Em-Powering Michigan and Advancing Wind Power on the Great Lakes

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Project is an outgrowth of:

State Waters

Offshore Wind Access System Framework

- Management Structure
- Methods for Allocating Property Rights
- Public Process to Debate New Ocean Uses
- Tenure
- Tract Size
- Transferability
- Financial Terms for Allocating Property Rights
- Exclusivity – whether to permit competing uses (e.g., fishing within the wind farm)

Dhanju and Firestone, 2009

2009 DOE Grant

- Begin to operationalize framework, with focus on:
  - Model Request for Proposal and Feed-in-Tariffs
    - Here, today focus on some elements of each
  - Comparative Environmental Effects Assessments

Options to promote Renewable Energy

- Policy options include
  - Tax credits
  - Grants
  - Loan guarantees
  - Renewable Portfolio Standards
  - Taxes of fossil fuels
  - Internalization of external costs of generation
  - **Mandated Request for Proposals (RFPs)**
  - **Feed-in Tariffs (FIT)**
    - Utility required to purchase, at a set rate and for a set time, generation by qualifying generators
- Why?
  - **Most renewable energy (RE) technologies are to expensive to be competitive w/traditional generation**

RFPs Examined

- All-source
  - Delaware
- Offshore Wind
  - LIPA
  - NJ
  - RI
  - NYPA
- Land-based wind
  - Delmarva Power (Delaware)
- Renewables
  - University of Maryland

Power Purchase Agreement

- Mandated PPA at end of line
  - DE all source, DE land wind, NYPA, LIPA
- No guaranteed PPA
  - RI, NJ

Developer Performance Guarantees

- Typical to have performance guarantees on
  - Amount of energy
  - Operation date
- Liquidated damages can be prescribed or negotiable.

Bidding Entity Preferences

- Wind farm location
  - Preference or mandatory
  - Instate
    - But raises dormant commerce clause concerns
- Point of delivery
- Responsibility for offshore transmission?
- Responsibility for any substation upgrades?

Information Requirements

- Should relate to evaluation requirements
- Balance between inadequate information and extra information

Price Components

- Energy
- Capacity?
- Renewable Energy Credits
  - Other environmental attributes?
- Escalator?

Price - How to handle tax incentives

- Could require bidders to price with and without tax incentives
- Or provide developer with option to terminate PPA

Alternative Approaches

- Could permit bidder to bid alternative
  - Turnkey
  - Joint Venture

  - But makes process more complicated
    - More difficult to evaluate
    - More complicated contractually
    - Generates very different risk profiles

Plans

- Helps decisionmaker analyze project viability
- Takes on increased importance if Buyer assuming some of the risk

Which Plans to Require?

- Site Engineering/design
- Balance of Plant (BOP)
- Permitting/Licensing
- Financing
- Project Revenue
- Interconnection
- Offshore/Onshore substation
- Decommissioning
- Gross/Net Energy Output/Resource Availability
- Environmental Effects
- Tourism Effects
- Community Outreach
- Economic Development
- Educational Plan

RFP Criteria – Broad

- Quantitative or Qualitative Criteria
- Multi-stage
  - Threshold Criteria: responsive, qualifications, financially feasible; minor deviation from model PPA
  - Stage 2: price, operation date,
- Multiple
  - Objective Criteria
  - Discretionary Criteria

Benefits of RFPs

- OSW RFPs have drawn significant interest from developers
  - Even without PPAs; But inclusion of PPA is gold standard

- Competitive pressure on developers to offer fair price/terms

- Control over amount of MW/MWh contracted

- All source bidding with proper accounting for externalities, carbon prices, range of future costs of fossil fuels places “cost” of offshore wind in perspective

  - Health cost of coal is 3.2 cents/kWh on average, and dirtiest coal plants 11-12 cents/kWh (**National R**esearch Council 2009)

- Open bidding process/regulatory proceedings can draw considerable citizen interest

