RENEWABLE ENERGY MARKET STRUCTURE

A Perspective from the United States with a Focus on California

FEDERAL AND STATE RESPONSIBILITIES FOR PROMOTING RENEWABLE ENERGY

- Role of Federal Government
  - Set federal tax policy including incentives for renewables
  - Promote transmission planning and expansion (RTOs, ISOs)
  - Regulate interconnection to the high voltage transmission system
- Role of State Governments
  - Regulate investor-owned utilities including mandates for renewable procurement and incentives for consumers
  - Supervise interconnection to the electric distribution system (net metering)
  - Supervise permitting of power plants for compliance with environmental laws

RESPONSIBILITY FOR MANAGING THE HIGH VOLTAGE TRANSMISSION SYSTEM

- Independent System Operators/Regional Transmission Operators
  - Set up as nonprofit corporations under the supervision of FERC
  - Organize and operate wholesale electric markets
  - Plan for transmission expansion
  - Manage application for interconnection in a fair and non-discriminatory manner
- Connecting to the High Voltage Electric System
  - Developers of power generation apply to interconnect to the grid
  - ISO conducts technical studies (power flow, short circuit, transient stability) to determine needed upgrades and improvements to the grid
  - Reform process groups together multiple projects for studies
  - Generators post letters of credit to secure right to interconnect and protect ratepayers from unused transmission projects
  - Utilities build needed transmission upgrades to permit interconnection

ELECTRICITY MARKET REFORM IN THE U.S AND MARKET MANIPULATION

- In the U.S. competitive wholesale electricity markets have been created in California (CAISO),the Mid-Atlantic (PJM), the Upper Midwest (MISO), New England (ISO-NE), New York(NYISO), the Southwest (SPP) and Texas (ERCOT).
- In 2000/2001 the California wholesale market experienced price manipulation leading to further market reform and the marginalization of corrupt actors like ENRON
- The fundamental flaw in the original market design in California was the requirement that the distribution utilities purchase all the energy needed to meet their load in the spot market.
- Distribution utilities in California and load serving entities in other wholesale markets can now build balanced portfolios of energy resources to hedge risks and control costs
- Wholesale electricity market reform in the U.S. has led to a very robust industry of companies developing and building both renewable and conventional energy generation technologies.
- Principal bottleneck to more development of renewable technologies in the U.S. is the permitting and construction of high voltage transmission line to bring power from resource rich areas to load centers.

FEDERAL GOVERNMENT TAX POLICY

- Investment Tax Credit for Solar Projects
  - 30% credit for investors with federal income tax liability – Can be taken in first year of operation
  - 2009 economic stimulus legislation provided grant in lieu of credit for projects started by 2011
  - Accelerated depreciation for capital expenses
- Production Tax Credit for Wind, Geothermal and Closed Loop Biomass
  - Paid for performance over project operation ($22/MWH)
  - Expires at end of 2012. Industry seeking renewal of the policy

STATE RENEWABLE PORTFOLIO STANDARDS

- Requirement that utilities procure specific percentage of renewable energy
- RPS allows for more price competition among generators compared to Feed-in-Tariffs
- 29 states in the U.S. have RPS Policies
- 16 states have RPS with solar or distributed generation provisions
- Establishment of federal RPS has been unsuccessful
- California has the most ambitious RPS in the U.S.

CALIFORNIA SOLAR POLICIES

- Renewable Portfolio Standard
  - 20% by 2013, 25% by 2016, 33% by 2020
  - Utilities conduct periodic solicitations for renewable projects
  - Projects selected based on project viability and price.
  - Utilities and project developers negotiate long-range power sales agreements of 20 to 25 years
  - Project developers have specific milestones they must meet and are required to post a large development security
  - Average bid-in price in 2011 cycle was less than $100/MWh
- Feed-in Tariff for projects up to 3 MW (Standard Contract and Fixed Price for solar generated electricity)
- Utility-Owned Solar (Utilities procure components; supervise construction and own systems)
- Renewable Auction Mechanism – 1 to 20 MW; Standard Contract; Pay as bid

NET METERING AND LOW VOLTAGE INTERCONNECTION

- Policy that allows customers who own renewable energy facilities to get credit for a portion or all of any energy outflows
- Does not require a second electric meter
- Standardized interconnection without detailed studies
- Monthly roll over of retail credits and an annual settlement of residual credit
- May include a monthly connection fee.
- Only 3 states in the U.S. do not have a net metering policy
- Some states cap the size of the system that can qualify for net metering
- Some states limit the total percentage of peak load that can be served by net metered systems


315MW SunPower
CVSR
Oasis Installation
December


January

55MW Alamosa, Colorado
Customers: Iberdrola, MetLife, Xcel Energy
Product: SunPower T0 & T20 Trackers

85MW Montalto, Italy
Customers: Etrion,
Product: SunPower T0 & T20 Trackers
First solar bond 200M Euro