U.S. Department of Energy
Energy Efficiency and Renewable Energy

Overview of the 1000 MW CSP Southwest Initiative

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In 2002, Congress asked the Department of Energy to:

"develop and scope out an initiative to fulfill the goal of having 1000 megawatts (MW) of new parabolic trough, power tower, and dish engine solar capacity supplying the southwestern United States"

In June 2004 the Western Governors' Association at their annual meeting in Santa Fe, resolved to diversify their energy resources by developing 30GW of clean energy in the West*, including a declaration to:

"establish a stakeholder working group to develop options for consideration by the Governors in furtherance of the 1,000 MW initiative"

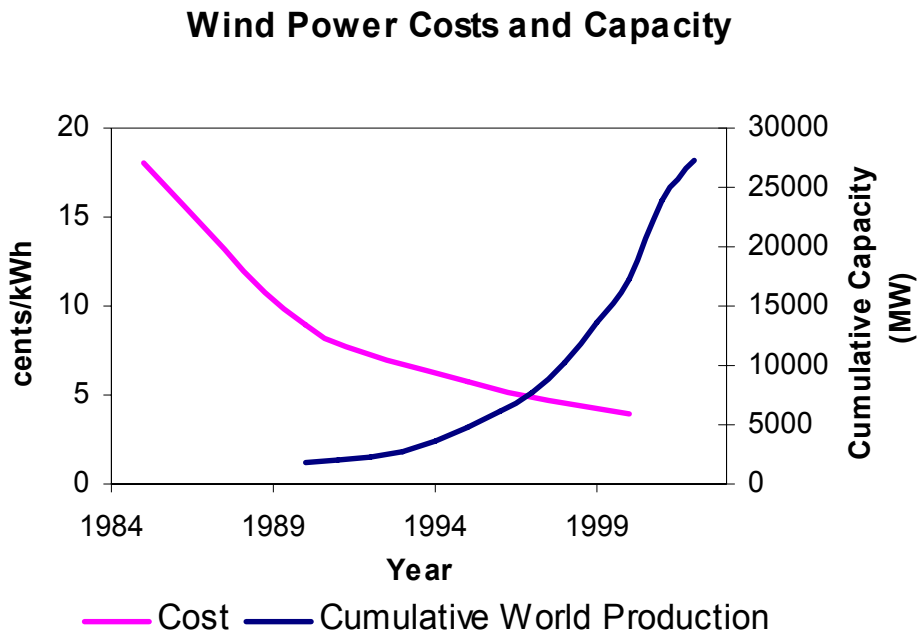
*http://www.westgov.org/wga/policy/04/clean-energy.pdf

Presentation Outline

- CSP Costs – Why should the states be interested?
- CSP Potential – Where could 1000MWs be sited?
- CSP Benefits – What will the states get for it?

CSP Costs Will Decline

Cost reductions realized by wind power are good examples for CSP.



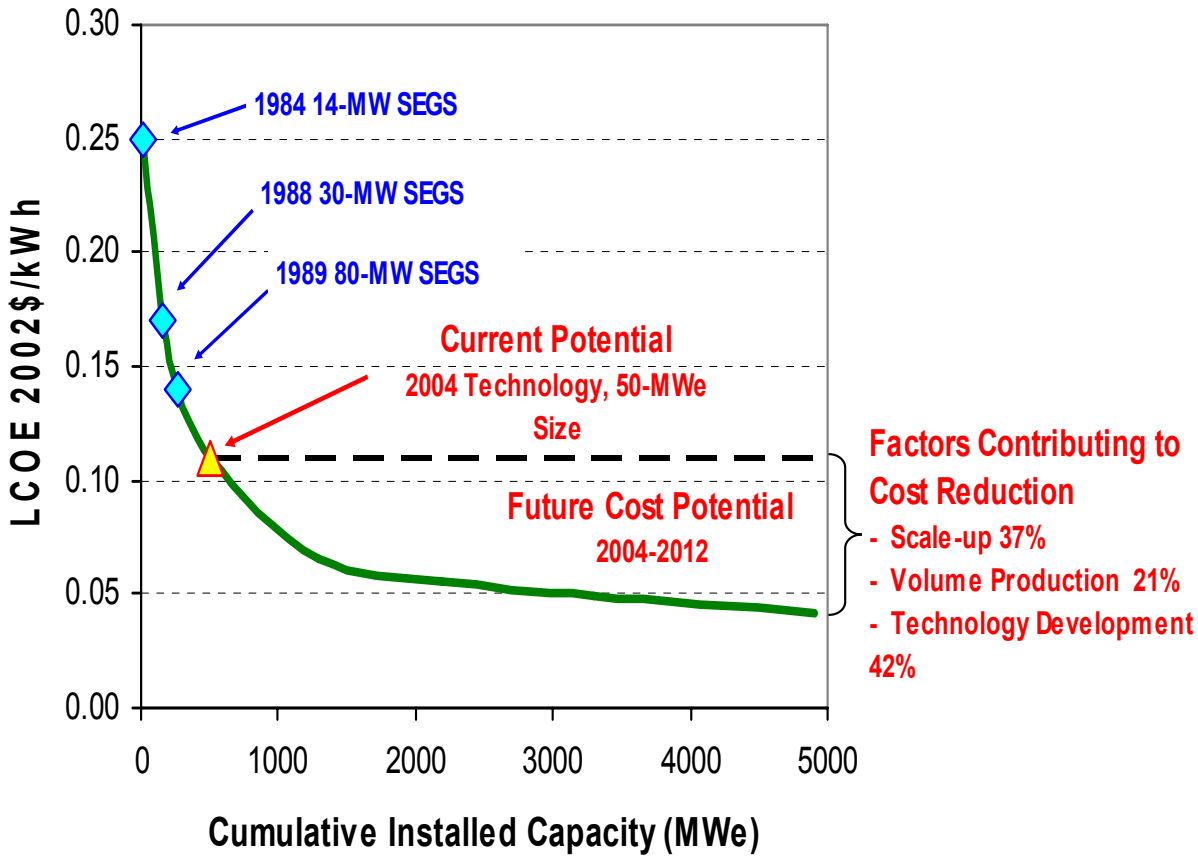
Initial cost of wind power was high but decreased as installed capacity increased.

The same trend will occur for CSP.

