

# Renewable Energy Status Update


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Power Association of Northern California Luncheon

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# California's Energy Goals

- GHG Emissions Reduction (AB 32)
- Energy Security & Reliability
- Job Creation & Economic Growth

# Assembly Bill 32, The California Global Warming Solutions Act of 2006

- AB 32 (2006) - landmark legislation requiring California to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020
  - Executive Order S-3-05 set a goal to reduce GHG emissions 80% by 2050.
- AB 32 directs the California Air Resources Board (ARB) to establish a comprehensive program of regulatory/market mechanisms to achieve real, quantifiable, cost-effective reductions of GHG.
- ARB is responsible for monitoring and reducing GHG emissions; Energy Commission plays a key role in helping the state meet its greenhouse gas emission goals.
- In December 2008, ARB adopted the "Scoping Plan“ -- California's policy blueprint containing the broad overview of programs, measures, and approaches to achieve the required GHG emission reductions.

***Renewables and distributed generation are key elements of the ARB AB 32 Scoping Plan.***

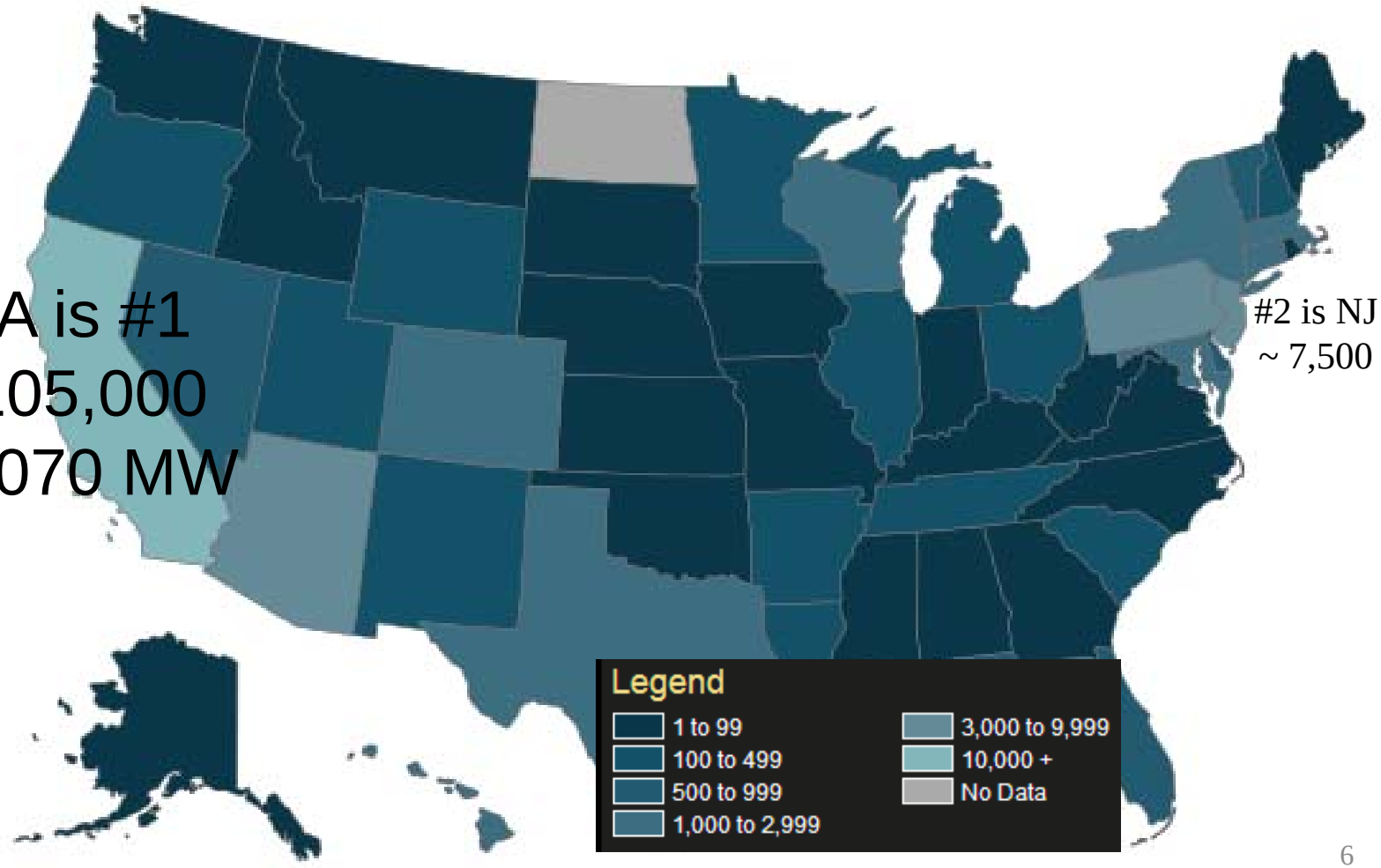
# Distributed Generation Roadmap

- What renewable energy power projects are counted toward the Governor's goal?
- How much generation is already operating, pending or authorized?
- How should the remainder of the Governor's 12,000 MW goal be achieved?
- How do we make expansion local renewable energy more efficient, effective and equitable?

