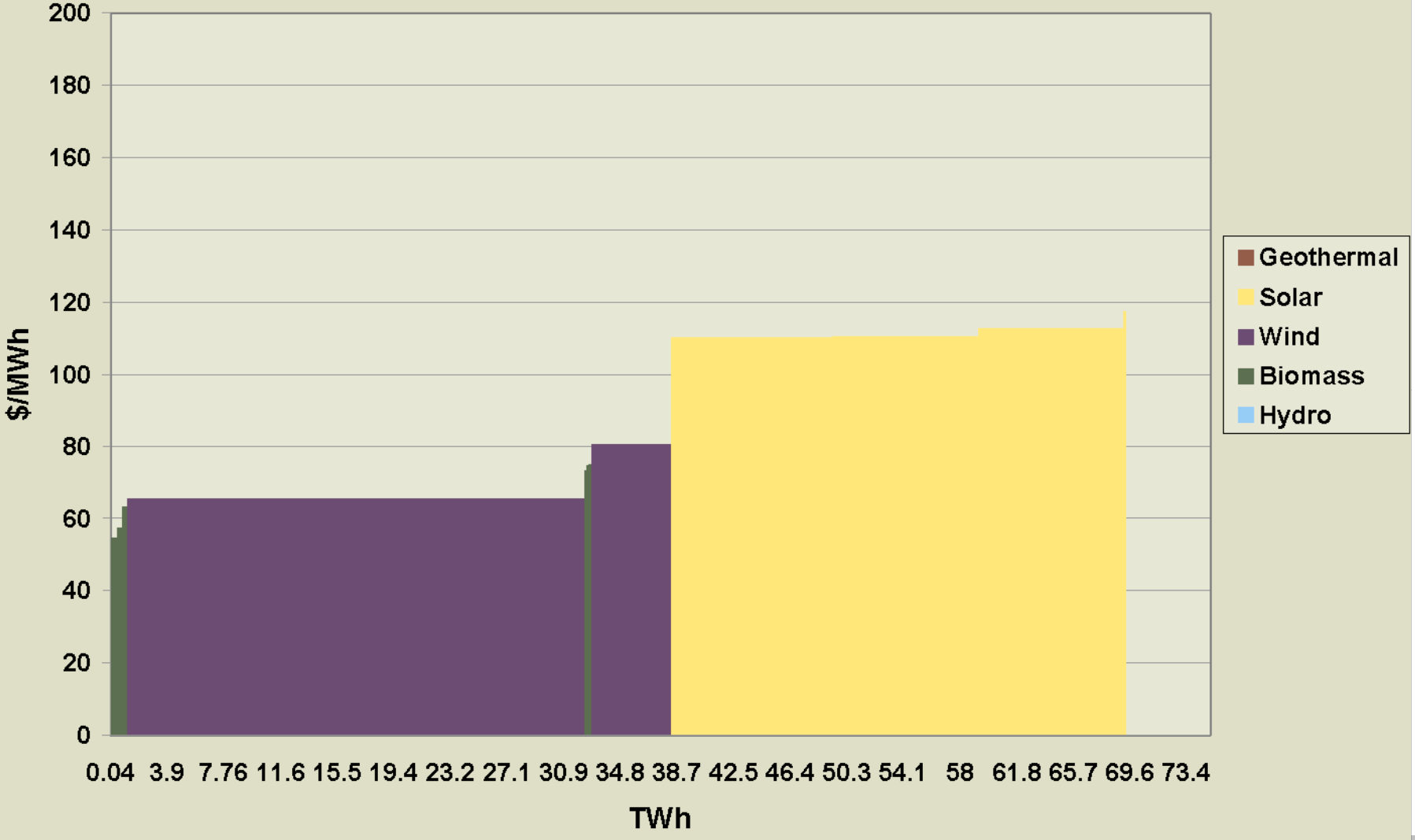
Alberta to Northern California



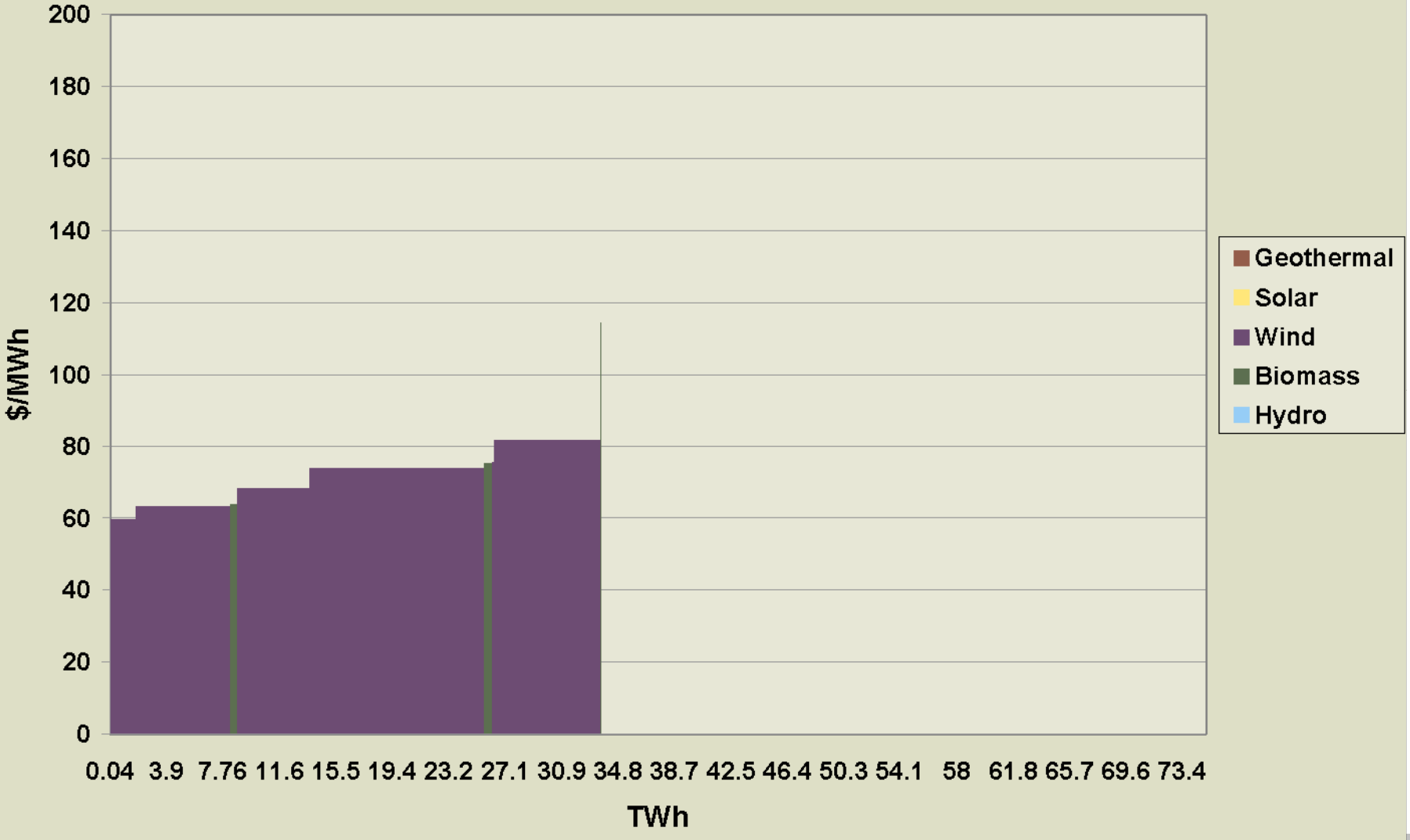
Colorado to Southern California



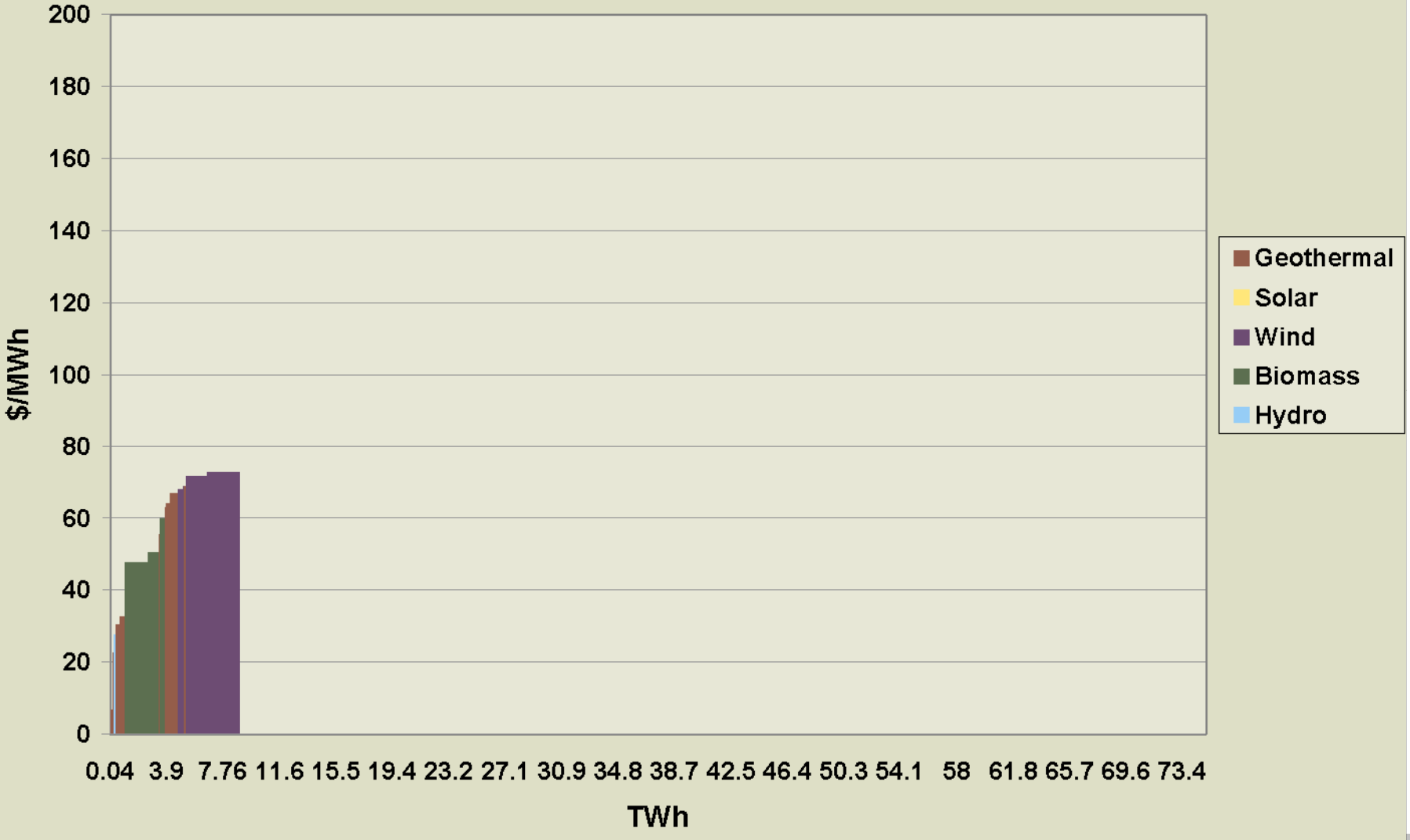
New Mexico to Southern California



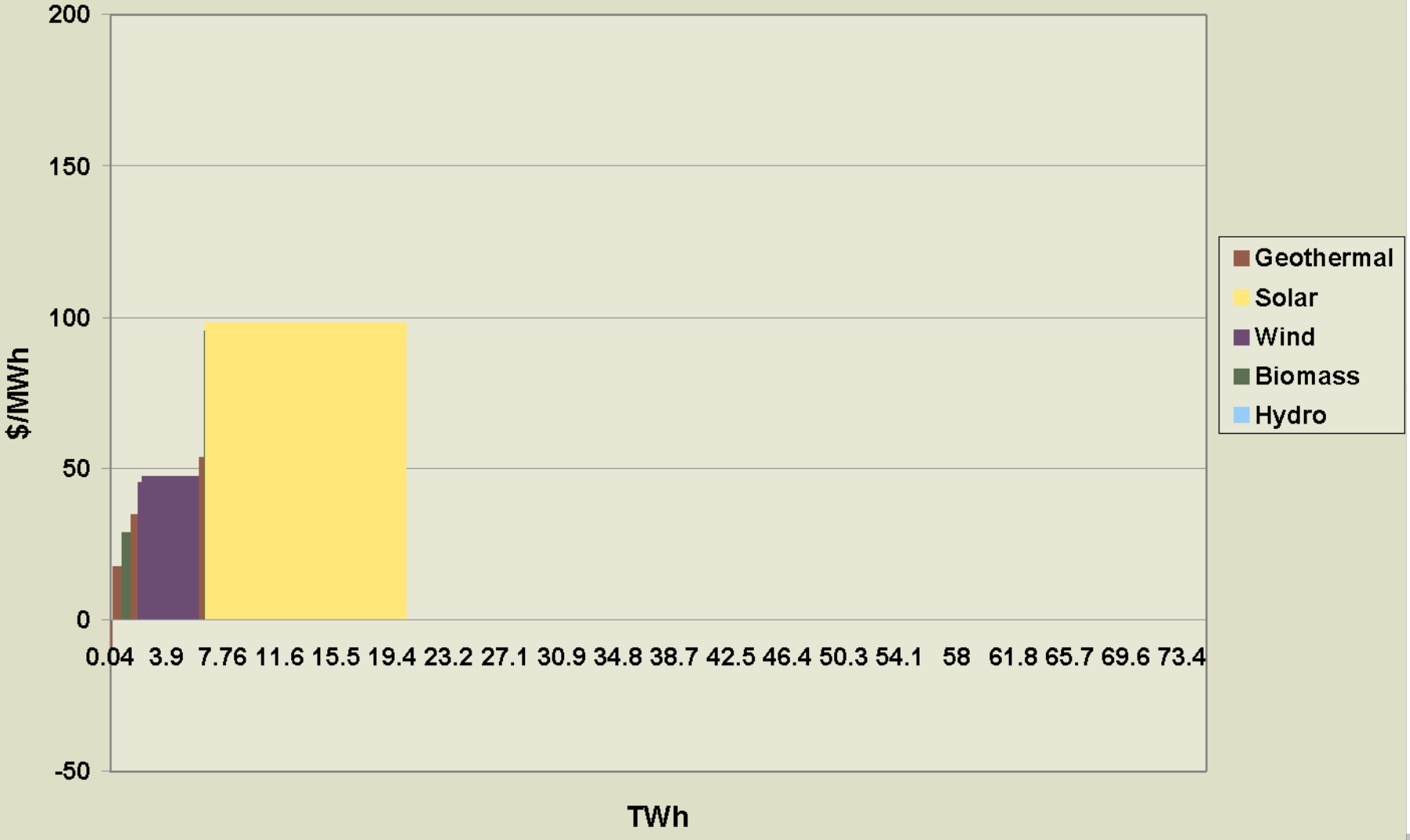
Montana to Southern California



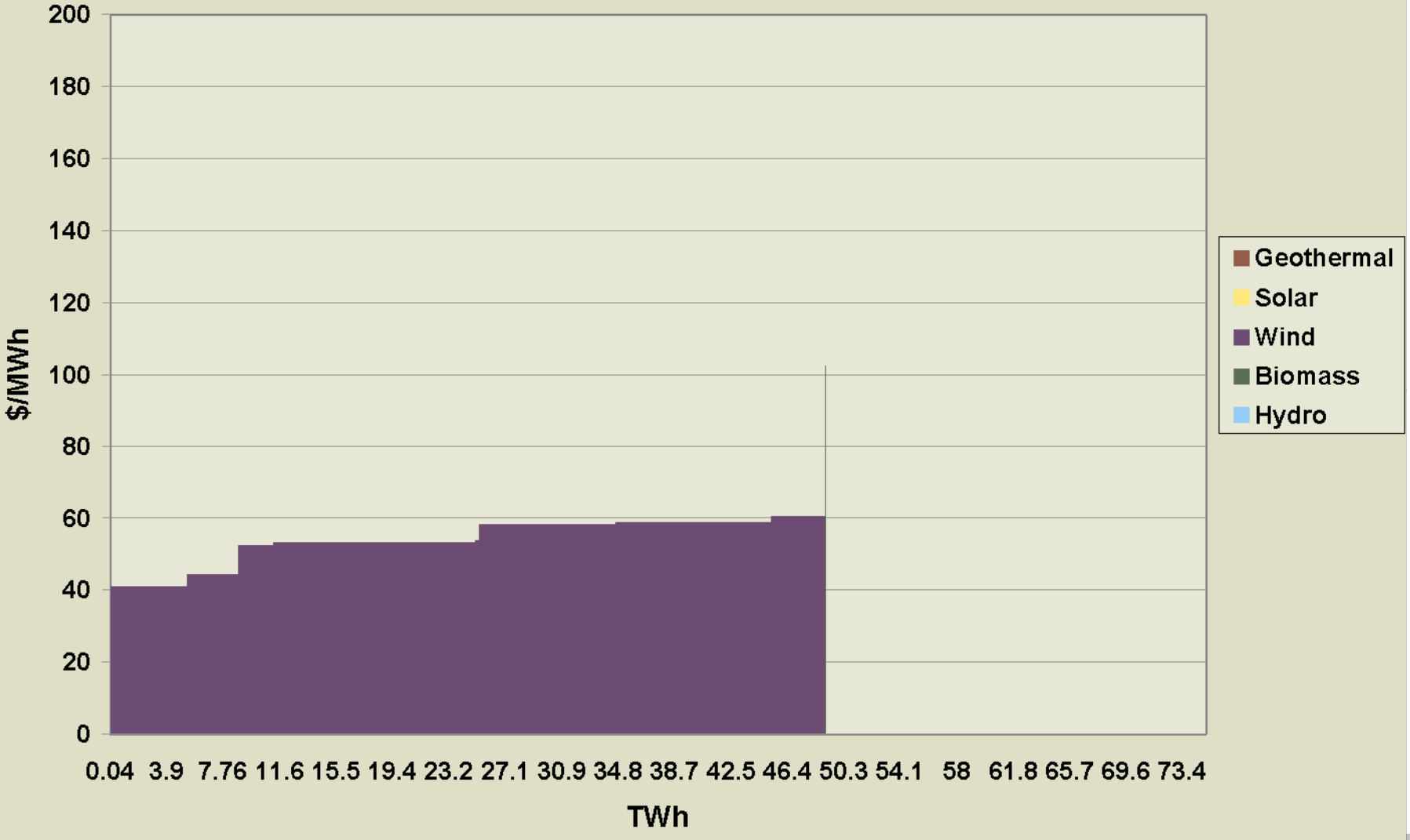
Idaho to Southern California



Utah to Southern California



