



Concentrating Solar Power A Utility Perspective

Barbara D. Lockwood, P.E.

Environmental and Energy Study Institute
September 6, 2007

APS Overview

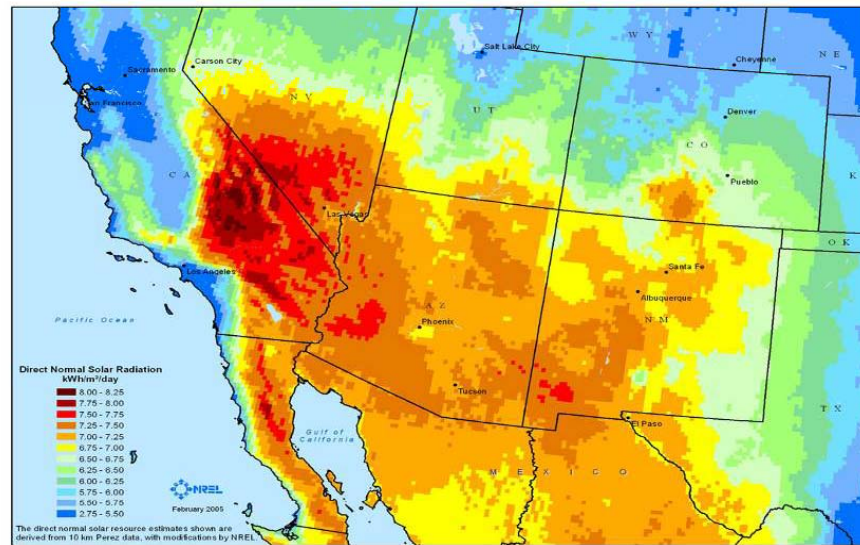
- Customer growth 3 times US Average
 - Fastest growing state
- 5,039 miles of transmission
- Peak demand ~ 7,700 MW
- Over 1 million Customers



 APS Retail Service Territory

Background

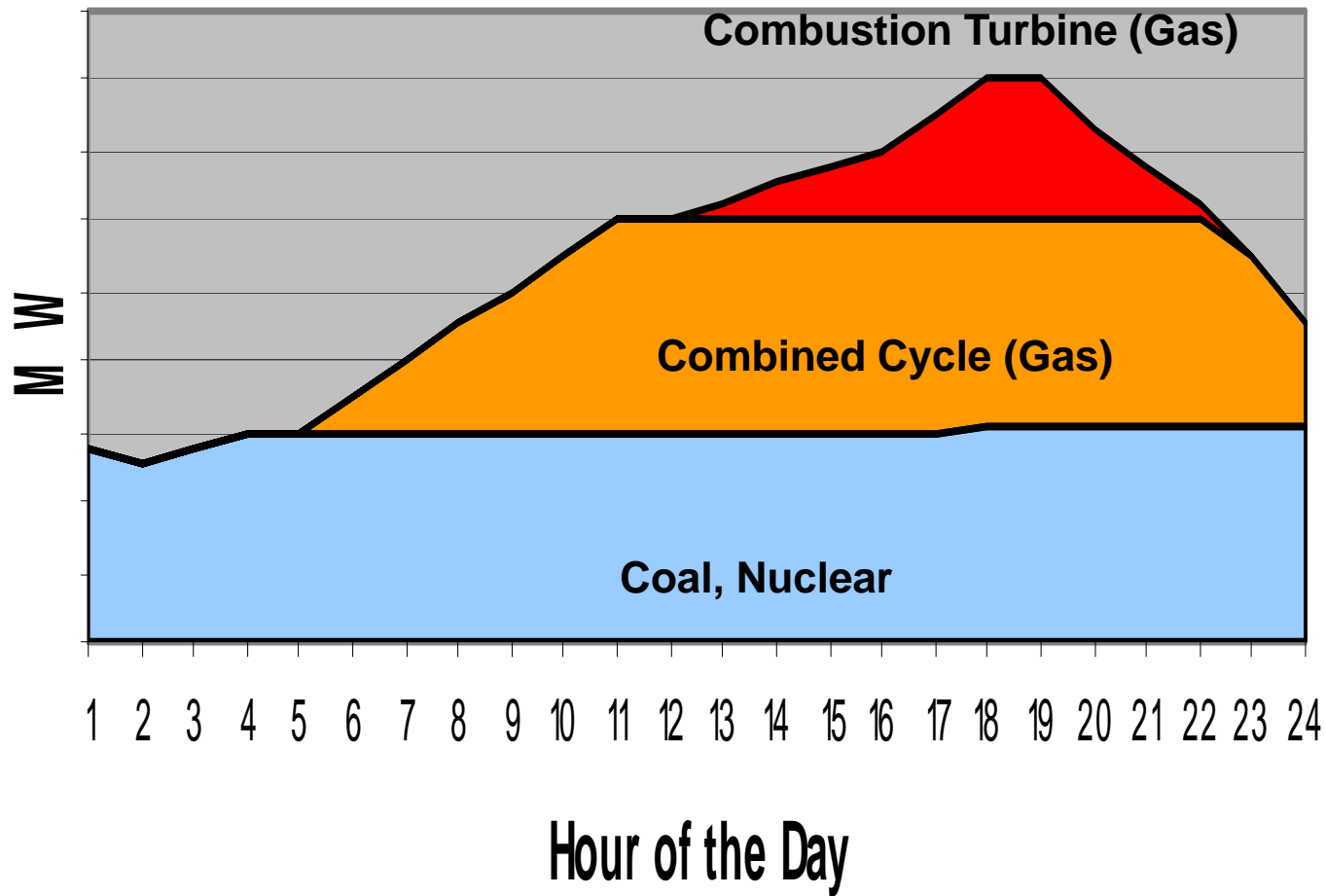
- Energy consumption is growing rapidly in the west
- Solar thermal has significant potential that is largely untapped
- CSP is currently the most *cost-effective* solar technology with the potential to be competitive in the mid-term