# Definition of Distributed Generation

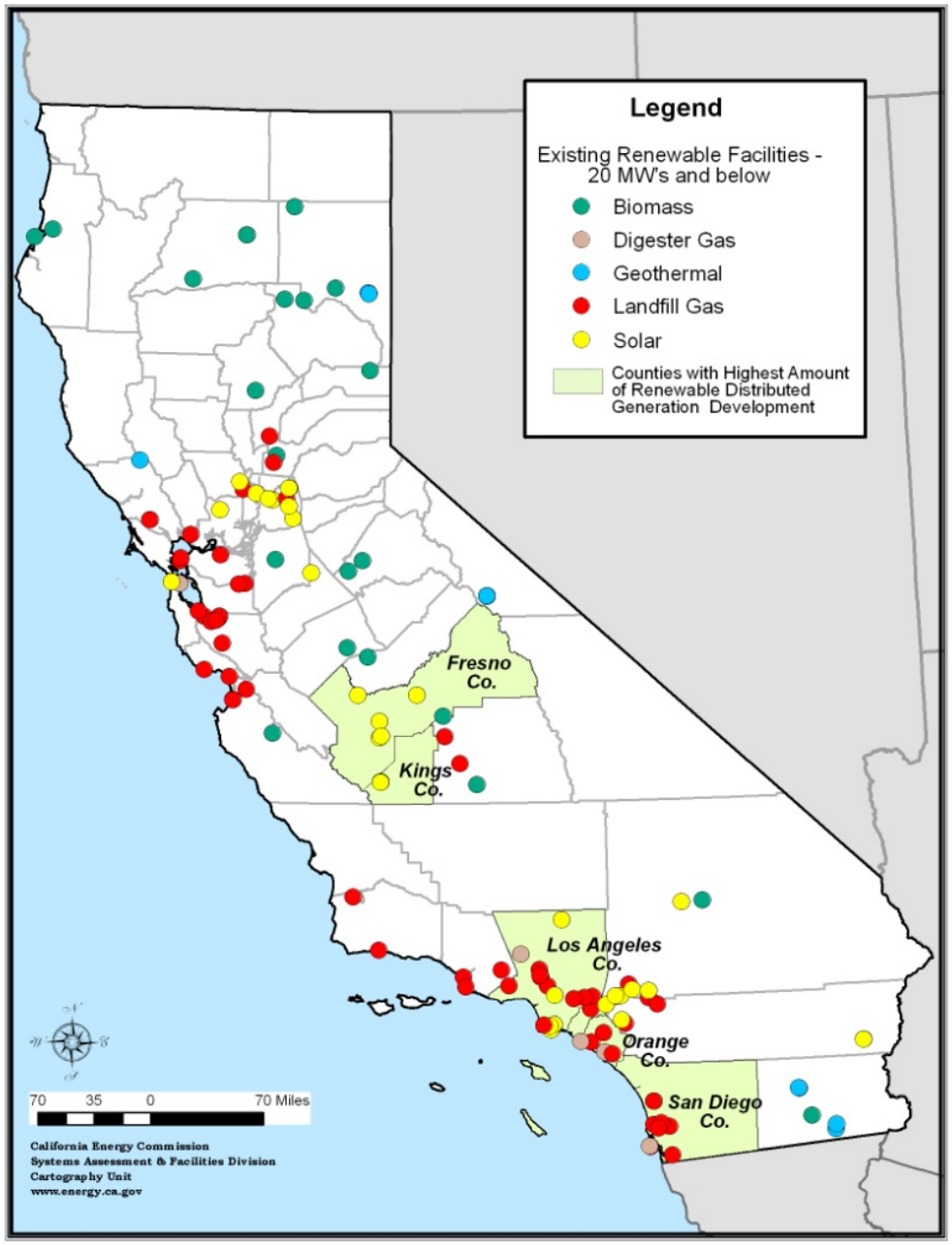
- Fuels and technologies accepted as renewable for purposes of Renewable Portfolio Standard
- Sized up to 20 MW
- Located within low-voltage distribution grid or supply power directly to consumer