** ASSESSMENT OF PARABOLIC TROUGH AND POWER TOWER SOLAR TECHNOLOGY COST AND PERFORMANCE FORECASTS, SL-5641 MAY 2003.*

Projected Costs of CSP Generation

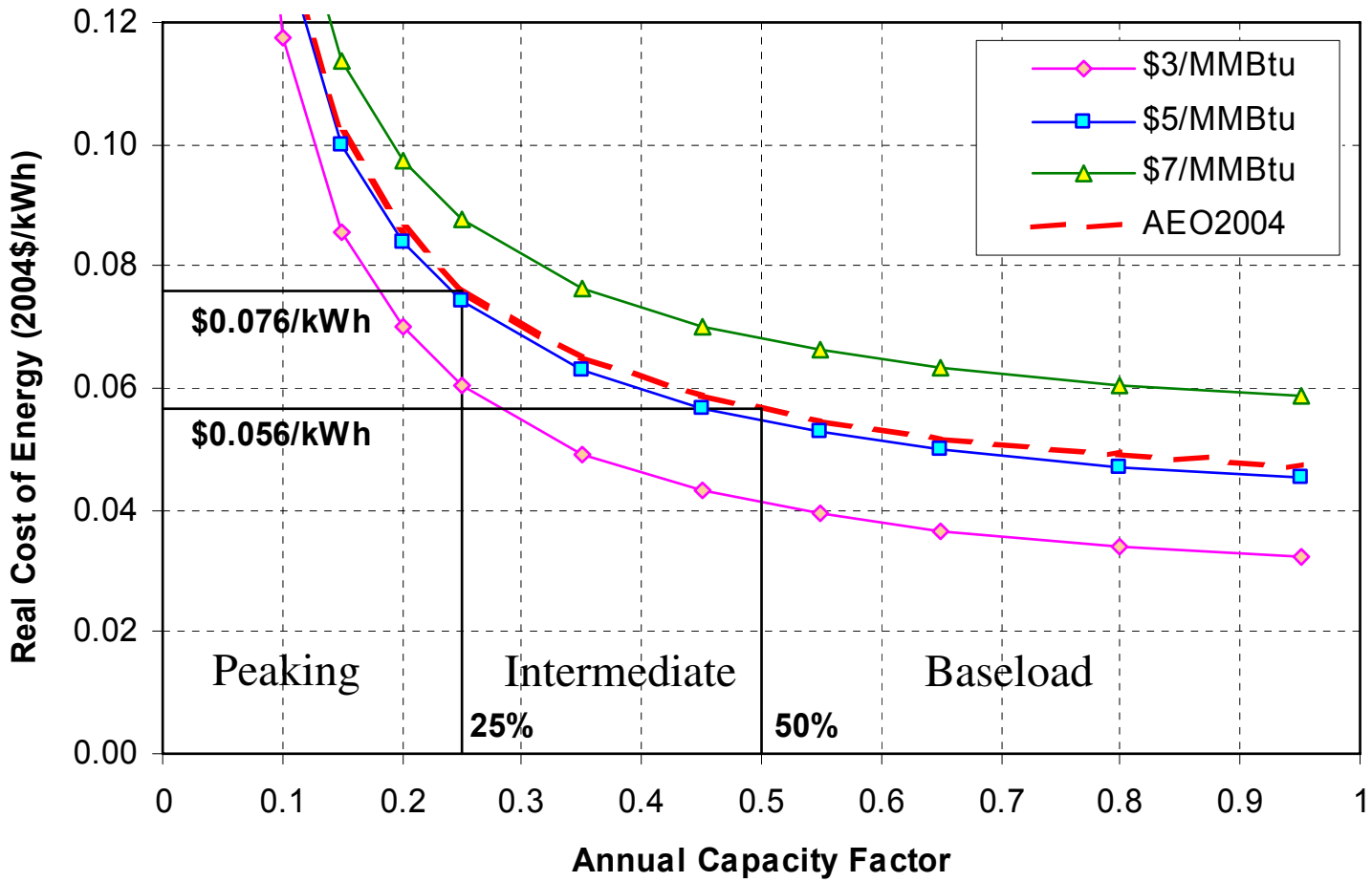
- Sargent & Lundy* and NREL/Sandia each evaluated the potential cost reductions of CSP.
- Cost reductions for trough technology will result from deployment, scale and R&D
- Cost reductions are accelerated with faster deployment schedule



* Sargent and Lundy (2003). Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Impacts. http://www.nrel.gov/docs/fy04osti/34440.pdf

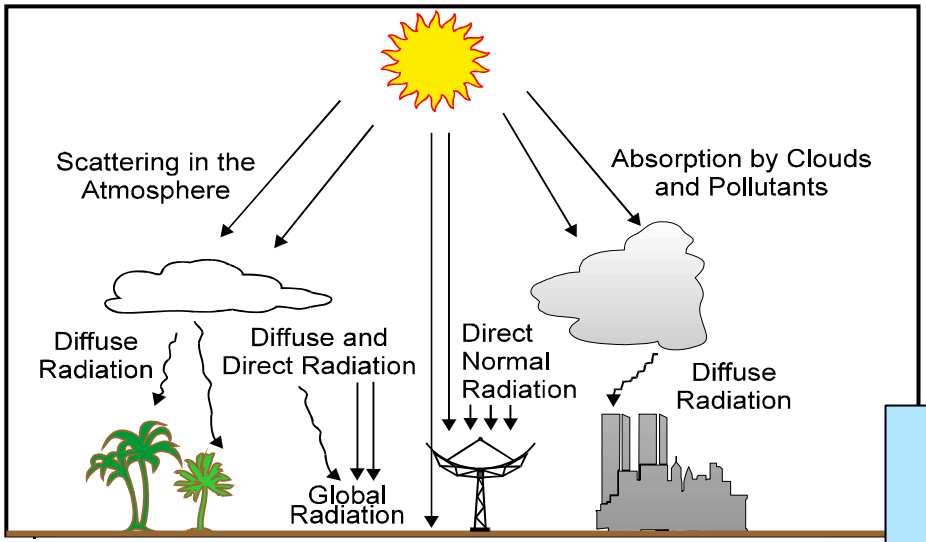
Cost of Conventional Generation

Advanced Combined Cycle Real Cost of Energy Versus Capacity Factor



Note: 1.0 MMBtu = 1.055 GJ

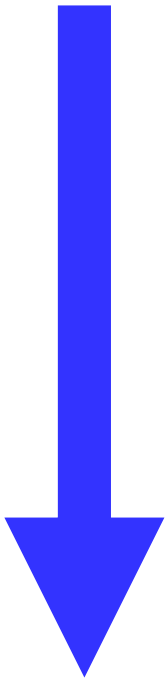
Concentrating Solar Power (CSP) Uses Direct Normal Radiation



Source: Status Report on Solar Thermal Power Plants , Pilkinton Solar International, 1996..

Southwest Solar Resources: Which Locations Are Suitable for Development?

All Solar Resources



Locations Suitable for Development

1. Start with direct normal solar resource estimates derived from 10 km satellite data.
2. Eliminate locations with less than 6.75 kwh/m^2/day.
3. Exclude environmentally sensitive lands, major urban areas, and water features.
4. Remove land areas with greater than 1% (and 3%) average land slope
5. Eliminate areas with a minimum contiguous area of less than 10 square kilometers.

