How to Choose Appropriate Incentives to Deploy Renewable Energy and Increase Energy Efficiency

Competitive Procurement of Energy Efficiency

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Regulatory challenges

1. Electricity rates that are coupled with energy sales;
2. Disincentives to technological innovation and to the entry of new service providers
3. Access tariff structures that are not dynamic – not even TOU rates are available for residential customers
4. Consumers that do not face information about their electricity consumption except on an ex-post basis
The experience so far:

- From the renewable perspective, a lot of progress has been achieved which may be applied to EE.
- Even though the international experience is limited, there are encouraging cases to be examined and possibly replicated as well as many DR programs in US.
The experience so far: MISSOURI

- Online reverse auctions have been used for the allocation of energy efficiency grants.
- Available incentive dollars were allocated based on the lowest price obtained.
- Pre-qualified providers submit bids on $3 million in incentives on a $/kWh-saved basis for expected energy efficiency projects.
  - US$ 3 million were successfully awarded in energy efficiency grants resulting in 75 GWh of energy saved.
  - On July 28, 2010, sixteen grants were awarded in three consecutive one-hour auctions with 23 pre-qualified bidders.
  - “Overall, across three different auctions, the average promised price-effectiveness was 3.97 cents per kilowatt-hour of saved energy.”
New England’s Forward Capacity Market (FCM)

- Energy efficiency and other demand resources compete with generation to meet reliability needs.
  - Demand resources are eligible to participate and compete in the auction for new capacity.
  - Resources that can meet power needs are allowed to bid in the auction and the bids determine the price for capacity in the region.

- Demand-side management is used to improve the efficiency with which the region uses existing capacity.

- Results
  - Capacity from demand-resources represents about 7 and 9 percent of the total requirements in the first and second auctions, respectively.
Inducing energy efficiency through competitive bidding mechanisms

PORTUGAL - Portuguese EE Regulatory Program (PPEC)

• The mechanism:
  – competitive tender mechanism through which potential promoters submit candidate measures to improve efficiency (MWh) in electricity consumption.

• Selection criterion:
  – technical and economic, based on a cost-benefit analysis publicly discussed and approved ex-ante.

• The experience:
  – strong increase in the number of submitted measures.

• The results:
  – sensible increase in financial co-participation from beneficiaries and promoters.
Major challenges to the adoption of competitive bidding to induce EE

- **Regulatory risks**
  - Are NWh reliable? Will they be available when needed?
  - Windfall profit for investments in energy efficiency
  - (Lack of) expertise in auction design and implementation
  - Poor regulatory processes and institutions

- **Evaluation – M&V challenges**
  - The need to specify the baseline properly
  - Monitoring costs
Auctions as allocation mechanisms to achieve EE

- Transparent
- Price discovery mechanism
- In search of an efficient allocation
- Can the proper features achieved in the supply side experience be extended?
- No one size fits all:
  - The need of customization
Auction Design

- Supply (Who are the sellers?)
  - Large Industries
  - Aggregators (ESCOs, Financial institutions, Utilities, …)
  - Combination

- Demand (Who are the buyers?)
  - Centralized – in a environment subject to intensive centralized planning transaction costs may be too high for small projects
  - The government as an auctioneer and/or taking positions
  - Utilities – compliance with energy efficiency standards and/or targets
Auction Design

- What is the commodity to be auctioned?
  - NWh or MW of load reduction
  - Technology specific or neutral
  - Project specific

- Mechanism design – the good, the bad and the ugly?
  - Robustness to collusive behavior, preemptive entry
  - Asymmetry:
Energy Efficiency in Brazil

- Several ongoing initiatives (some dating back to the 70’s) – standards, codes and labeling
- The 2001 power crisis unveiled a huge unexploited EE potential – and a policy response to overbuild
- Most relevant funding through the obligation to allocate 0.5% of the Disco’s total revenue to EE projects
The performance of the funds allocated to EE (mandatory) has deteriorated as a result of affirmative policies.

Recent rulings in Brazil (ANEEL Ruling No. 300/2008 and the Law No. 12.212/2010) require the LSEs must channel at least 60% of the mandatory energy efficiency funds to programs addressing consumers benefited by the Social Rate (low income consumers).
Recent cost benefit analysis report that the applied resources are granting the program ineffective as a result of an excess of resources.

After the intervention favoring lower income customers these values (...) experienced a significant increase: from R$69/MWh to R$209/MWh for energy with comparable effects for lowering peak demand (ANEEL).
In Brazil the relative stability and maturity of the New Model coupled with changes in the electricity sector at an international level are motivating discussions of mechanisms to enable energy efficiency.

Since there is a considerable experience with competitive mechanisms on the supply side, discussions are taking place about the desirability of extending these auctions to energy efficiency.
Mechanism design choices:

- Who should bid in these auctions?
  - Demand:
  - Supply: ESCOS, but large consumers must be eligible to participate.
    - Caveats: the Brazilian experience reveals a lack of financial expertise in these companies (ESCOs) and the difficulty also in the financial sector to careful evaluate some of the projects.
    - Financial guaranties may be an obstacle.
  - The commodity
Smart Grids: Technology as an EE enabler

- Smart grid technologies are being deployed or piloted in many countries throughout the world. There has been considerable effort to better understand the impact of these technologies.

- In principle these technologies would allow a better integration of non conventional renewables into the grid (not to say off grid solutions) as well as to enhance consumer’s response.
Smart Grids: Technology as an EE enabler

- This grants an opportunity to have EE seamlessly embodied into the functioning of the power system.
- Like most developing countries, Brazil is looking at SG more from the supply side perspective (automation, operational efficiency, metering, theft control,…).
- The consumer’s perspective: there is ample evidence that consumers do respond to prices as well as to non pricing levers. (e.g, the Brattle Group experience).
Smart Grids: Technology as an EE enabler

- This grants an opportunity to have EE seamlessly built into the power system.
- SG technologies may help identify, monitor and monetize EE opportunities at considerably lower transaction costs.