# Number of PV Installations by State

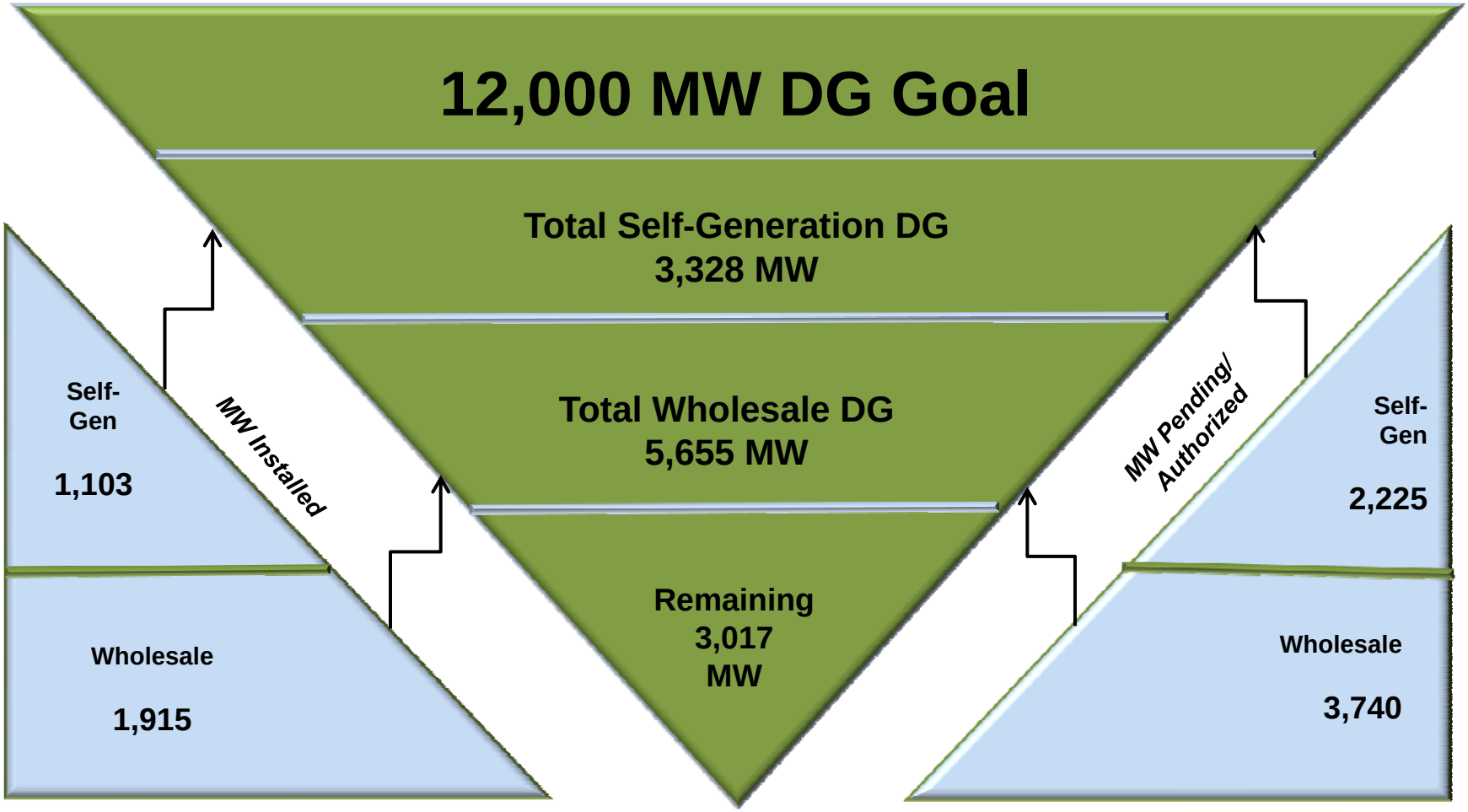



Source: http://openpv.nrel.gov/rankings

# Wholesale Distributed Renewable Capacity in CA is ~1,900 MW

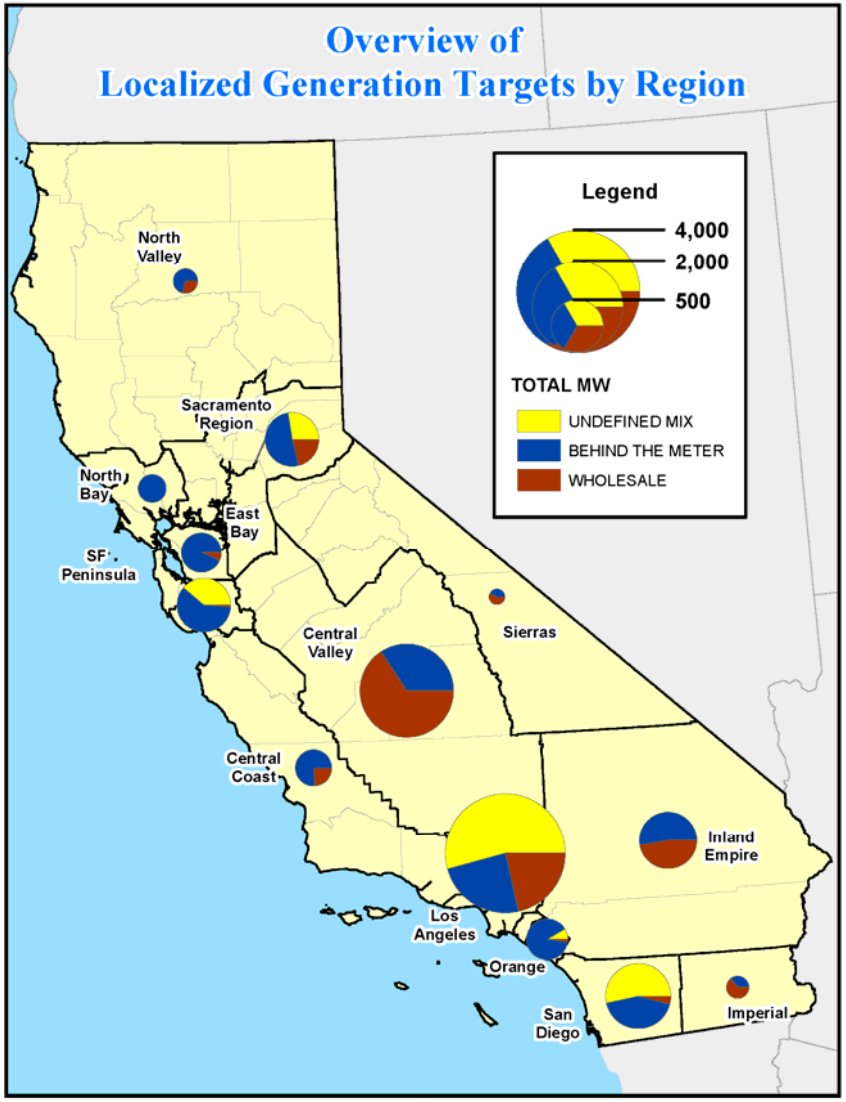


# DG Progress


12,000 MW DG Goal
Total Self-Generation DG
3,328 MW
Total Wholesale DG
5,655 MW
Remaining
3,017
MW
Self-
Gen
1,103
Wholesale
1,915