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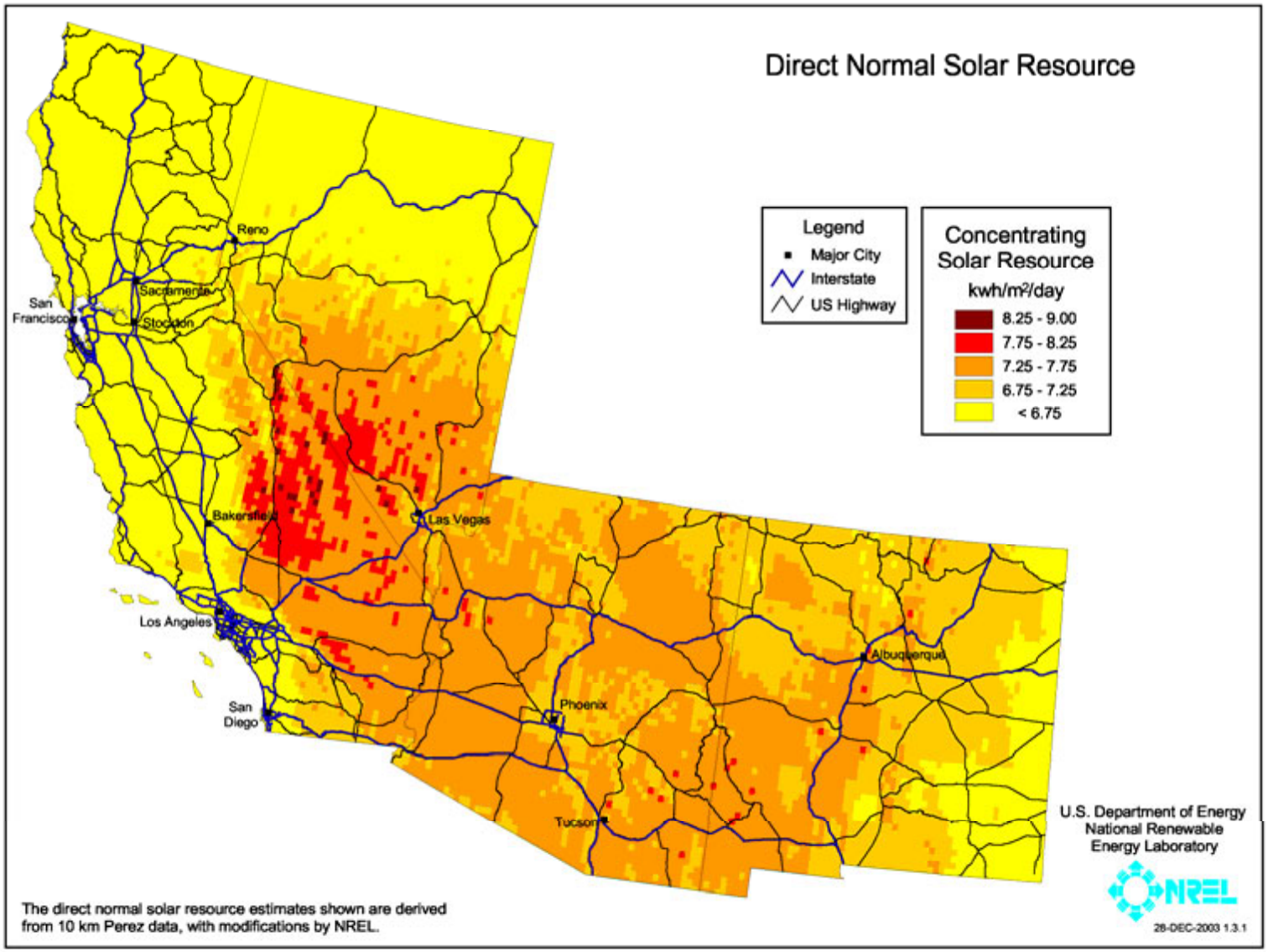
Southwest Solar Resources
Unfiltered Data



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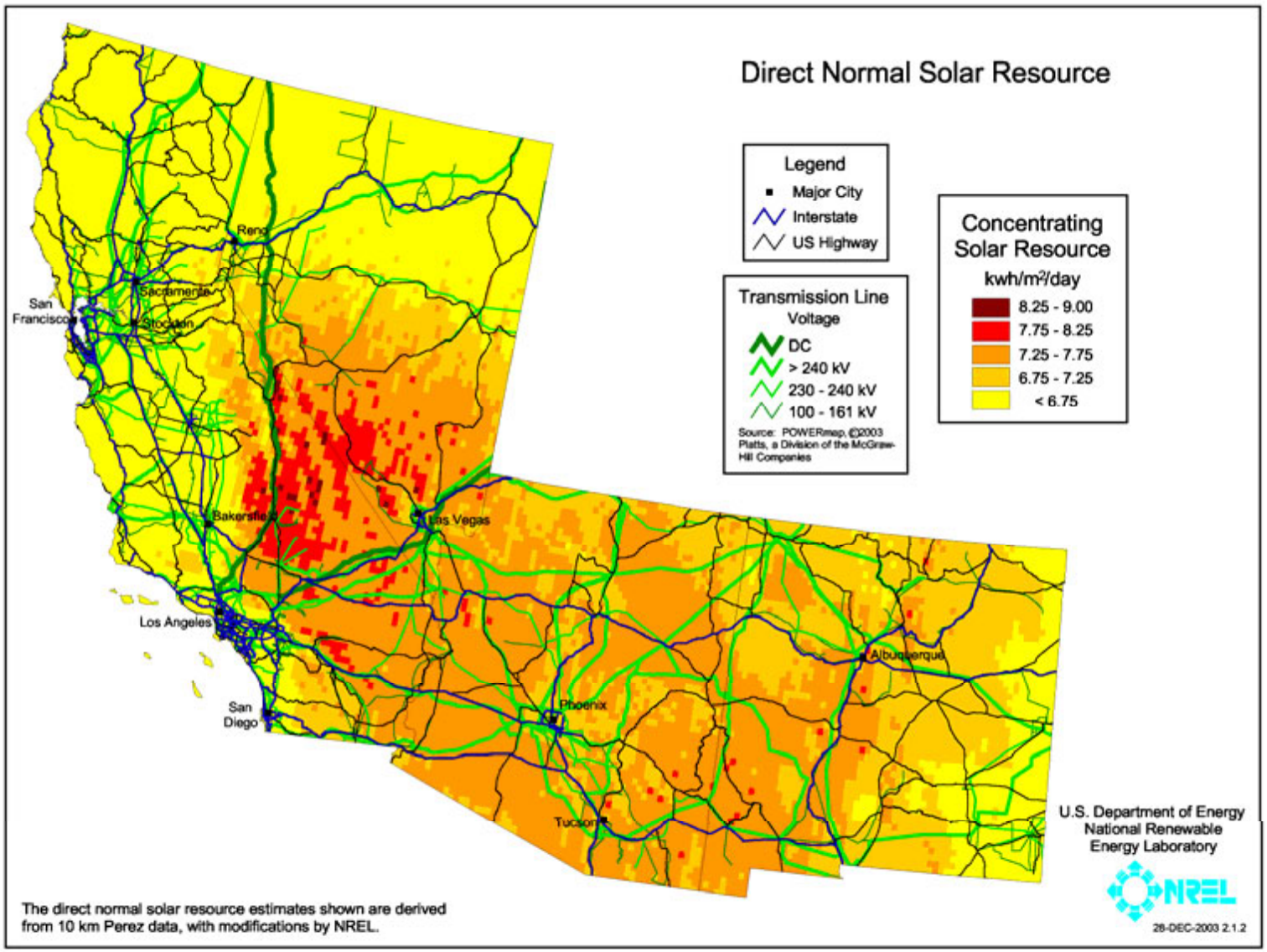
Southwest Solar Resources
Transmission Overlay



