Promoting Renewable Energy Development: An Introductory Workshop for Energy Regulators

Nairobi, Kenya
March 16-18, 2011

The Feed-in Tariff Model

Outline

- What is a Feed-in Tariff?
- Tariff Design Options
- Basic Pricing Options & Considerations
- Advantages and Disadvantages of FIT Policies
- Alternatives to Feed-in Tariffs
- Wisconsin's Experience

What is a Feed-in Tariff (FIT)?

- A "tariff" refers to a document containing detailed, standard terms on which an electric provider or grid operator provides service

- A "feed-in" tariff contains standard terms and conditions on which an electric provider or grid operator is willing to purchase renewable energy, at a price that provides an incentive for installing renewable energy (to "feed in" to the grid)

Core Elements of a Feed-in Tariff

- Offers stable, long-term purchase of renewable energy (often through long-term contract)
- Payment at a level sufficient to drive renewable energy development
- Access to the electric grid (interconnection)
- Most feed-in tariff policies are created by establishing a legal requirement for electric utilities to purchase renewable electricity that meets certain conditions

Feed-in Tariff Design Options

- Type of eligible technology
- Size of eligible project (max, min, or both)
- Cap on total eligible installed capacity?
- Geographic considerations, resource quality
- Price – method and amount
- Length of contract – 10, 20, 25 years?

Feed-in Tariff Pricing Options

1) Levelized cost to generate renewable energy, plus rate of return*
2) Auction – based on bids by potential renewable energy sellers*
3) Value of renewable energy to the utility (avoided costs)
4) Value of renewable energy to society (externalities)
5) Some other simple, fixed incentive

*A rate that reflects actual cost + profit will likely be preferred by many renewable energy developers

Pricing Options – Considerations

- What other incentives are available to renewable energy developers?
  - Don't want to require payments higher than necessary or create windfall profits for renewable energy sellers.
- What can the utility or grid operator and its customers afford to pay?
- What information is available about the cost to install and finance renewable energy?

Pricing Options - Considerations

- Price degression (regression) –projects that come along later are offered lower prices
  - Encourages renewable developers to act early
  - Can reduce price paid as technology becomes more common and costs to install decrease
- If prices need to be adjusted over time, be sensitive to effects on the market
  - Too sudden or too large changes in price or eligibility requirements decrease market stability & attractiveness to investors

1 & 2: Cost + Rate of Return (Profit)

1) Use market research and empirical analysis to determine cost to finance, install & operate each type of renewable technology

Or

2) Auction-based pricing = use auction bids by renewable energy producers help to set price
   - Be careful of underbidding – bids held artificially low to increase chance of being selected
   - Projects that are underbid may not actually be constructed due to insufficient funds

3: Value to Utility: Fixed Prices

- Develop a fixed price to be paid based on cost compared to anticipated future cost of providing energy from other resources
  - May also consider time of energy production, grid benefits, value of price certainty to utility purchaser
- If other sources of energy become more expensive, a fixed price can result in lower cost to the utility than without the feed-in tariff
- Fixed price means price certainty for renewable energy developers → good for investors, as long as the price is high enough

4: Value to Society

- Premium/rate based on current or future societal costs related to fossil fuel energy as the avoided alternative
  - Energy security
  - Greenhouse gas emissions reduction
  - Public health, pollution reduction
- Value of job creation, economic development

Market + Premium (Any basis)

- Develop a premium to be paid above market price based on renewable system cost compared to anticipated future market prices
  - Need to identify payment level necessary to support renewable projects
  - Need to forecast future market prices →another variable (another place for error in forecasting)
- May want to identify a price cap
  - Lesser of market + [premium] or $[?]/MWh
  - If market prices go above [?], then no premium
- Limits the amount of additional cost to utility
- Without a cap, does not limit absolute cost to utility
- Does not provide much price certainty for developers
  - If market prices drop below predicted levels, some projects may fail, unless minimum price is established

Price Adjustments – Examples

- Annual degression – goes down every [?] months
- Periodic adjustments when milestones are reached (lower price offered after first [?] megawatts or kilowatts are installed)
- May want to make adjustments to account for effect of inflation on costs to install
- Will price adjustments apply to existing projects, or only future projects going forward?