MW Installed
MW Pending/
Authorized
Self-
Gen
2,225
Wholesale
3,740

# DG Regional “soft” Targets

- Localized Electricity Generation Allocated by Region and Type:
  - Wholesale
  - Behind the Meter
  - Undefined Mix
- Technology Neutral
- Plan to update annually to biannually



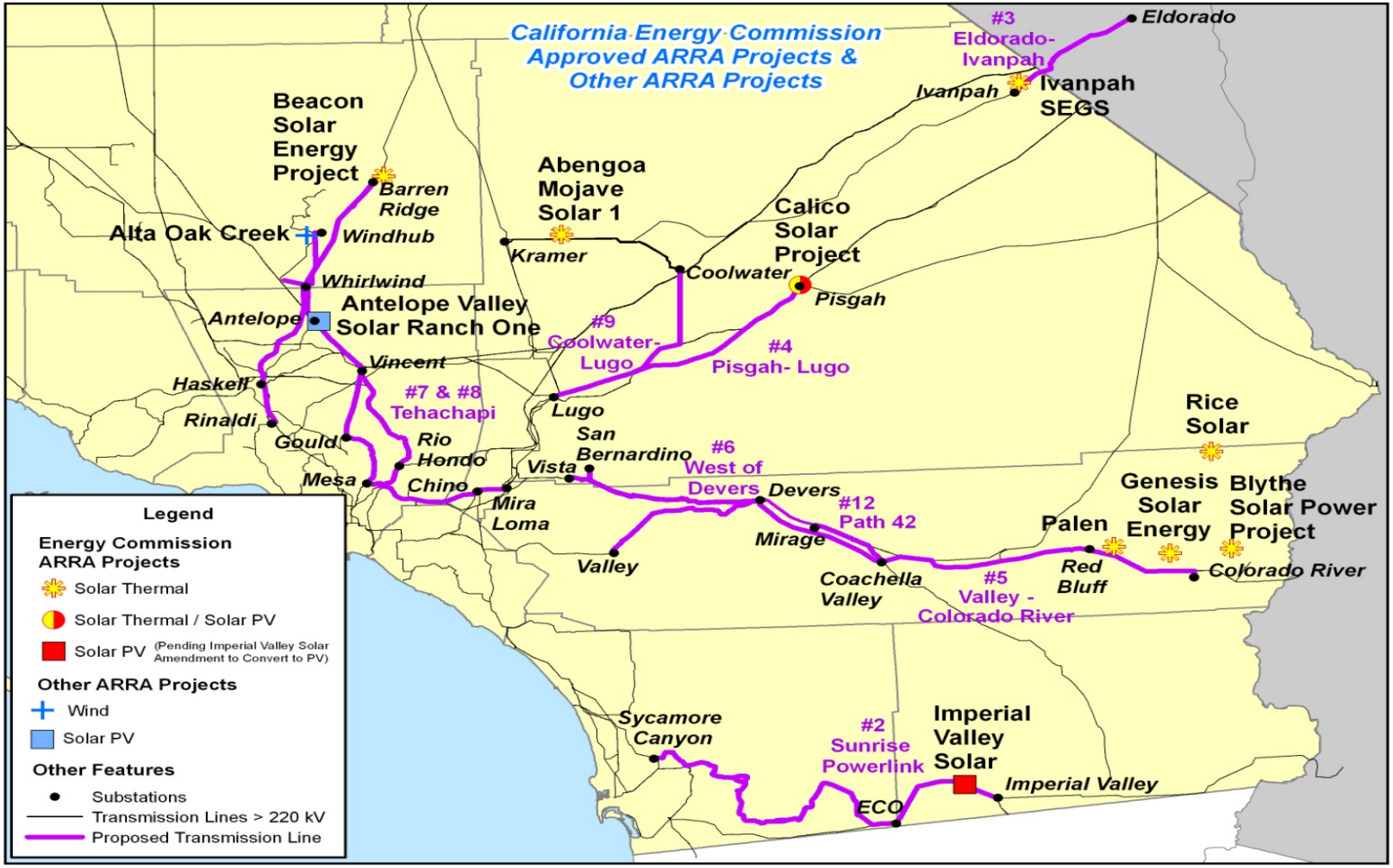
# Major Renewable Energy Projects Permitted in 2010

