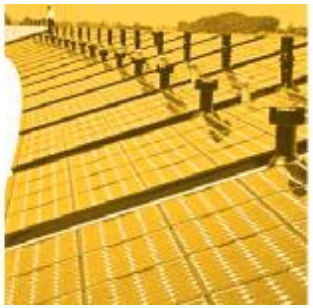
RENEWABLE ENERGY


SOLAR ENERGY IN A TIME OF POLICY, REGULATORY, and FINANCIAL UNCERTAINTY

REPP

Overview

- Review three market challenges:
  - Look at ‘first step’ on CO2 control. A corrected ‘wedge’.
  - Solar ‘market’ is really multiple sub-markets.
  - Future - Solar progress requires a successful innovation policy.

Market Size: Renewable Generation

- Stabilization wedge approach. Pacala and Socolow call for 2 million MW of solar or wind for one wedge.
- Correction shows one wedge requires removing 15 million tons of carbon per year.
- Requires approximately 18,500 MW per year.
- Ten year program means $150 billion capital investment.

Market Structure

- Market ranges from distributed to grid parity projects.

  Basic Equation:

  - (CapEx)x(CRF)-(Annual Production)x(Rate)><0
  - Where CapEx = Installed Cost - Subsidy, e.g. watt buydown, ITC, other. Tie public payment to CO2 avoidance.
  - CRF= (debt/Equity leverage), Debt Interest Rate.
  - Rate = PPA, net metering, other. Rate will reflect position in grid.

Innovation

- The competitive advantage of solar is its ability for rapid technology innovation.
- Successful innovation requires a transmission belt to take basic science to lab prototype to initial commercial scale up to market participant.
- Successful innovation requires a workable, efficient, permanent commercialization policy. The DOE Loan Guarantee needs shock therapy.
- Portfolio standards pose costly non-transparent impediments. A limited feed-in tariff for ‘significant commercialization efforts’ should be explored.