Revenue Stream Considerations

- Same price for the entire contract, or should it change over time?
- Front-end loading = higher price for early years, then lower price for remainder of contract
  - Can pay off investors faster than a static fixed price – may help to attract investors
- Combine fixed and market-based pricing = fixed for initial period, then receives market price or market price + premium
  - Provides some price certainty, but also reduces amount of risk to utility (by placing some risk on renewable energy developer)

Tailoring to Your Preferred Resource

- Bonus payments to encourage:
  - Energy production during time of peak demand
  - Very efficient systems (co-generation for example)
  - Use of specific fuel stream (farm waste, municipal waste)
  - Ownership structure (local, community owned)
  - Siting in particular location (on buildings, near high energy loads, certain grid locations)
  - Repowering/upgrading existing facilities

Advantages of Feed-in Tariffs

- Payment for energy generated → encourages good quality, efficient systems to be installed
- Can create price certainty for renewable energy suppliers – easier for developers to get project financing
- Can identify & to some extent limit financial impact on utility & its customers (using caps, price degression)
- Can tailor to specific technology, project size

Disadvantages of Feed-in Tariffs

- Many factors affect pricing
  - Hard to keep up with changes in cost of renewable energy systems, other incentives available
- Likely to cause increase in the cost of electricity to customers unless other funding sources (taxpayers?) are used
- Requires administrative commitment to:
  - Set prices accurately
  - Conduct periodic review

Alternatives to Feed-Tariff Model

- Renewable Portfolio Standard (RPS) Quotas – require utilities to obtain electricity from renewable resources
  - Percentage of electricity sales
  - Set amount of installed capacity
- RPS relies on the market to set the cost of meeting the requirement
- Every project planned to meet an RPS has risk that it will not be chosen by the utility to satisfy its obligation, increasing the cost to finance a potential RPS-compliance project
  - Feed-in tariffs can reduce investment risk by providing certainty – if you meet the requirements, you will get paid at the identified level for identified period of time

Alternatives to Feed-Tariff Model

- Green Pricing – allows electricity customers to choose to pay more for "green" electricity from renewable resources
  - Demand for new renewables is customer-driven
  - If too costly, no customers will participate
- Tax Credits
  - Production tax credit (per MWh)
  - Investment tax credit (help with up front costs)
- Loan guarantees or interest rate subsidies
- Net metering – net out your generation against your electricity load (reduce your electricity bills by what you produce)

Wisconsin's Experience

Wisconsin's Experience

- Many utilities voluntarily offer feed-in tariffs
  - Cap on eligible system size – small systems only
  - Cap on total installed capacity eligible for tariff price – "experimental tariffs" – limits financial impact on utility customers
- Renewable energy purchased by utility under feed-in tariffs is eligible for utility to use to:
  - Meet part of its renewable portfolio standard requirement, or
  - Sell to customers who choose to purchase "green" electricity from the utility (blocks of energy or %)

Wisconsin's Experience

- Public Service Commission of Wisconsin conducted investigation regarding expanding feed-in tariffs in Wisconsin (2009-2010)
  - Obtained input from stakeholders, utilities
- Looked at:
  - Authority of Commission to require tariffs
  - Technologies that should be eligible
  - Uniformity v. flexibility for individual utilities
  - Pricing sufficient to incent projects

Wisconsin's Experience

- Wisconsin's Commission may not have authority to require additional utility purchases of renewable energy (under Wisconsin law)
- Stakeholder input reflected interest in:
  - Solar and Biogas (manure digesters)
- Biogas – manure is anaerobically (without oxygen) digested and the resulting gas is captured and burned to produce electricity
  - Wisconsin has approximately 3.4 million cows
  - Manure from all of these cows together could produce 22,800 MWh/day = 8.3 million MWh/year

Wisconsin's Experience

- Based on stakeholder input, Commission staff identified price levels that could be sufficient to encourage new installations
- Utilities continue with voluntary, limited tariff offerings
- Utilities have committed to additional tariff offerings since beginning of the investigation, even though no additional mandate has been imposed

Thank You!

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