| Project | Capacity (MW) | Jobs | Substation or Transmission Line Interconnect | Current On-line Date (Transmission) | Capital Cost |
|---|---|---|---|---|---|
| Abengoa # | 250 | 1200 construction<br>70 permanent | Coolwater-Kramer 230kv line and new Coolwater-Lugo 230 kV line | 2017 | $1.2 billion |
| Beacon* | 250 | 850 construction<br>70 permanent | Barren Ridge 230 kV Substation | 2/1/2012 | $1 billion |
| Blythe* | 1000 | 1,000 construction<br>300 permanent | Colorado River Substation and West of Devers Upgrade | 2013; 2017 | $4 billion |
| Calico* | 663 | 400 construction<br>140 permanent | Pisgah Substation and Pisgah -Lugo upgrade | 2017 | Not available |
| Genesis # | 250 | 1,000 construction<br>50 permanent | Colorado River Substation and West of Devers Upgrade | 2013; 2017 | $1 billion |
| Imperial Valley* | 709 | 400 construction<br>240 permanent | Imperial Valley Substation | | Not available |
| Ivanpah # | 370 | 1,000 construction<br>100 permanent | Loop new sub connecting to Eldorado-Mtn Pass 115kV line; Ivanpah Substation 230kV;<br>El Dorado – Ivanpah Transmission Project | 6/30/2010<br>6/30/2012<br>2013 | $1.1 billion |
| Palen* | 500 | 900 construction<br>170 permanent | Red Bluff Substation and West of Devers Upgrade | 7/1/2013; 2017 | $2 billion |
| Rice | 150 | 300 construction<br>50 permanent | Plan to interconnect into WAPA sub. | No CAISO upgrades needed | $850 million |
| Alta (Oak Creek) # | 800 | 50 permanent | Whirlwind Substation 230kV | 2012 | $600 million |
| AV Solar Ranch One # | 245 | 400 construction<br>20 permanent | Tehachapi Conceptual Substation #1 | Unavailable | Not available |
| **Total** | **5,200** | **7,450 construction jobs**<br>**1,260 permanent jobs** | | | |

*Converting to PV or have announced an intention to convert.

# Project has already begun construction

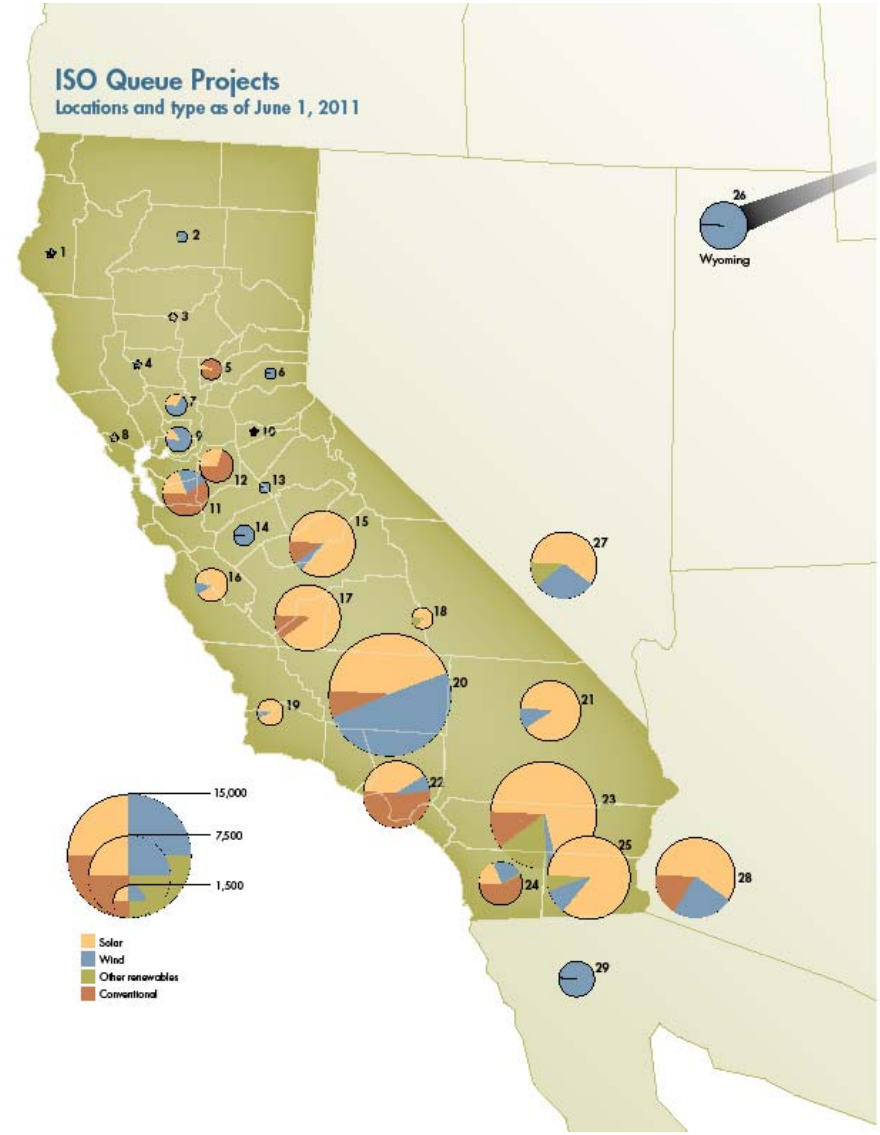
# ARRA Projects & Proposed Transmission Upgrades



