

Regional Integration of Renewables

First Stakeholder Conference Call - Status Report

February 5, 2008

Assessment of Northern California Sub-Regional Renewable Transmission Integration Priorities Beyond 2010

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Core Analysis Team:

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Kick-off Meeting

Link to the slide presentation in the 10/2/2007 meeting to introduce the project:

<http://www.energy.ca.gov/pier/notices/index.html#100207>

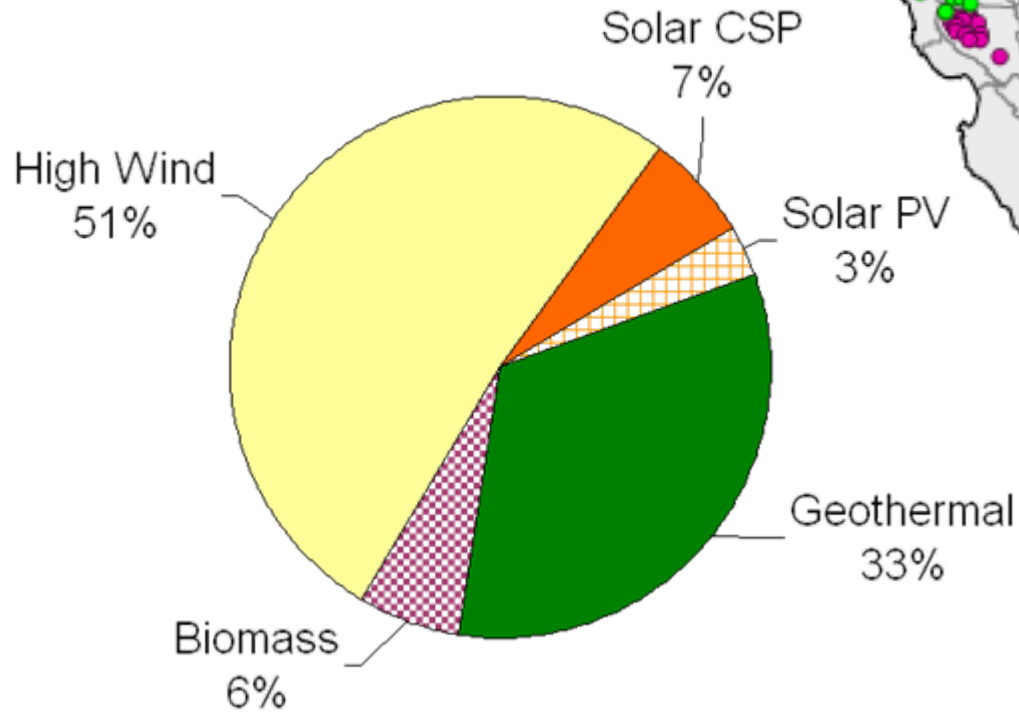
CA Integration Challenges

Policy, Market & Technology Drivers

- **Policy:** RPS and accelerated Goals for 2010 and 2020 targets
- **Market:** *Wind and geothermal* resources are anticipated to be the largest contributors to meeting the RPS (kWh)
- **Transmission Grid:** System & operational changes to accommodate higher levels of renewables
 - Resource planning (infrastructure, models)
 - System reliability (regulation, load following, reserves, ramping)
 - Control & dispatch (process, tools)

