12,000 MW of DG Renewables by 2020

Bill Powers, P.E., CEC DG workshop, May 9, 2011

1. Suggest methodology for interim and regional targets

Recommendation: Joint IOU *Energy Efficiency Strategic Plan*, January 2011 Update, should guide allocation of PV capacity:

- Existing residential: 25% of existing residential reaches 70% reduction by 2020
  - Assume 30% reduction with EE, 40% with PV
  - Residential rooftop PV requirement = 4,800 MW
- Existing commercial: 50% of existing commercial reaches net zero energy by 2030 (assume 25% reach net zero by 2020)
  - Assume 30% reduction with EE, 70% with PV
  - Commercial rooftop PV requirement = 9,800 MW
- Total 2020 residential/commercial rooftop PV requirement = 14,600 MW

2. Rule 21 restriction on DG inflows

Recommendation: 2007 CEC IEPR (p. 155) called for all new and upgraded distribution substations to be smart grid compatible, and that utilities should be required to conduct cost/benefit analysis if proposing not to incorporate smart grid features, like 100% bidirectional capability, in all upgrades/new builds. This should be required utility practice to avoid distribution substations creating an artificial bottleneck to DG renewable energy development.

3. Comments on any methodologies – contract pricing must be transparent/public

All RPS and gas-fired generation power purchase agreement pricing is confidential. This prevents the state from: 1) assuring it is getting the best value in meeting RPS targets, and 2) developing a coherent "economic loading order" for RPS generation options. Transparent, public contract terms are essential to determine the full cost of non-DG RPS options and validate the reasonableness of FIT rates.

4. Should state create incentives/penalties to achieve targets?

Recommendation: Administration of public good funds for energy efficiency, and feed-in tariffs for distributed renewables and CHP, should be shifted from the IOUs to an independent administrator along the lines of Energy Trust of Oregon. Commit most/all funds to Whole House Performance Program targeting net zero energy consumption and greatly expand on-bill financing pilot programs to serve as de facto Property Assessed Clean Energy (PACE) programs.

Recommendation: A feed-in tariff for PV with pricing and allocation similar to that developed by UCLA/LA Business Council in July 2010 should form the framework for meeting PV targets. The "all-in" avoided cost to IOUs of solar PV power is greater than $0.20/kWh, yet CPUC/IOUs assert the avoided cost is at $0.10/kWh or less. This is the difference between rapid DG PV growth and none.

5. Should there be options to trade allocation requirements?

Recommendation: No. Allocations should be apportioned on a percentage basis relative to annual electricity consumption in each utility service territory.

6. Near-term/long-term actions to achieve 12,000 MW by 2020?

Recommendation: Administration of EE and feed-in tariff programs must be transferred from the IOUs to an independent third party. Feed-in tariff rates must be set at a level that spurs rapid and large-scale installation rates. All benefits of DG renewable energy, including the wholesale market price depression effect that benefits all ratepayers, must be taken into account.

Contribution of Solar and Wind to German Electricity Supply on May 6, 2011: Distributed Solar PV Meets 22% of Country's Demand at 1 pm

Installed solar and wind capacity in Germany as of Jan. 1, 2011:

- solar PV, 16,500 MW_{dc} (13,200 MW_{ac} at 80% dc-to-ac conversion)
- wind, 27,000 MW_{ac}
- Germany is approximately the same geographic size as California
- German electricity market is approximately double size of California market

Table 1. Distributed PV reaches 22% of German Electricity Demand on Clear to Partly Cloudy Day, May 6, 2011

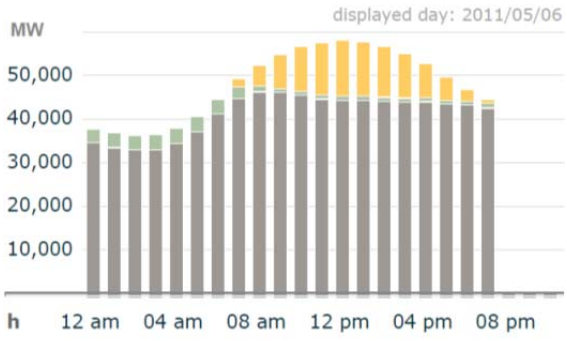
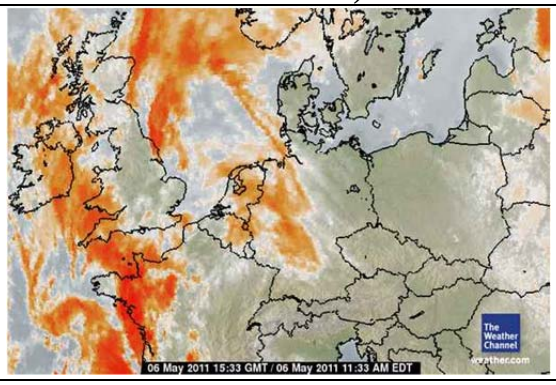
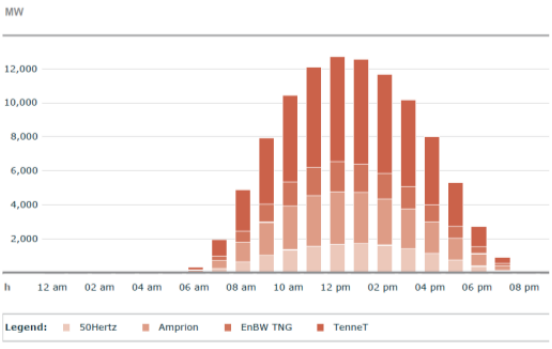
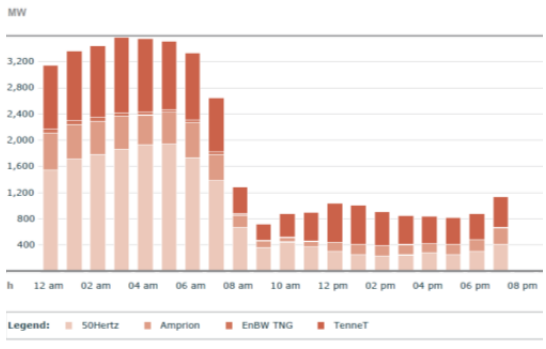
Contribution of solar (yellow), wind (green), and gray (conventional) on May 6, 2011 – Solar meets 22% of German demand at 1 pm	German cloud cover conditions on May 6, 2011 – partly cloudy in western half of country (satellite image is at 5:30 pm German time)
	

Table 2. 24-Hour Profiles of German Distributed PV and Wind Output, May 6, 2011

PV production > 12,000 MW at mid-day, weather conditions clear to partly cloudy	Wind production, ranging from 3,400 MW in early morning to 1,000 MW in afternoon
	

Source of data:

German EEX Transparency Platform:
http://www.transparency.eex.com/en/Statutory%20Publication%20Requirements%20of%20the%20Transmission%20System%20Operators