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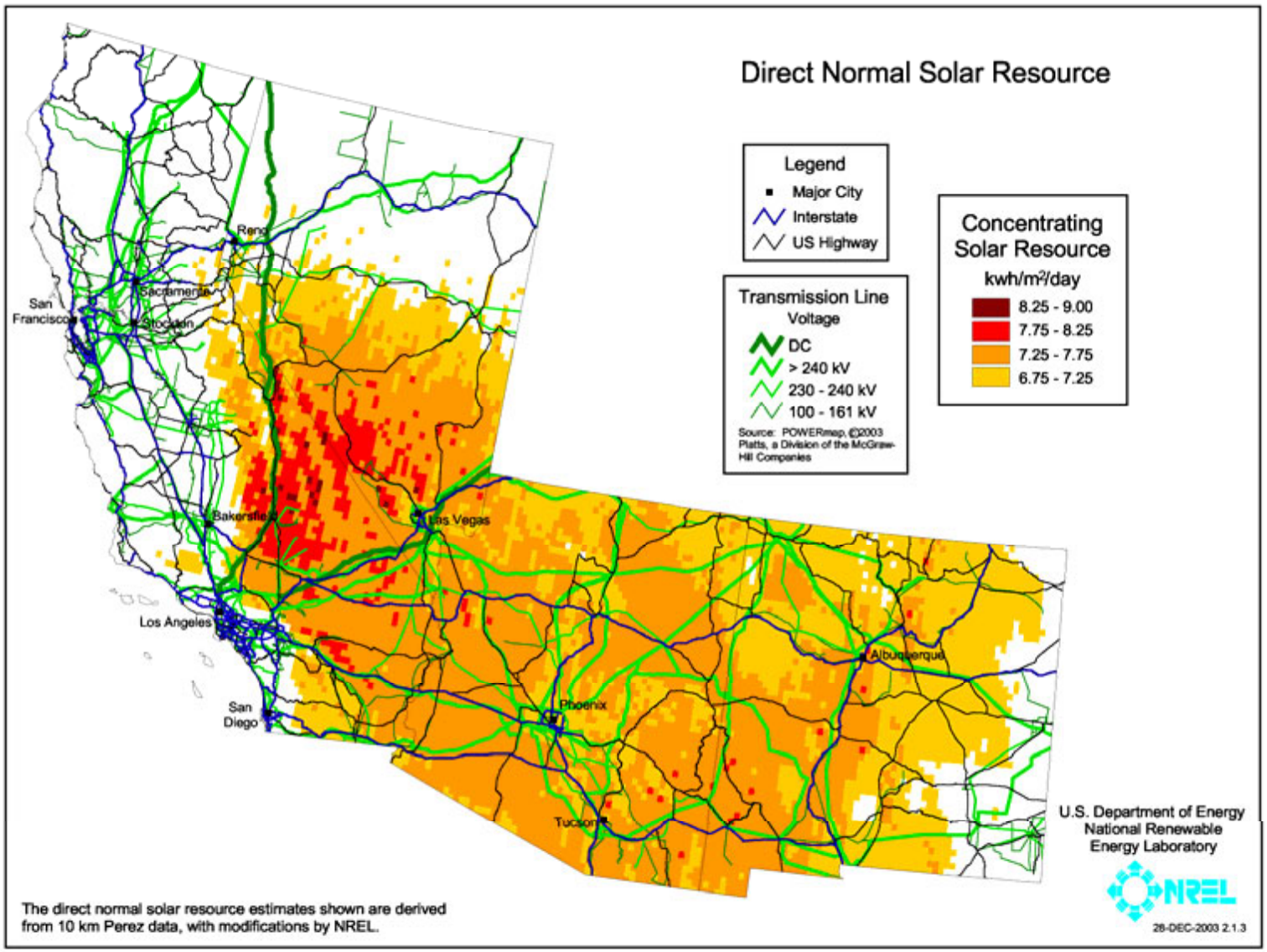
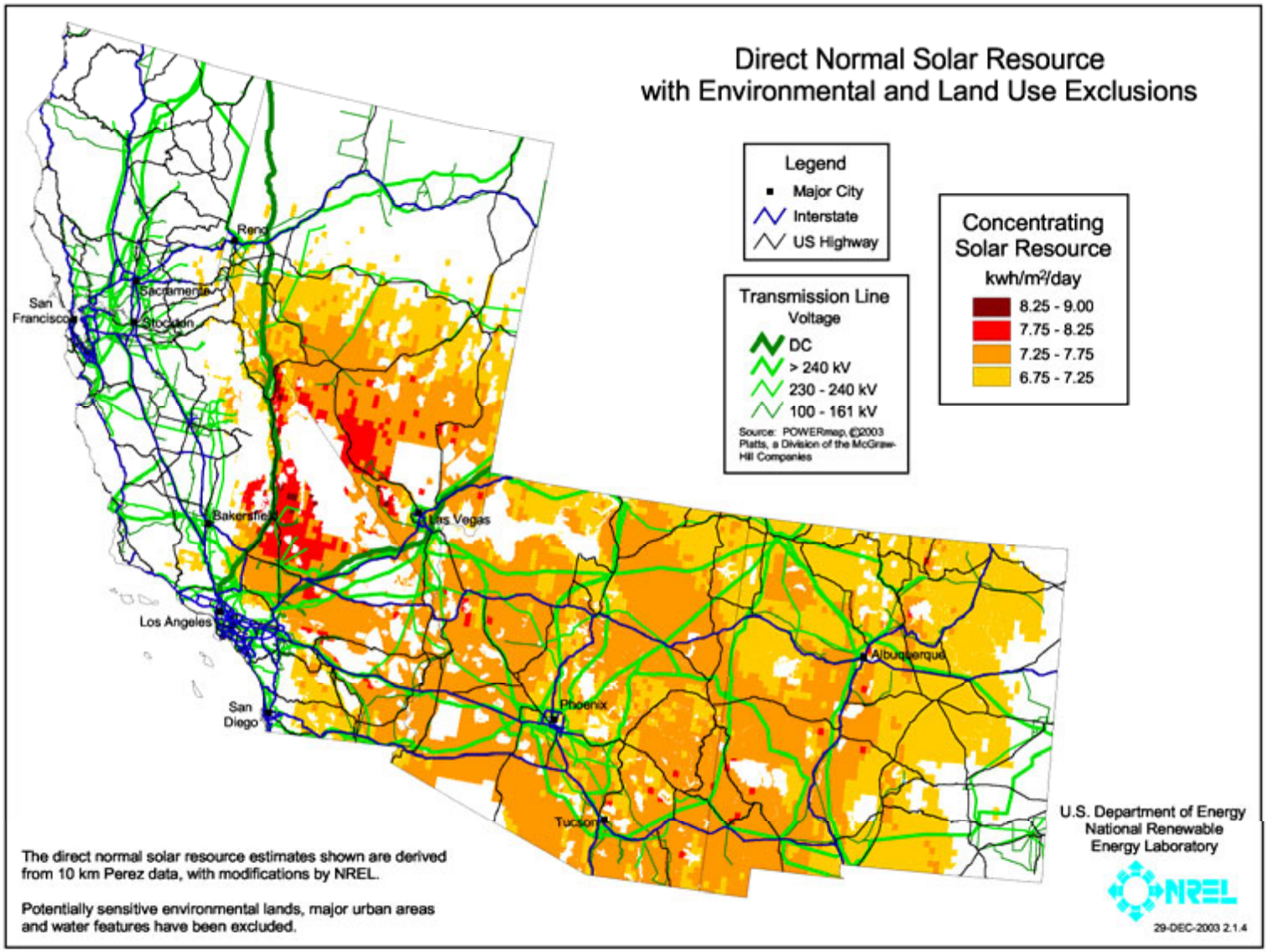
Southwest Solar Resources

