



A Master Plan to Meet California's RPS Needs for Peaking Power

An Update of Work in Progress

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A Look Back: the CSP California Success Story in the 1980s

Back to the roots:

- The high oil prices in the early 1980s created a boost for renewable technologies
- CSP was capable to respond with firm, peaking power

The Successful Framework in the 1980s:

- Favorable FERC Regulation
- Investment Tax Credits (Federal & State)
- Attractive time-of-use tariffs:
 - 14 US cts. / kWh on the average
 - up to 36 cts. for summer on-peak

The Result:

- 9 plants with accumulated 354 MWe solar capacity built in only 7 years
- 1.2 billion US \$ invested; all private capital (30-40% equity)
- 12 TWhe solar power produced;
- Electricity sales: \$ 2 billion kWh



Concentrating Peaking Solar Power “Comeback”

- The global solar trough “industry” is moving again at a significant scale after a 15 year hiatus.
- Introduction of thermal storage provides important operational flexibility
- Levelized electricity costs for parabolic trough projects in construction and development range, today, from \$ 170 to \$ 200/MWh

CSP Price Trends

- With full 30% ITC available, costs for “next” projects in SW US will be \$130 - \$150/MWh
- Costs in the \$100 - \$120/MWh are expected by the end of this decade for large scale projects
- R&D and other “efficiencies” will drop costs to below \$100/MWh

CSP Benefits

CSP Offers:

- Firm, dispatchable peaking power – significantly reducing dependency on gas peaking plants
- Reliable technology, reducing fossil fuels up to 100% through use of thermal storages w/o need of any back-up capacity in the electric system
- Utility-scale and proven technology, perfectly fitting into the utility's thermal power expansion plans

Most importantly:

- Solar field investments (50-65% of total investment) require more labour - intensive solar field construction & erection work
- Thus, more jobs are created than building conventional power stations

The Market for Solar in the US Southwest

- **California**
 - ◆ 500 MW by 2010
 - ◆ 8,000 MW by 2020 – most of that peaking demand
- **Arizona:** 2,000 MW
- **Nevada:** 1,500 MW
- **New Mexico** and – mostly –
West Texas: 1,000 + MW
- **Colorado:** 500 MW after 2010

**Forecast of CPUC in fall 05:
10,000 MW of CSP by 2020**

California CSP Masterplan

= > **Build 10 GW CSP
peaking power by 2020**

1,000 MW / yr from 2010 on

- - 2/3: Mojave Desert
- - 1/3 Imperial Valley

Labor effects:

- About 2,000 local construction jobs
- in CA for 12 years
- 1,000 manufacturing jobs in CA
- 2,000 permanent operating jobs

