

California's Renewable Portfolio Standard Program



By

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California's Renewable Portfolio Standard ("RPS") is one of the most ambitious renewable standards in the country.

- California's RPS Program was adopted in Senate Bill ("SB") 1078 (2002) and subsequently modified by SB 107 (2006) and SB 1036 (2007).**

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- **California's RPS obligates investor-owned utilities ("IOUs"), such as Pacific Gas and Electric Company ("PG&E"), electric service providers, and community-choice aggregators that are regulated by the California Public Utilities Commission ("CPUC") to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached - no later than 2010.**

California Eligible Renewables

- **Small hydro (less than 30 MW)**
- **Ocean wave, ocean thermal, tidal current**
- **Wind Power**
- **Solar (concentrating thermal and photovoltaic)**
- **Biomass, Biogas (landfill, gas, digester)**
- **Geothermal**
- **Fuel cell using renewable fuel**
- **Municipal solid waste conversion using a non-combustion thermal process as defined by Senate Bill 1038**

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- **The CPUC and the California Energy Commission (“CEC”) are jointly responsible for implementing the renewable program.**
 - **Governor Arnold Schwarzenegger’s Executive Order, dated May 14, 2008 and issued November 17, 2008, established a further goal of 33% renewable energy by 2020.**
 - **The CPUC supports increasing RPS to 33%, and it is expected a bill will pass the California Legislature in 2009.**

CPUC is Responsible for . . .

1. **Adopting RPS Compliance Rules;**
2. **Requiring each utility to submit an RPS Procurement Plan;**
3. **Adopting a process that utilities must use to evaluate renewable energy projects' bid into their solicitations;**

CPUC is responsible for (continued) . . .

- 4. Reviewing and approving or rejecting utilities' RPS contracts;**
- 5. Adopting a Pricing Benchmark to evaluate RPS contracts; and**
- 6. Reporting to the legislature on a quarterly basis on the RPS program.**

RPS Program

- **Since the RPS Program was adopted, the CPUC has approved over 110 RPS contracts for nearly 7,000 MWs.**
- **1,000 MWs have begun delivering RPS-eligible energy.**

RPS Program (continued) . . .

- The CPUC is also involved in the Renewable Energy Transmission Initiative (“RETI”).
- RETI is a California-wide multi-stakeholder initiative to identify the transmission projects needed to accommodate the states’ renewable energy goals and facilitate transmission planning and permitting.

Renewable Energy Credits (“REC”)

- **Renewable Power is characterized by its “green attribute”. The Green Attribute is conveyed in a renewable energy credit.**
- **A REC is an accounting tool for the RPS Program such that one REC includes all environmental and renewable attributes of one MW hour of renewable energy.**
- **RECs are tracked in the Western Renewable Energy Generation Information System (“WREGIS”), which is a multi-state program that facilitates the interstate purchase of renewable energy.**

Renewable Energy Credits (continued) . . .

- RECs include the attributes of recorded greenhouse gas (“GHG”) emissions from the burning of fossil fuels.
- Only RECs from CEC certified generations are RPS eligible.
- The CPUC may allow RECs (without power deliveries) to meet RPS requirements if approved by the Legislature.

RPS Compliance

- **California's three large IOUs are PG&E, Southern California Edison ("SCE"), and San Diego Gas & Electric Company ("SDG&E"). These IOUs received a robust response to their 2008 RPS solicitations.**
- **Approximately 24,000 MW worth of RPS Projects were bid to these solicitations.**
- **Solar projects made up most of the bids.**