# Transmission underway to meet 33% RPS in 2020


| Transmission upgrade | | Approval status | | Renewable Potential | | Online |
|---|---|---|---|---|---|---|
| | | ISO | CPUC | MW | TWh/Yr | |
| 1 | Carrizo-Midway | Pending LGIA | Not yet filed | 900 | 2.1 | 2012 |
| 2 | Sunrise Powerlink | Approved | Approved | 1,700 | 4.1 | 2012 |
| 3 | Eldorado-Ivanpah | LGIA | Approved | 1,400 | 3.6 | 2013 |
| 4 | Pisgah-Lugo | LGIA | Not yet filed** | 1,750 | 4.1 | 2017 |
| 5 | Valley-CO River | Approved | Approved* | 4,700 | 8.6 | 2013 |
| 6 | West of Devers | LGIA | Not yet filed | | | 2017 |
| 7 | Tehachapi | Approved | Approved | 4,500 | 15.2 | 2015 |
| 8 | Tehachapi Wind/ Solar Diversity | N/A | N/A | 1,000 | 3.0 | 2015 |
| 9 | Cool Water-Lugo | Pending LGIA | Not yet filed | 600 | 1.4 | 2018 |
| 10 | South Contra Costa | LGIA | Not yet filed | 300 | 0.8 | 2015 |
| 11 | Borden-Gregg | LGIA | Not yet filed | 800 | 2.0 | 2015 |
| 12 | Path 42 | Pending approval | Not yet filed | 1,400 | 3.5 | 2015 |
| Other-Outside of ISO Grid | | N/A | N/A | 3,300 | 8.4 | |
| **Total** | | | | **22,350** | **56.8** | |
| ***TWh/year needed in ISO area to meet 33% goal:*** | | | | ***44*** | | |

# ISO Queue Projects




**Interconnection queue by county**

| County | Number of Projects | Renewables MW | Conventional MW | Total MW |
|---|---|---|---|---|
| 1 Humboldt | 1 | 50 | | 50 |
| 2 Shasta | 2 | 165 | | 165 |
| 3 Butte, Glenn, Tehama | 5 | 122 | | 122 |
| 4 Lake, Colusa | 1 | 66 | | 66 |
| 5 Sutter, Yuba | 2 | 20 | 600 | 600 |
| 6 Placer | 1 | 220 | | 220 |
| 7 Yolo | 5 | 587 | | 587 |
| 8 Marin, Sonoma | 3 | 92 | | 10 |
| 9 Solano | 11 | 908 | | 908 |
| 10 Amador | 1 | 18 | | 18 |
| 11 Alameda, Contra Costa Santa Clara | 16 | 1,110 | 1,698 | 2,808 |
| 12 San Joaquin | 11 | 325 | 1,020 | 1,345 |
| 13 Stanislaus, Tuolumne | 5 | 202 | | 202 |
| 14 Merced | 7 | 612 | | 612 |
| 15 Fresno, Madera | 79 | 4,474 | 594 | 5,067 |
| 16 Monterey, San Benito | 4 | 1,550 | | 1,550 |
| 17 Kings | 38 | 4,614 | 625 | 5,239 |
| 18 Inyo, Tulare | 13 | 625 | | 625 |
| 19 San Luis Obispo, Santa Barbara | 6 | 896 | | 896 |
| 20 Kern | 109 | 13,802 | 1,100 | 14,902 |
| 21 San Bernardino | 21 | 4,395 | | 4,395 |
| 22 Los Angeles, Orange | 50 | 2,390 | 2,650 | 5,040 |
| 23 Riverside | 34 | 10,667 | 1,420 | 12,087 |
| 24 San Diego | 29 | 1,094 | 1,453 | 2,545 |
| 25 Imperial | 27 | 7,683 | | 7,683 |
| In-state Totals | 481 | 56,787 | 11,159 | 67,947 |
| 26 Wyoming | 1 | 3,000 | | 3,000 |
| 27 Nevada | 18 | 5,252 | | 5,252 |
| 28 Arizona, New Mexico | 10 | 1,094 | 1,250 | 7,128 |
| 29 Mexico | 3 | 1,628 | | 1,628 |
| Out-of-state Totals | 33 | 10,974 | 1,250 | 12,224 |
| **TOTAL ALL PROJECTS** | **514** | **67,761** | **12,409** | **84,955** |

as of 06/01/2011

# Job Creation & Economic Growth

| POU Fiscal Year | Expenditures for Energy Efficiency Programs (millions $) | Job-Years |
|---|---|---|
| **2007-08** | 103.9 | 1,950 |
| **2008-09** | 146.1 | 2,750 |
| **2009-10** | 123.4 | 2,350 |

Table 1: Preliminary estimates of job-year creation from publicly owned utility expenditures on energy efficiency programs(CA Clean Energy Future Metrics)

| | Job-years created 2010 | Cumulative job-years created 2011-2020 |
|---|---|---|
| **Investor-Owned Utility Programs** | 36,150 | 361,500 |
| **Publicly-Owned Utility Programs** | 2350 | 23,500 |
| **Total Estimated Job Creation** | 35,500 | 385,000 |