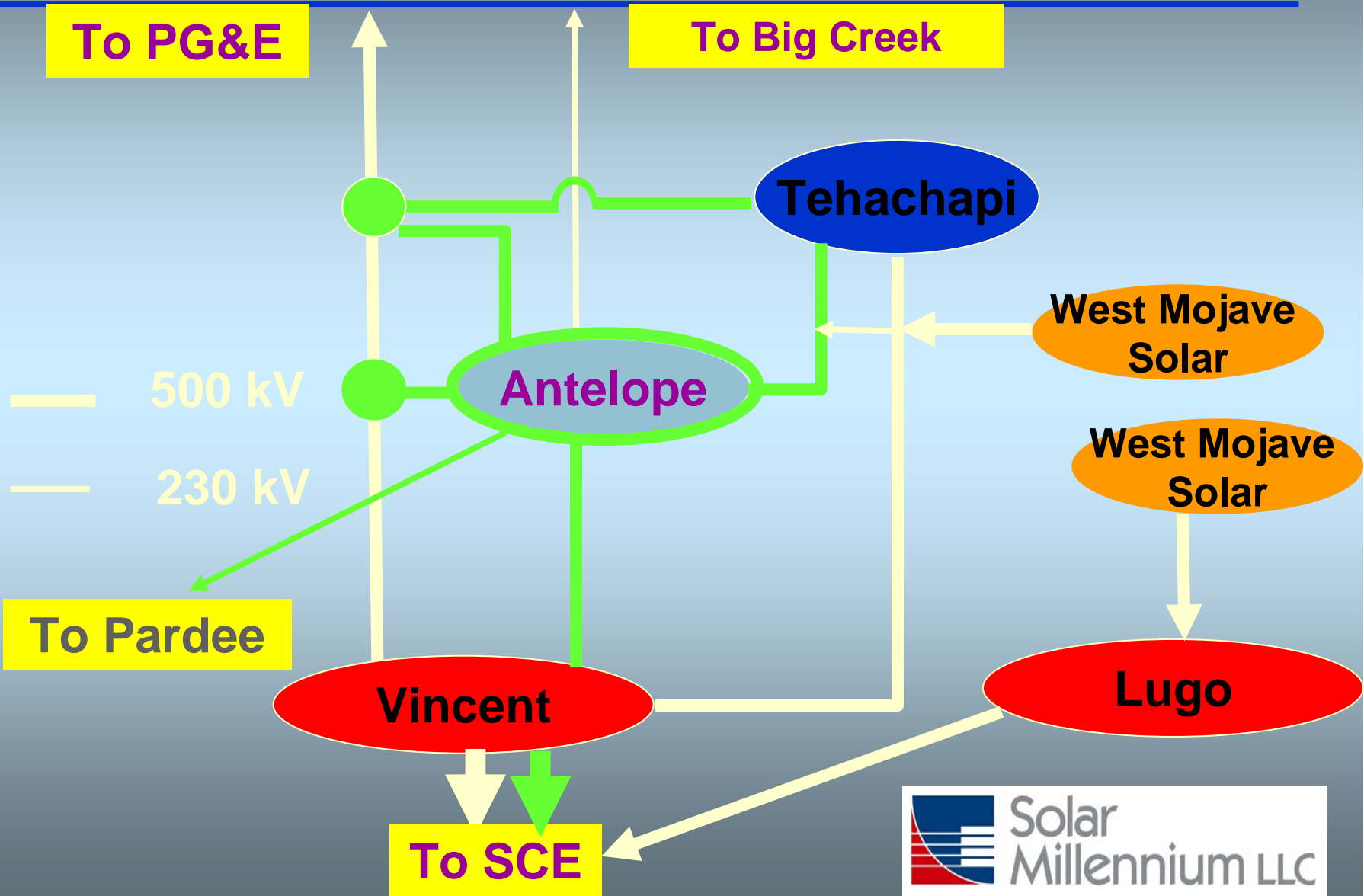
=> **Improve/strengthen electrical
grid system**

- 3 GW west of CA 395 =>
Antelope/Mojave sub
(with link to Midway – central
– northern CA grid)
- 3 GW east of 395 =>
(**Kramer/Lugo substations**)

**Ease environmental permit
procedures**

- Secure property tax exemption
- Apply reasonable land mitigation requirements

Enhanced Tehachapi Plan with West Mojave Solar



Reliable Regulatory Framework is the Key

- **30 Year PPAs**

- ◆ Demonstrated plant reliability beyond 20 years
- ◆ This would lower LCOE by about 1.5 cts /kWh

- **Firm long-term extension of the ITC**

- ◆ Project lead time of 3 to 4 years requires longer financial window

- **Greater rewards for renewable peaking power**

- ◆ Utility planners call for more peaking capacity, but not offering big incentives

New Procurement Approaches Necessary

- **Current Procurement Procedures lack transparency –**
 - ◆ **Elimination of the peaking MPR was a major blow for CSP**
Application of TOD factors and use as a “best fit” criteria are a black box!
- **Needed: “Performance-based, Solar-peaking-power set-aside tariff” -**
 - ◆ **Regulation awards a tariff that helps solve CA’s demand needs without emissions**

Comprehensive land use and mitigation plans

- **West Mojave Solar Development Zone**
 - ◆ **Corridor of 10 miles north and south of CA 58 and 2-3 miles east and west of CA 14 and CA 395**
 - ◆ Land here is already largely in use today: real estate, industrial development, Department of Defense, Mining Operations
 - ◆ **Over 6 GW of generating potential**
- **Need a Coordinated Joint Plan that includes all relevant agencies**
 - ◆ CEC, CA Department for the Environment, CA Department for Fishery & Game, Fed Bureau of Land Management (BLM), Dep. of Defense and CSP developers
- **The plan should recognize the large environmental benefits of renewable peaking power**

Transmission and Interconnection

- ◆ **Transmission reinforcement required on the scale of Tehachapi**
 - ◆ 3 GW from West of Highway 395 => Mojave / Antelope substation;
 - ◆ 3 GW from East of 395 go to either Kramer/ Lugo or some part near to Barstow with continuation to Lugo
- ◆ **Planning and Implementation needed now**
 - Expand some of the Tehachapi plans in a non-intrusive way