Drawbacks of RFPs

- Process can be lengthy and politicized
- Critical to report consumer effects in terms ratepayers can understand—per monthly bill effects in real (un-inflated) dollar terms
- Long-term PPAs have consumer risks (new, cheaper technologies that arise on the horizon) as well as benefits (stable prices)
- Developers in a desire to have "winning" bid, might under bid, resulting in an unfinanceable project

Feed-in Tariffs

- Payment on a kilowatt-hour basis
- Goals
  - Short-term: make renewable energy investments profitable
  - Long term: render renewable energy cost-competitive
- Aka feed in laws, advance renewable tariffs, renewable tariffs, and renewable energy payments.
- Track record- most successful policy to encourage development of renewable energy

Primary FITs Examined

- Germany
- Spain
- France
- Ontario

Feed-in Tariff Design

- Decide which resources should be subsidized
- Decide who may participate in the program
- Select appropriate cost-calculation methodology
- Develop tariff differentiation (including adders), adjustment, digression and revision plans

Burgie and Crandall, 2009

Cost Calculation Methodology

- Three main ways to set FIT rates:
  - Fixed price
  - Avoided cost of generation
  - Actual cost of generation

- Most common approach is to set based on the actual cost of generation plus a reasonable rate of return that is "fair but not excessive" (Gipe, 2009)

- Tariff is then set at fixed rate (more common) or tied to market prices.

Feed-in Tariff Duration

- Long-term power purchase agreements generally required to ensure fair return on investment (ROI) and thus stability for lending
- Length of PPA is critical – too short then uptake will be slow, too long then greater than equitable ROI
- Contract lengths of 15-25 years are common

Feed-in Tariff Differentiation

- FITs can be differentiated by:
  - Technology
  - Size of project
  - Application (e.g., rooftop PV, ground PV)
  - Resource intensity (e.g. to balance out areas of different wind resources)
  - Time of day/season

- Adders – bonuses that can be added to the tariff if the project meets certain criteria
  - E.g. Community based

Feed-in Tariff Adjustment

- Tariffs generally reviewed every 2-4 years to determine efficacy

- Prices can be reduced (digression) to slow development or increased to spur growth

Feed-in Tariff Revision

- In addition to changes through adjustments, more substantial changes can be made to a FIT during a revision
  - Take into account: investor needs, ratepayer burdens, commodities markets, and technological advances
- Unlike adjustments, revisions can be retrospective and use actual market data to adjust tariff schedule

Benefits of Feed-in Tariffs

- Proven track record of success in Europe
  - Germany (e.g.)
    - PV from 100s MW (2000) to over 5 GW (2008)
    - Employs 280,000 people in RE sector, $50B turnover
    - Generates 12% of electricity from RE (non-hydro)
    - Installed 2,000 MW of wind per year 2004-08

Benefits of Feed-in Tariffs

- Bankable and simple – low risk of lending
- Equitable – open to all (utilities and individuals)
  - No tax liability to offset needed
- Incentive to optimize efficiency to maximize revenues
- Can be implemented alongside an RPS

Drawbacks to Feed-in Tariffs

- Need to make decisions based on short- & long-term renewable energy growth
  - High FIT for one technology may displace more economical options
  - Low FIT might not encourage investment
- Tariff schedules often require multiple revision
- Generation caps can lead to speculative queuing to lock in project and/or higher tariff

Ontario FIT

- Wind, waterpower, biomass, bio-gas, landfill gas, & PV
- Contract length: 20 years
- Offshore wind tariff 20 CAN¢/kWh
- Projects must be viable in four years
- Adder for community (1 CAN¢/kWh) and Aboriginal (1.5 CAN¢/kWh) involvement
- Program began Oct 2009 – 2,500 MW of connections awarded (April 2010).

United States FITs

- Gainesville, FL – first FIT program in US, PV only.
- Vermont – project cap of 2.2 MW. Geared towards community projects
- California – small scale generation (<1.5 MW)
- Hawaii – passed European style FIT in March 2009
- Maine – passed pilot program for small-scale generation in May 2009

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