Solar Resource > 6.75 kWh/m^2/day



Southwest Solar Resources

Previous plus environmental & Land Use Exclusions



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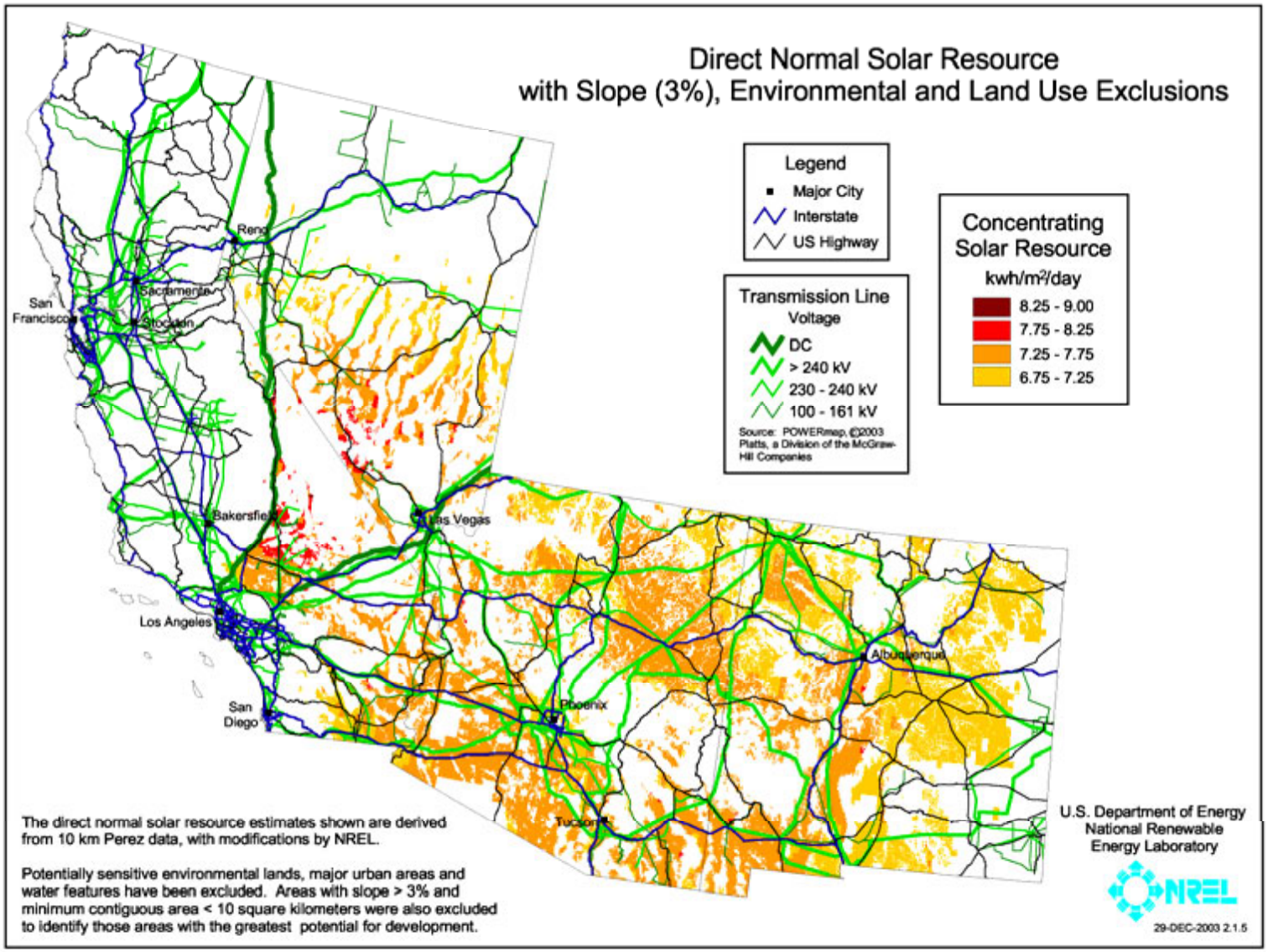
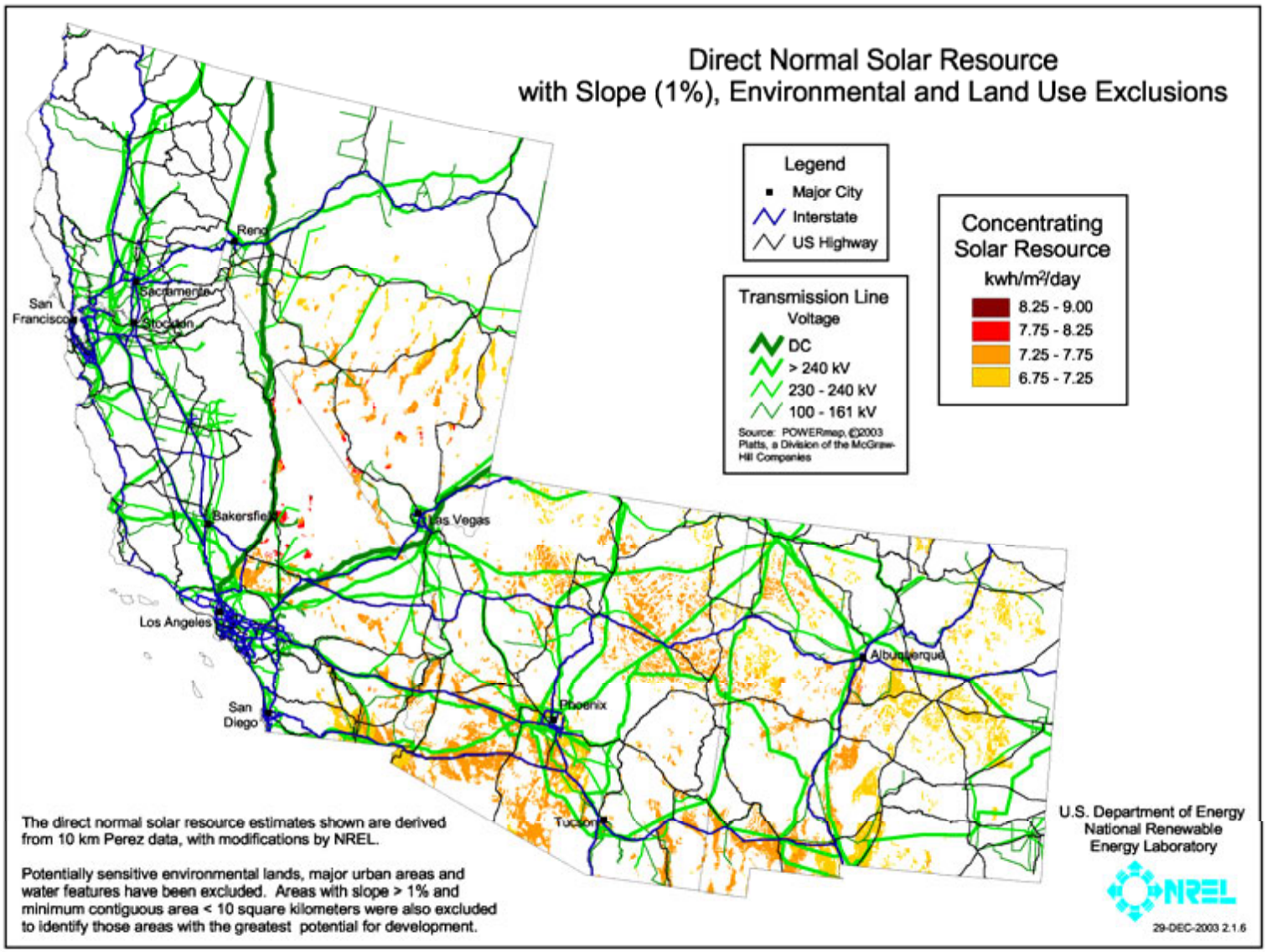
Southwest Solar Resources