2010 Scenario

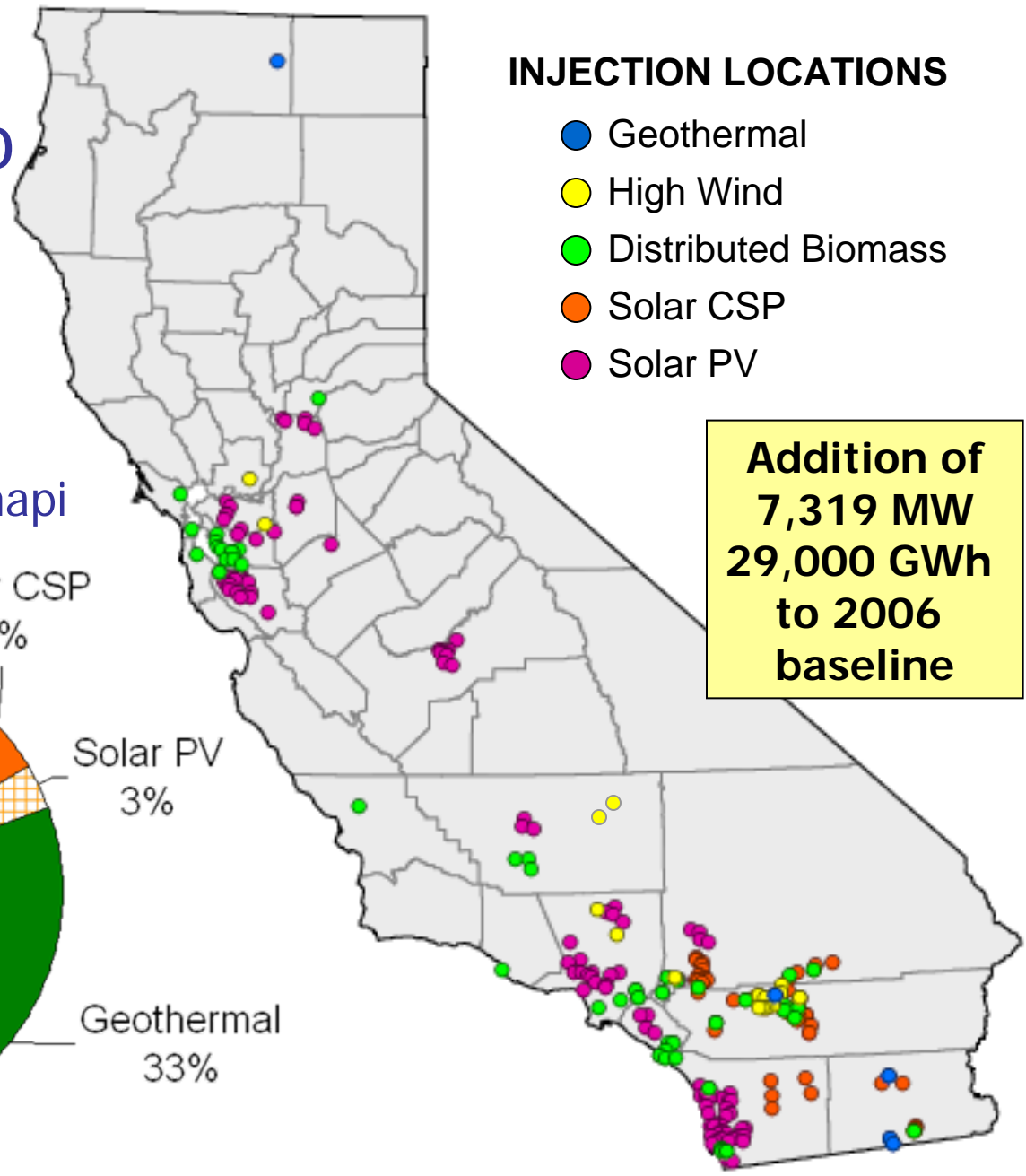
- 20% renewable generation
- Portfolio mix of resources
- 3000 MW of wind at Tehachapi