Renewable Energy

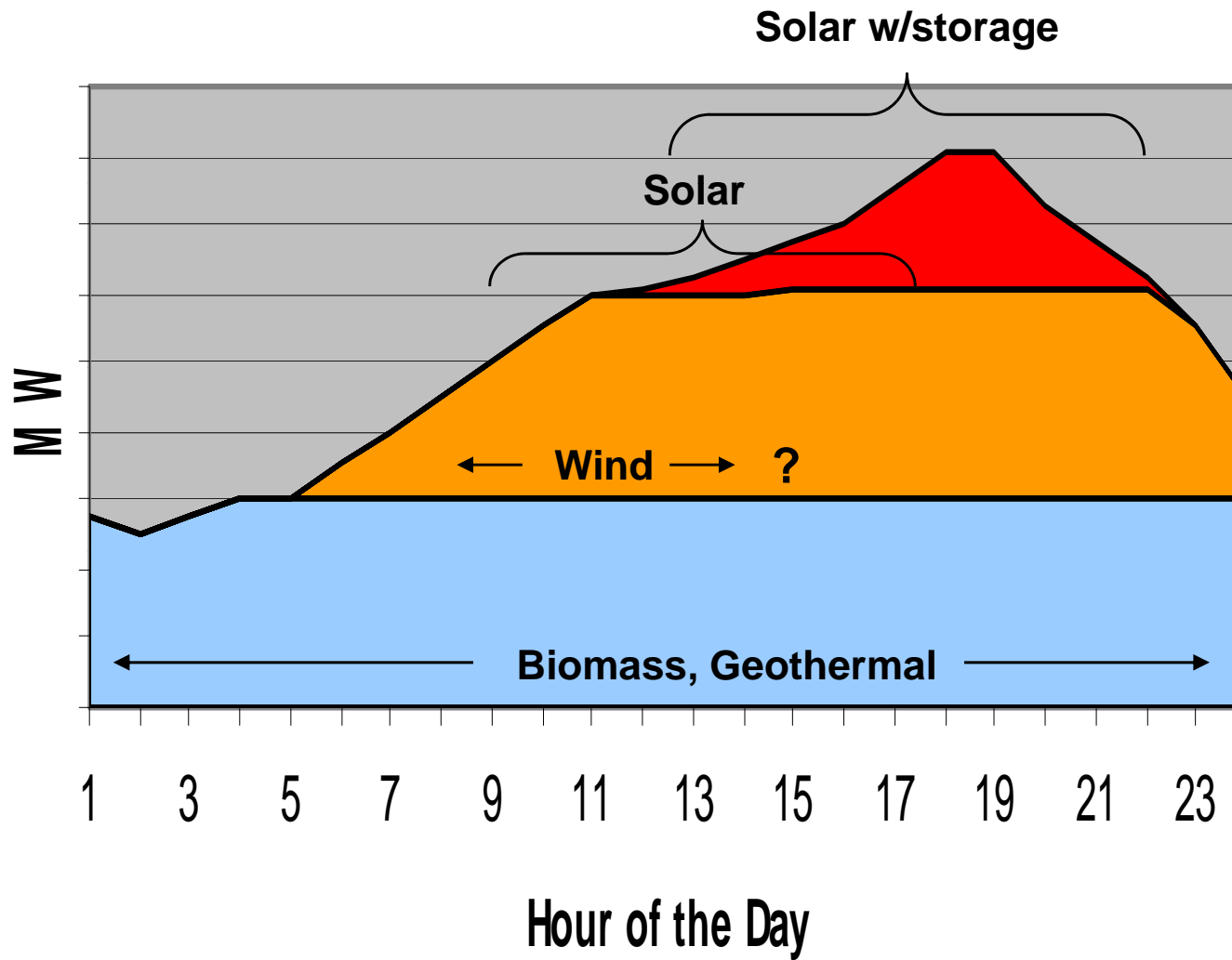
Summer Generation Profile

Traditional Resource Fit



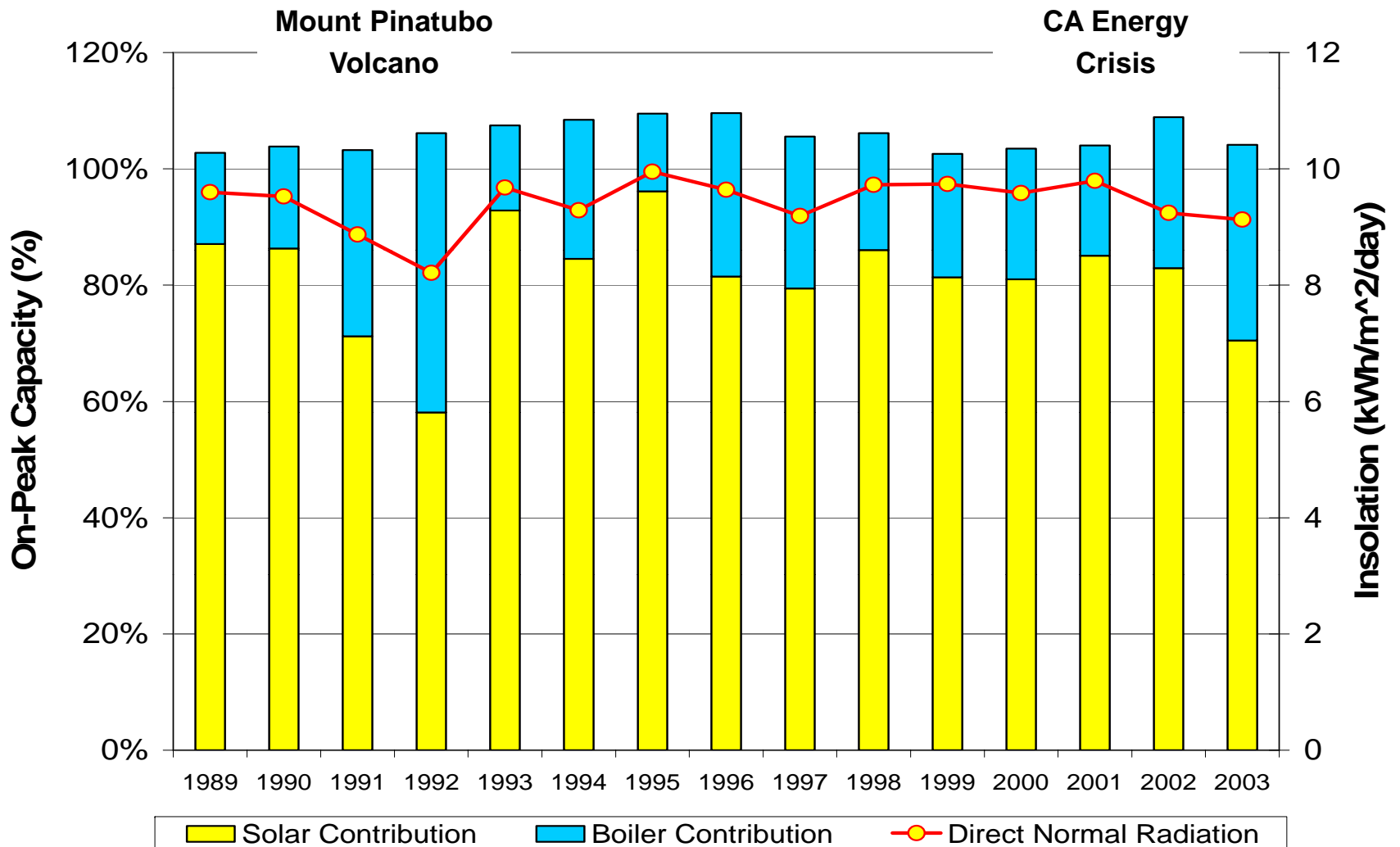
Summer Generation Profile

Renewable Resource Fit



Historical On-Peak Performance For 5 Parabolic Trough Plants

SCE Summer On-Peak
Weekdays: Jun - Sep
12 noon - 6 pm



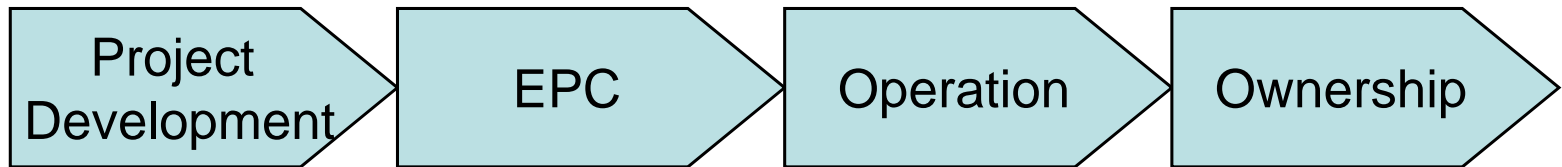
Market Developments Projects

- US Projects In Operation (Trough)
 - 354 MW California (1986 – 1988)
 - 1 MW Arizona (2006)
 - 64 MW Nevada (2007)
- US Projects Announced (CA)
 - 1750 MW Dish
 - 500 MW Tower
 - 653 MW Trough
- Worldwide Projects in Planning/Development
 - 45 projects – mostly Spain and US
 - > 5,000 MW



Market Developments

CSP Value Chain