Previous plus slope < 3%

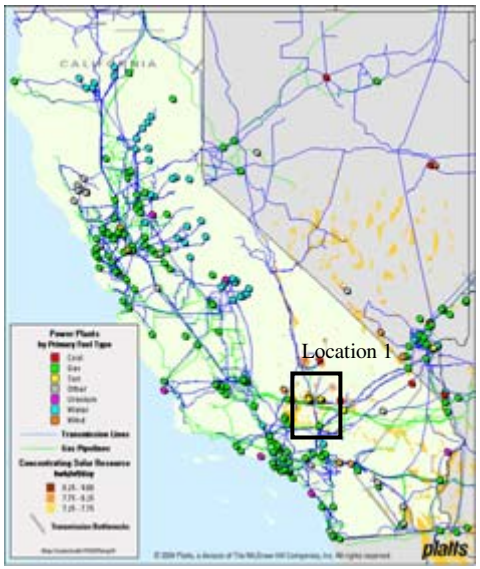


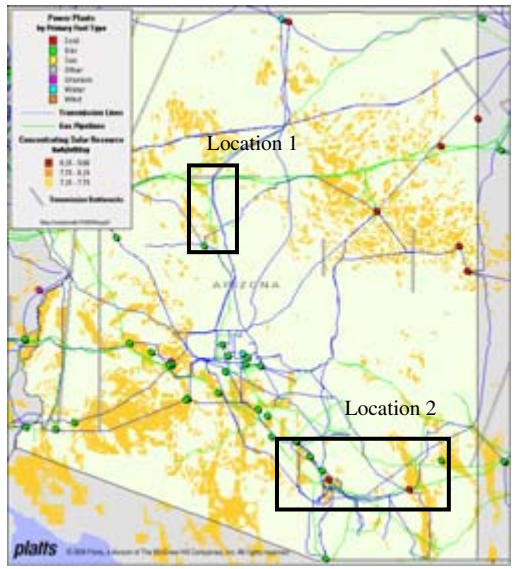
Southwest Solar Resources

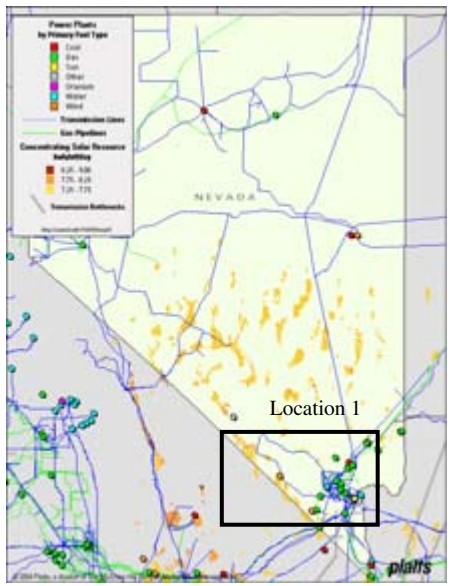
Previous plus slope < 1%

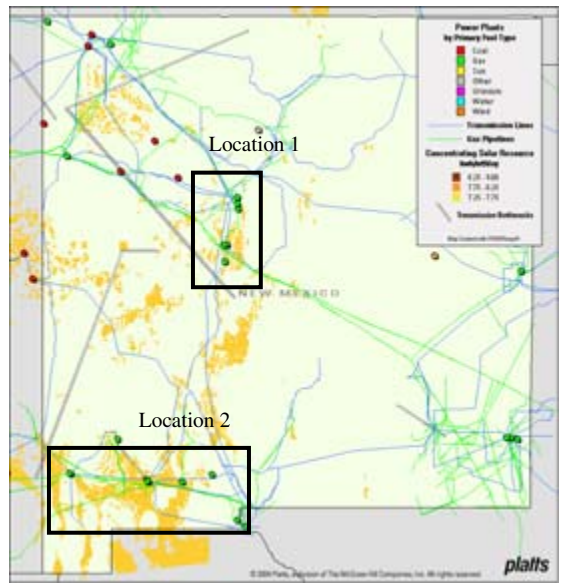


4-State Resource/GIS Analysis

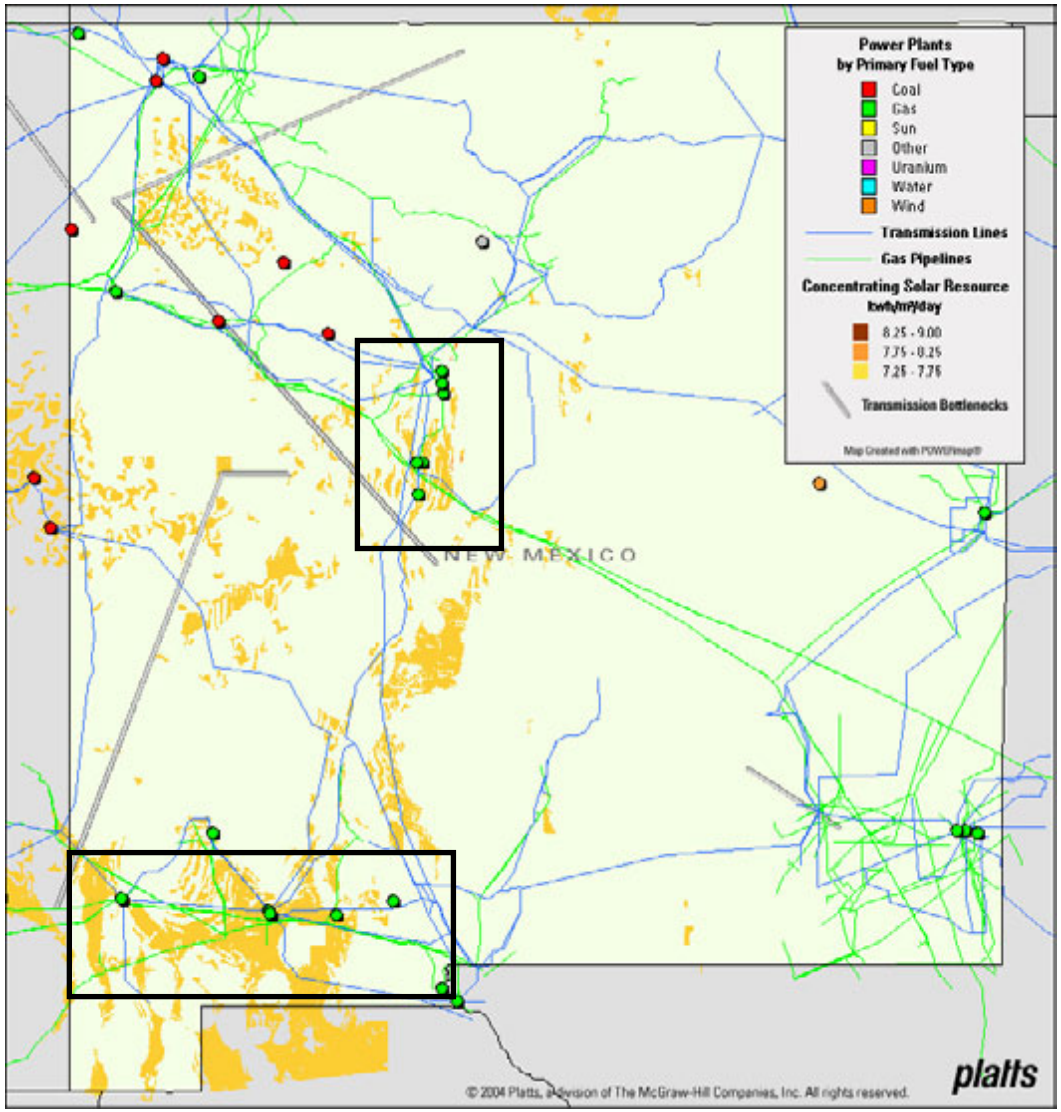






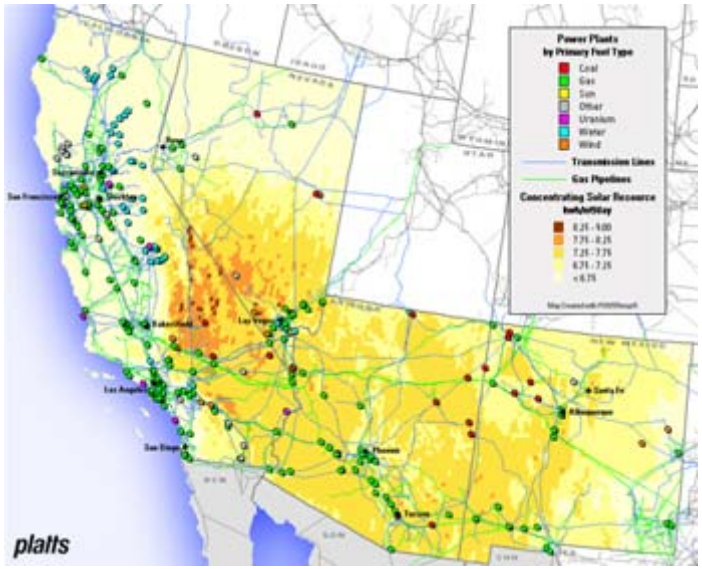


New Mexico Proposed Regions



Energy Benefits - SW Solar Energy Potential

State	Solar Capacity (MW)	Land Area (Sq Mi)
AZ	3,267,456	25,527
CA	821,888	6,421
NV	743,296	5,807
NM	3,025,920	23,640
Total	7,858,560	61,395



The table and map represent land that has no primary use today, exclude land with slope > 1%, and do not count sensitive lands.
Solar Energy Resource ≥ 7.0 kWhr/m2/day (includes only excellent and premium resource)