INJECTION LOCATIONS

- Geothermal
- High Wind
- Distributed Biomass
- Solar CSP
- Solar PV

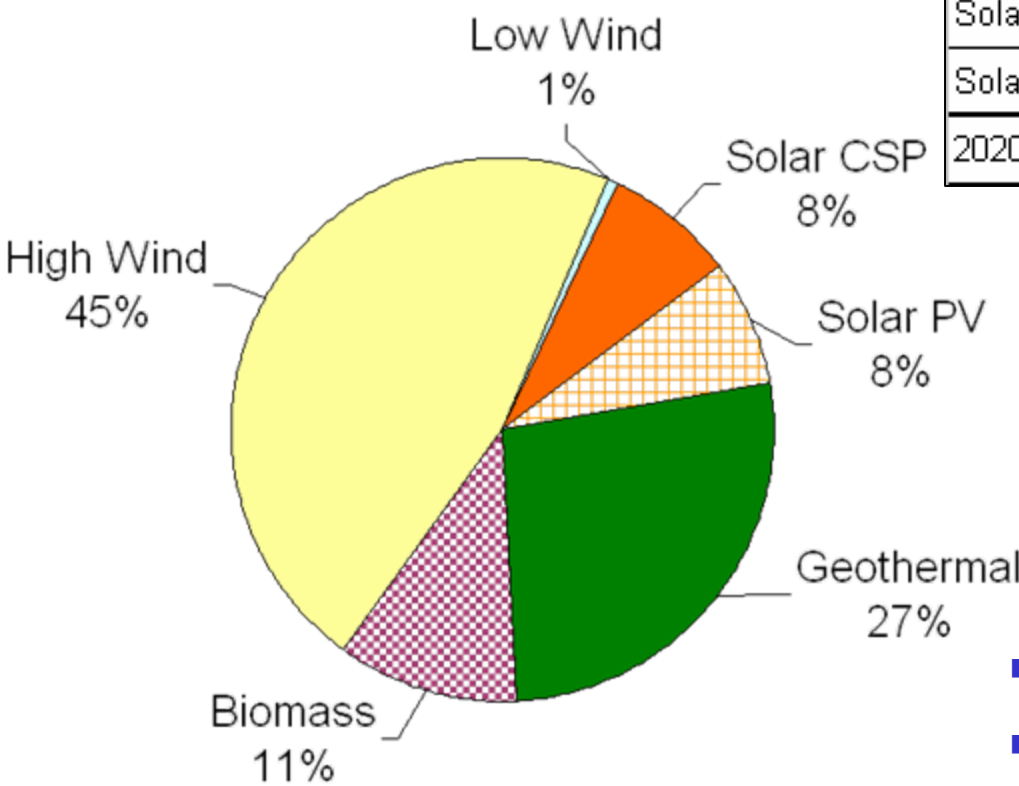
**Addition of
7,319 MW
29,000 GWh
to 2006
baseline**



2020 Scenario

Technology	MW	CF%	Energy (GWh)
Geothermal	2,385	90%	18,803
Biomass	980	89%	7,669
High Wind	9,961	37%	32,286
Low Wind	181	25%	396
Solar CSP	2,650	27%	5,442
Solar PV	3,000	20%	5,256
2020 Net Add-on	19,157		69,852

Preliminary



**Addition of
19,157 MW
69,852 GWh
to 2006
baseline**

- 33% renewable generation
- Portfolio mix of resources



CAT Activities

- Develop Power flow base cases to establish Benchmark:
 - from 2017 WECC Summer Peak Case, develop 3 cases:
 - 2020 Summer Peak
 - 2020 Spring Peak
 - 2020 Autumn Off-peak
 - 20% Renewables penetration (includes all existing and contracted + other renewables in IAP)
 - Approved transmission projects only



Load

- 2020 N CA Summer peak, spring peak and Autumn off-peak
- Coincidental load



Resource Scenarios

- Renewables at 20%, 26% and 33%
 - Start with IAP resource mix
 - Develop other resource mixes
 - Consider resources in the Interconnection Queue
 - Solar PV will be represented separately from the Load



Transmission

- Identify potential 500 kV and 230 kV transmission problems
- CAT members will provide major potential transmission solutions
 - All Transmission solutions will be noted



To be considered Next

- Renewable generator reactive capabilities
- Resource Adequacy
- Production simulations



Conference Call Schedule

- First Tuesday every other month?