Table 2: Preliminary estimates of job-year creation from publicly owned and investor-owned utility expenditures on demand-side programs (CA Clean Energy Future Metrics)

# Renewables & Economic Growth

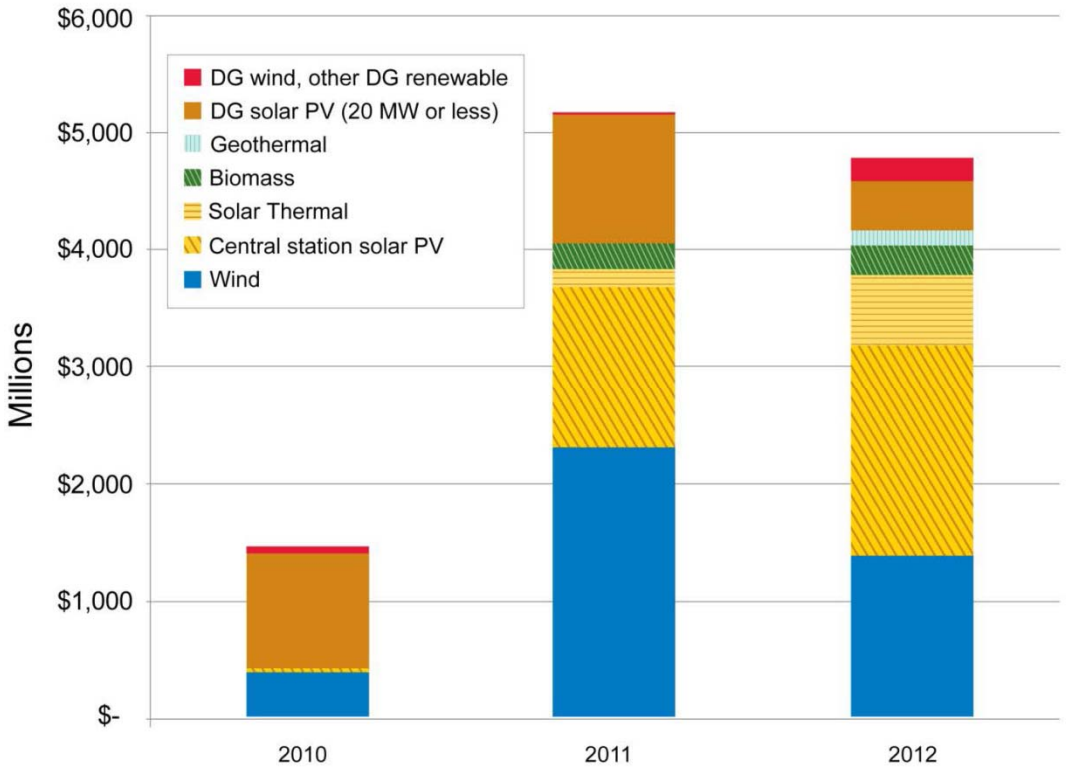



Table: Preliminary estimate of private investment in CA renewable energy facility (central station and distributed generation) for 2010-12 (CA Clean Energy Future Metrics)

- In Governor Brown's Clean Energy Jobs Plan , investments in renewable energy are central elements in rebuilding California's economy.
- Despite the economic downturn, significant investments are being made in developing clean energy in California.

# 2011 Integrated Energy Policy Report (IEPR) Highlights

- Energy supply/demand forecasts – electricity, natural gas, transportation fuels
- Siting Lessons Learned Proceeding
- Electricity infrastructure analysis
- Natural gas prices/market trends
- Energy efficiency
- Renewables status and issues
- Bioenergy
- Interagency coordination
- Research and development
- California's nuclear plants

# 2011 IEPR Electricity Infrastructure Issues

- Achieving energy efficiency goals
- Increasing distributed generation
- Addressing barriers to renewable development
- Improving power plant and transmission permitting processes
- Renewable integration
- Potential retirement of aging and OTC plants
- Nuclear reliability

# 2011 Natural Gas Infrastructure Issues

- Safety and reliability of California's natural gas pipelines
  - CPUC staff report with findings and recommendations
  - Energy Commission monitoring potential impacts on natural gas customers
  - PIER funding for natural gas safety research

CALIFORNIA'S
Clean Energy Future

http://www.cacleanenergyfuture.org/

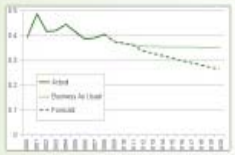
Home > Progress

## Progress

The vision of a clean energy future requires achievement in many key areas. Each of the 16 metrics shown below provides an understanding of the goals and progress being made in each integral part of this comprehensive effort (see greater detail by clicking on the thumbnail for each metric). These interdependent activities can be tracked from several perspectives and in relation to established milestones. Click here for a PDF document containing all 16 of the metric reports.

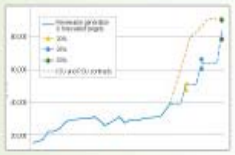
### Greenhouse Gas

The 2020 forecast of greenhouse gas emissions is important for tracking California's progress towards the goal of reducing statewide emissions.