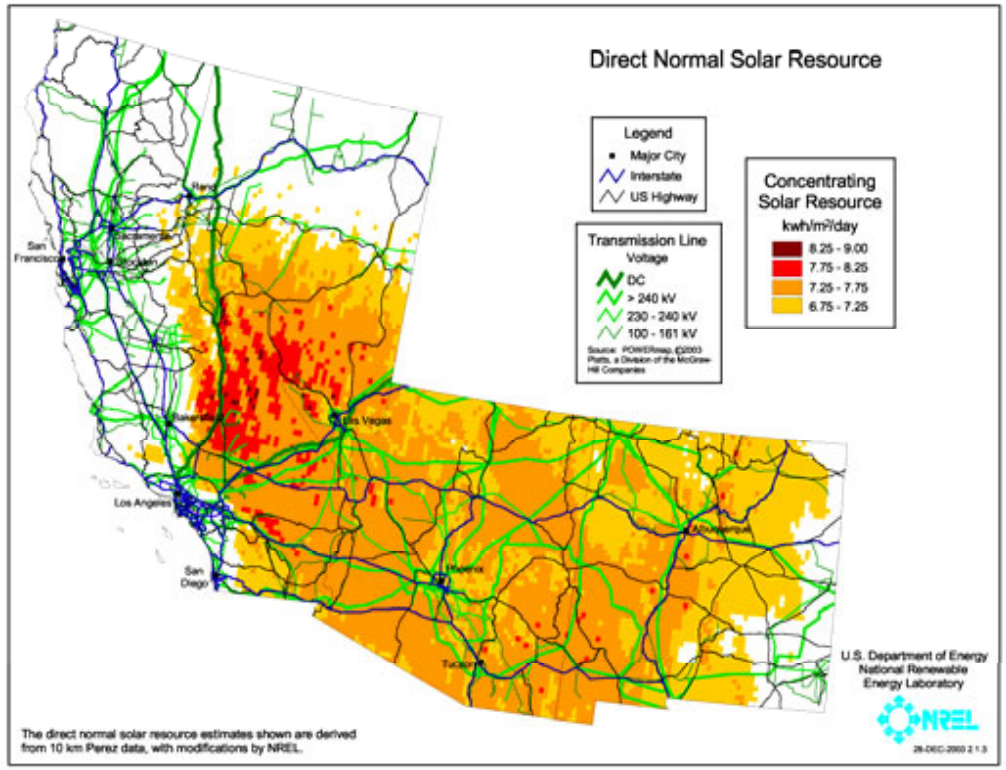
	RPS Capacity of the States				
YEAR	CA (MW)	NV (MW)	NM (MW)	AZ (MW)	Total (MW)
2008	4,343	393	129	61	4,926
2010	5,648	505	172	64	6,389
2012	5,876	627	198	68	6,769
2015	6,236	779	209	73	7,297

- **Current total generation in the four states is over 100,000 MW.**
- **Planned additions in four states over the next 3 – 5 years are 37,099 MW of which 87.6% is natural gas.**

Energy Benefits – Beyond the RPS

Large-scale deployment of CSP would:

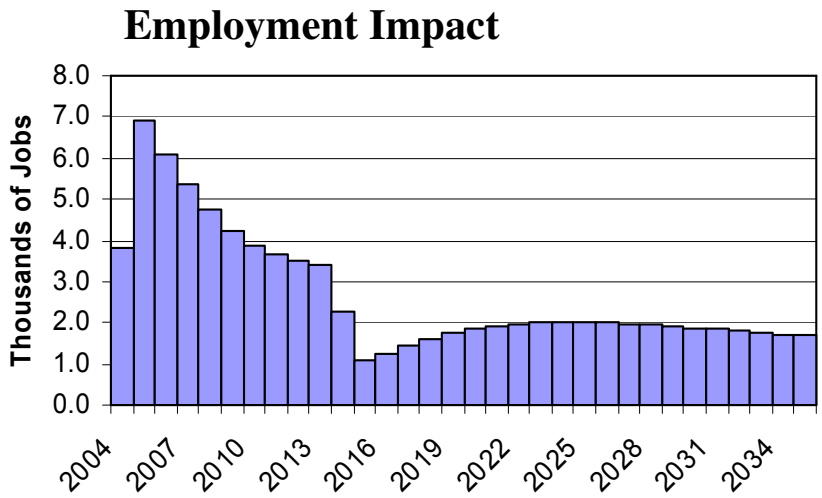
- Help offset local transmission constraints by locating plants near load centers and away from bottlenecks.
- Provide the potential for export power to other states in the region.
- Support energy price stability by hedging against natural gas price volatility.
- Offset hydropower reductions during times of drought, a particular issue in the SW

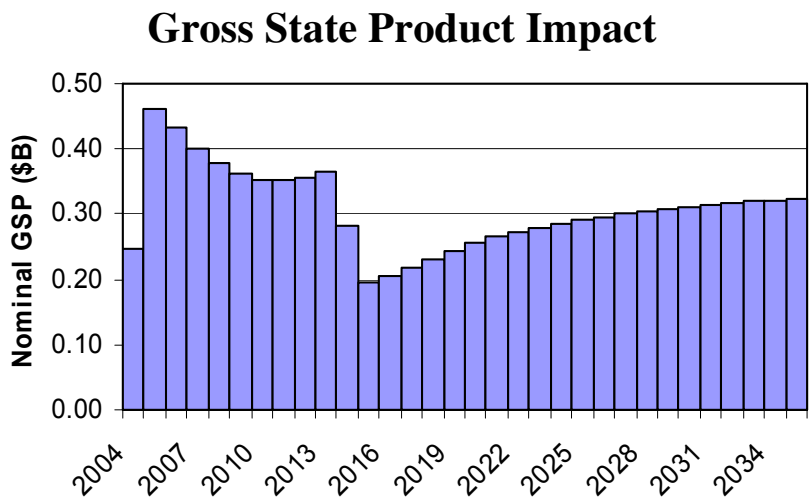


Economic Benefits

Create New Jobs in Rural Areas

- At its peak, installation of 1000 MW of CSP power plants would create nearly 7,000 new jobs*
- These jobs can readily be created in rural areas.
- With the location of CSP plants in the Southwest, manufacturing and assembly plants can be expected to locate in the region.





* Based on UNLV Center for Business and Economic Research study on the potential impact of constructing and operating solar power generation facilities in Nevada. http://www.nrel.gov/docs/fy04osti/35037.pdf

Summary

- The solar energy resource in the Southwest is enormous and largely untapped.
- 1000MW of CSP capacity in the Southwest would greatly benefit the region's energy, economic, and environmental interests.
- The Western Governors' have heard this message, and are forming a stakeholder working group to develop options for furtherance of the 1000MW initiative.