Large, multi-national corporations involved in every part of chain

Project and Technology Developers

Utilities and Independent Power Producers

Engineering and Construction Companies

Quality counterparties reduced overall risk

Large balance sheets

Power and construction expertise

Strategic technology deployment



Renewable Energy

A Narrowing Cost Gap



CSP

- ✓ Large Scale Projects
- ✓ Global Uptake
- ✓ Strong Developers
- ✓ Incentives

- Carbon Policy
- Fuel Risk

- ✓ Equipment and Labor Costs
- ✓ Increasing Fuel Prices
- ✓ Environmental

Traditional Resources



Renewable Energy

Policy Needs

- Extension of the 30% Investment Tax Credit
 - Currently expires end of 2008
 - Large projects require 3 to 5 years to develop
 - Eight year extension would provide opportunity for market to become sustainable
 - Momentum will be lost without certainty
- Removal of the Utility ITC Exclusion
 - No definable basis for exclusion
 - Vast majority of energy is purchased from utilities
 - Option for utility ownership will potentially increase market and reduce costs

Conclusions

- CSP is a Unique Renewable Technology
 - Large resource
 - Ability to store energy to fit utility need
 - Potential for cost competitiveness
- The Market is Rapidly Developing
 - Large credible, financially stable developers
 - Real projects
- Policy Decisions will Maintain Momentum
 - Long term ITC extension
 - Removal of utility exclusion