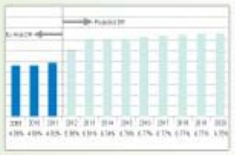
### Renewable Energy

Investor Owned Utility and Publicly Owned Utility contracts could meet 33 percent renewable energy by 2020. Some projects may not be viable.



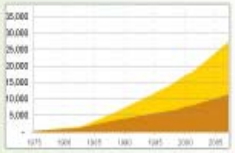
### Demand Response

Demand Response supports efficient use of the grid by reducing or shifting energy consumption. This decreases costs and lessens impact on the environment.



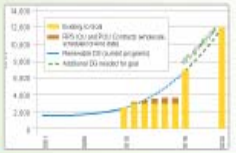
### Energy Efficiency

Statewide savings from appliance standards are expected to provide an increasing proportion of energy efficiency savings through 2020.



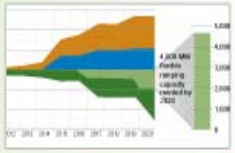
### Distributed Generation

Current programs, if fully subscribed, could achieve about 6,000 MW. After that, an annual growth rate of about 19 percent would be needed between 2016 and 2020.



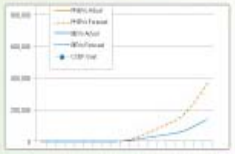
### Resource Flexibility

The Resource Flexibility Metric shows needed generating capabilities beyond simple energy requirements, especially considering the OTC resources being phased out.



### Electric Vehicles

California's Zero Emission Vehicle (ZEV) program will play a critical role in meeting California's air quality and greenhouse gas reduction goals for 2020.



### Transmission Expansion

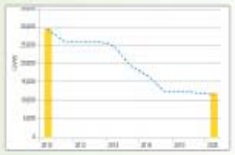
The ISO has identified and approved the transmission projects that provide sufficient capacity to enable the state to achieve the 33 percent renewables target by 2020.


### OTC Phase Out

Generators must eliminate or mitigate use of coastal or estuarine waters for once-through cooling (OTC) on a schedule established by State Water Control Resources Board.

### Energy from Coal

By 2020, electricity used in California from coal and petroleum coke is expected to decline 60 percent from 2010.



# 2012 IEPR Update – Limited Scope

- Electricity and natural gas demand forecast 2012-2022
- Natural Gas assessment – natural gas market trends
- Electricity infrastructure assessment (especially in the South Coast Air Quality Management District)
  - Including CHP and nuclear
- Renewable Strategic Plan

# 2012 Renewable Focus

1. Identify and prioritize geographic areas in the state for both renewable utility-scale and distributed generation development
2. Evaluate the cost of renewable energy projects beyond technology costs – including costs associated with integration, permitting, and interconnection – and their impact on retail electricity rates.
3. Develop a strategy that minimizes interconnection costs and time, and also minimizes integration costs and requirements at the distribution level and the transmission level and that strives for cost
4. Promote incentives for renewable technologies and development projects that create in-state jobs and support in-state industries, including manufacturing and construction.
5. Promote and coordinate existing state and federal financing and incentive programs for critical stages including research, development, and demonstration

# Renewables - Senate Bill X 1 2 (Simitian): Codified 33% RPS by 2020 in April 2011

Retail sellers and POUs to adopt RPS goals of

- an average of 20% by December 31, 2013
- 25% by December 31, 2016
- 33% by December 31, 2020

RECs fall into one of 3 buckets and have the following limitations:

- Interconnected to a CA Balancing Authority or dynamically transferred (no less than 50% by 2013; 65% by 2016; and 75% after 2016)
- Firmed and shaped
- All other RECs including Unbundled RECs (no more than 25% by 2013; 15% by 2016; and 10% after 2016)

# RPS Enforcement Roles for Energy Commission, Publicly Owned Utilities, and ARB – SB X1-2

- SB X1-2 directs the Energy Commission to adopt regulations specifying procedures for enforcement of the 33% RPS for Publicly Owned Utilities (POUs).
- Requires the Energy Commission to certify and verify eligible renewable energy resources procured by POUs and to monitor their compliance with the RPS. The Energy Commission will continue to certify and verify RPS procurements by retail sellers.
  - The Energy Commission refers the failure of a POU to comply to the Air Resources Board. The ARB may impose penalties.

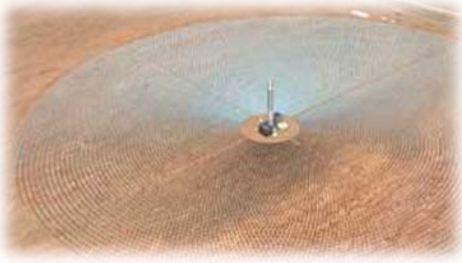
- Energy Commission must provide a report to the legislature by June 30, 2011*, analyzing run-of-river hydroelectric generating facilities in British Columbia, including whether these facilities are, or should be, included as eligible renewable energy resources.

* Simitian has authored clean up language, SB 32 that, would extend the report deadline to June 30, 2012.

# Moving Forward

- POU RPS Regulations and Guidebook
- SB 1368 Emissions Performance Standard
- IEPR 2012 Update
- Title 24 Standards Update
- AB 758 Comprehensive EE Program for Existing Buildings
- Streamlining Reporting Requirements





# Any Questions?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