Wyoming to Southern California



Recommended Out-of-State Resource Additions

	Included in 1B	Recommended
Arizona		
Nevada		
Wyoming		
Idaho		
Utah		

Out of State Transmission Issues

- Cost Assumptions
- Import limits
- Open issues

Out of State Transmission Costs

- Assume all incremental transmission
- Line costs assume 500 kV single circuit, using WREZ assumptions
- Federal financing for new lines – low cost financing with no tax
- Line utilization = resource capacity factor (Wyoming Wind), shared utilization for all others (60%)
- Transmission costs:
  - Line cost from resource hub interconnection point to CA grid access points (i.e COB, PV, Mead, etc.)
  - CA grid costs from access point to load center

Transmission Financing Assumptions

Assumption	Value	Units
AFUDC	5%	of capital cost
Economic Life	40	years
Debt Percentage	100%	
Debt Term	30	years
Debt Interest Rate	5%	
Discount Rate	5.00%	
Tax Rate	0%	
Annual O&M	3%	Of capital cost

Out of State Resource Imports and Limits

- Resources interconnected to CA grid located outside CA (Nevada, Baja, AZ, etc.)
  - Modeled identical to CA resources
  - Same transmission cost as CA resources
  - No import limit
- Resource accessing CA grid through gateway
  - Total import limit (current = 2500 MW from COB, 2500 MW from SW)
  - Must pay transmission access cost to host transmission owner
  - CA costs from CA grid gateway to load centers

Out of State Transmission Issues

- Environmental scores for resources interconnected to CA grid located outside CA?
- Import limits for non-interconnected resources?