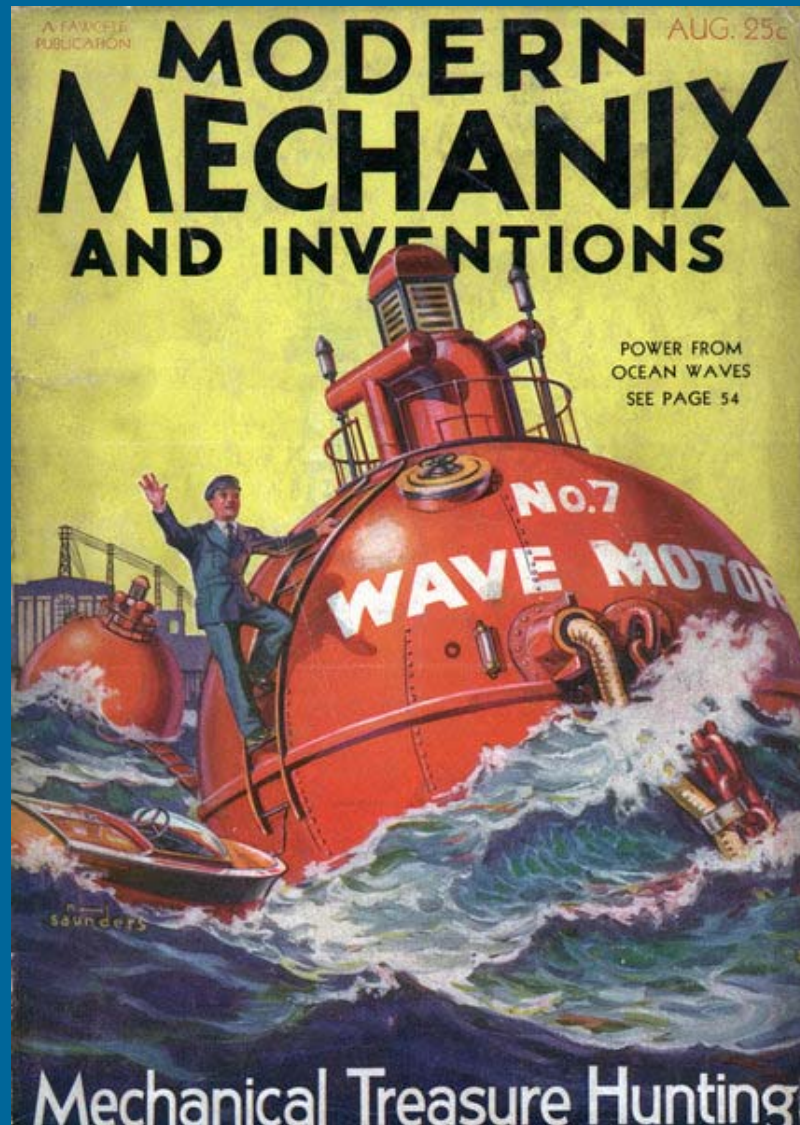
RPS Compliance (Continued) . . .

- In 2008, the CPUC approved twenty-four contracts totaling 2,812 MW. Twenty of those contracts were for the development of new capacity.
- The CPUC also rejected two contracts – one for non-compliance with the CPUC standard RPS contract terms and conditions, and the other because the CPUC viewed the technology as too speculative to warrant a power purchase agreement (“PPA”).
- The PPA the CPUC rejected was for a WaveConnect Project.

RPS Compliance (Continued) . . .

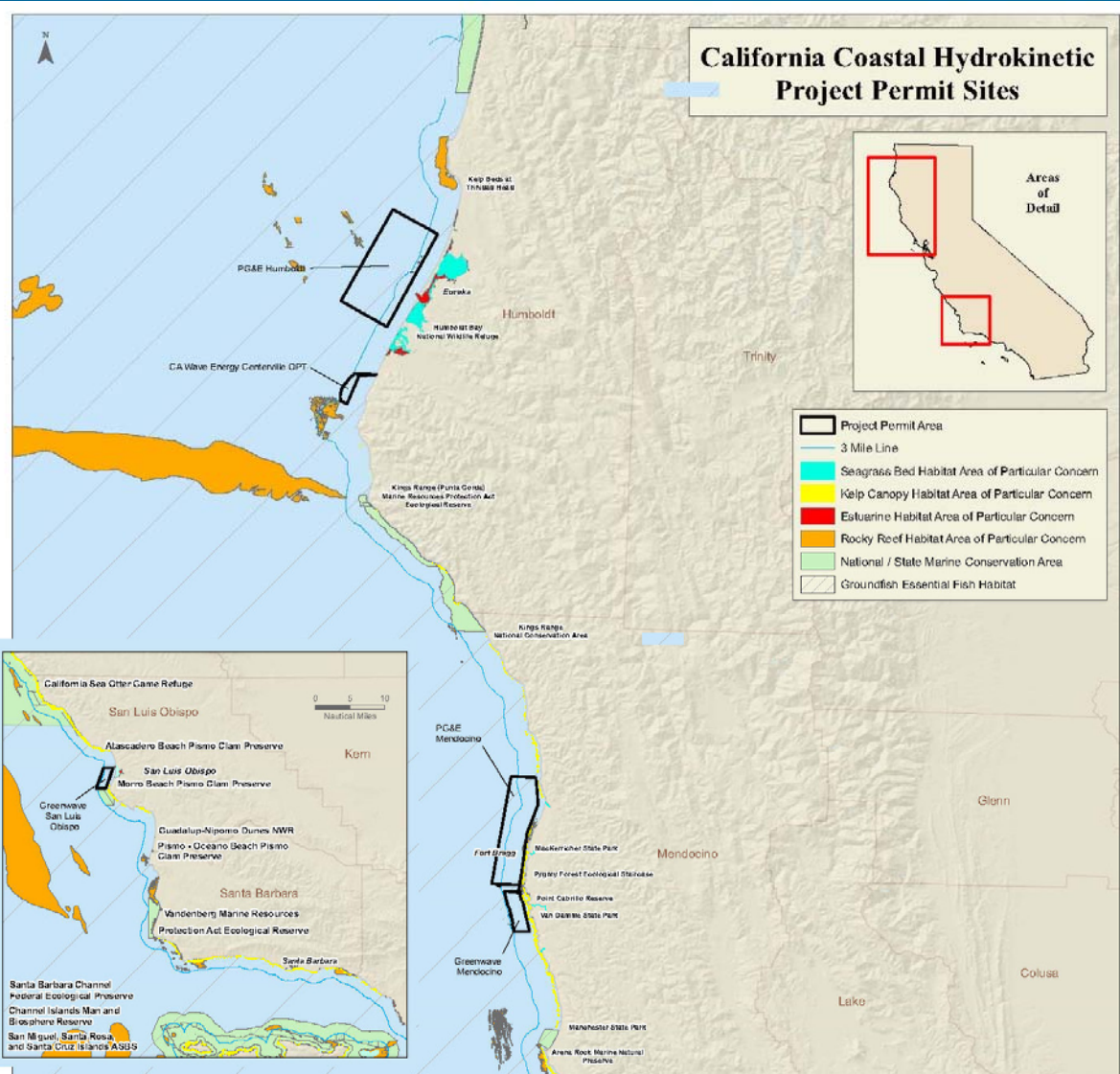
- PG&E is fulfilling its RPS obligations through the procurement of renewables from third parties and also through ownership of its own renewable energy sources.
- PG&E is involved in developing its own WaveConnect Projects and is optimistic wave energy development can be a viable RPS source in California.

PG&E Wave Energy Development



*Pacific Gas and
Electric Company®*

Northern Coast Calif Wave Power Projects



- PG&E has received FERC preliminary permits for two Northern California locations (40 MW each).
 - Humboldt County (Eureka)
 - Mendocino County (Fort Bragg)

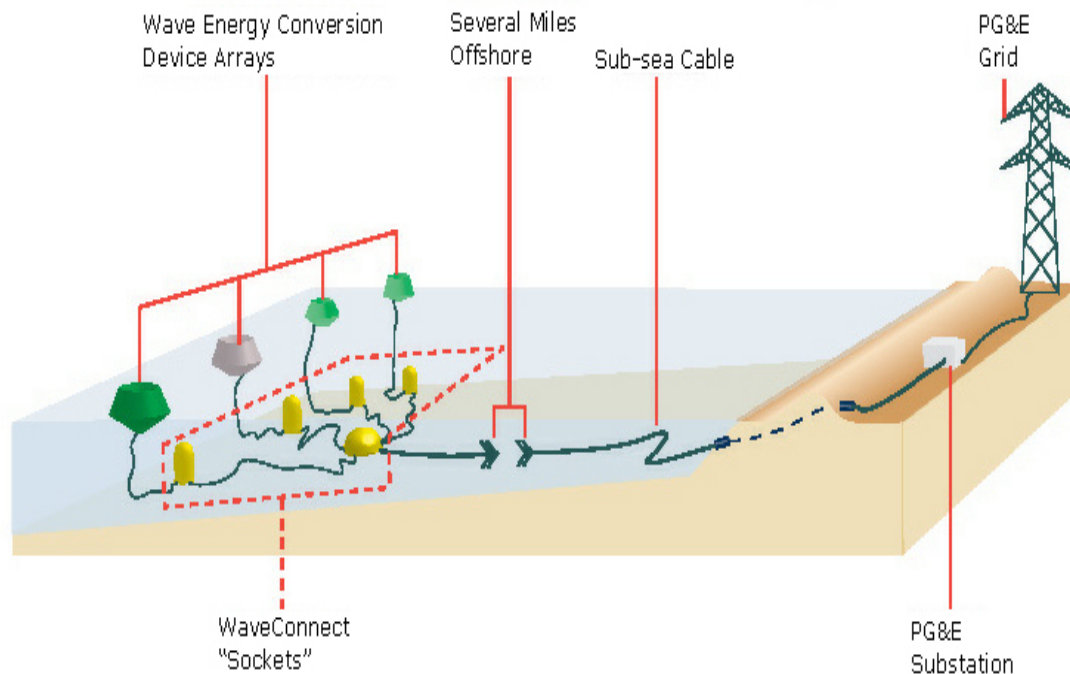
WaveConnect Project - Current Status

- CPUC funding for \$4.8 million was authorized January 29, 2009.
- Received \$1.2 million competitive US DOE grant in September 2008 with matching funding requirement.
- Stakeholder outreach continues with informal meetings with County, City, and local organizations.

PG&E WaveConnect Project Schematic

The WaveConnect concept is to build an undersea electrical grid connection point several miles offshore which will serve as a common interconnect for several wave energy conversion devices.

In simple terms, it consists of an offshore electrical "socket" connecting wave energy converters to the PG&E grid.



- **PG&E is lead project developer**
- **Initial phase uses FERC pilot license alternative**
- **PG&E obtains site control and conducts licensing studies for entire facility**
- **PG&E develops infra-structure to evaluate, test, and deploy various WEC devices**
- **Open process for WEC device selections**
- **Projects may be built later out to 40 MW each**
- **Contributes to post-2010 RPS goals**

RPS REGULATORY CHALLENGES . . .

WaveConnect -- Regulatory Agencies

Major Licenses, Leases, Permits, or Authorizations:

- **Federal Energy Regulatory Commission (FERC)**
- **Dept of Interior Minerals Management Services (MMS)**
- **United States Fish & Wildlife Service (USF&WS)**
- **California Coastal Commission (CCC)**
- **California State Lands Commission (CSLC); Lead CEQA agency**

Additional Licenses, Permits, or Other Authorizations (Partial List):

- **State Water Resources Control Board (SWRCB)**
- **US F&WS and NOAA Fisheries**
- **United States Army Corps of Engineers (USACE)**
- **State Historic Preservation Office**
- **US Coast Guard (USCG)**
- **California Dept of Fish & Game (CDF&G)**

Renewable Hydro

- **PG&E owns 26 FERC-licensed Hydro Projects totaling 3,888.5 MWs.**
- **In California, Hydro projects that are 30 MWs or less qualify as RPS.**

PG&E has several small projects . . .

» Chili Bar	7.0 MWs
» Crane Valley	28.7 MWs
» Hat Creek	17.0 MWs
» Kern Canyon	11.5 MWs
» Kilarc-Cow Creek	5.0 MWs
» Merced Falls	3.5 MWs
» Narrows	12.0 MWs
» Phoenix	2.0 MWs
» Potter Valley	9.2 MWs
» Tule River	6.4 MWs

These all qualify as RPS.

» Drum Spaulding	190 MWs
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Consists of several small powerhouses so 87 MWs qualify as RPS.

Incremental Hydro From Efficiency Improvements . . .

- PG&E is trying to develop small hydrokinetic projects that qualify as RPS.
- PG&E received FERC Preliminary Permits to develop the:
 - Britton Powerhouse at Pit 3 Dam;
 - Chalk Mountain Powerhouse at Pit 4 Dam; and
 - Feather Powerhouse at Rock Creek Dam.

Incremental Hydro From Efficiency Improvements (Continued) . . .

- **McCloud is a 364 MW Project.**
- **PG&E received FERC approval to incorporate the McCloud Development (5-8 MWs) and the Pit 7 Afterbay (10 MWs) into the larger McCloud Pit Relicensing.**

Pumped Storage

- **Hydropower pumped storage is part of the solution for reducing GHG emissions and maintaining electric system reliability.**
- **Pumped Storage can integrate new renewable energy sources – like wind and solar – into the grid.**

Pumped Storage (continued) . . .

- **Pumped Storage complements the intermittent nature of some renewables firming these resources to ensure stable grid operation.**
- **PG&E owns and operates the Helms Pumped Storage Project - 1,212 MWs.**
- **PG&E received FERC Preliminary Permits to develop the:**
 - **Mokelumne Pumped Storage Project with a potential between 380 MWs and 1,140 MWs; and**
 - **Kings River Pumped Storage Project with a potential between 380 MWs and 1,140 MWs.**

Summary

- *Meeting California's RPS Goal of 20% by 2010 is a challenge.*
- *To reach 33% RPS by 2020 will take extraordinary efforts.*
- *Small hydro, ocean technologies, and pumped storage can help California meet its RPS goals.*