

Customer Demand For Renewable Energy as a Market Driver: Regulatory Barriers and Designs

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The Regulatory Assistance Project (RAP)

We are a global, non-profit team of experts focused on the long-term economic and environmental sustainability of the power and natural gas sectors, providing assistance to government officials on a broad range of energy and environmental issues.

About RAP – US

RAP provides technical and policy support at the federal, state and regional levels, advising utility and air regulators and their staffs, legislators, governors, other officials and national organizations.

We help states achieve ambitious energy efficiency and renewable energy targets and we provide tailored analysis and recommendations on topics such as ratemaking, smart grid, decoupling and clean energy resources. RAP publishes papers on emerging regulatory issues and we conduct state-by-state research that tracks policy implementation.

About RAP – China

RAP assists China's decision-makers in developing and implementing policies that promote economic development, reliability, improved air quality and public health, which in turn produce substantial and permanent reductions in the country's greenhouse gas emissions.

Working with the Energy Foundation's China Sustainability Energy Program (CSEP), we provide technical and international expertise on energy efficiency, market and regulatory reform, renewable resources and environmental policy. Our network of international experts includes Lawrence Berkeley National Laboratory's China Energy Group, the Center for Resource Solutions and the Natural Resources Defense Council.

About RAP – European Union

RAP works directly with European institutions and Member States to advance energy efficiency, renewable power and other low-carbon resources while assuring economic competitiveness and robust regional energy security.

RAP provides ongoing support to energy regulators and government agencies in their efforts to de-carbonise the European power grid and meet the EU's ambitious goals for greenhouse gas reduction.

About RAP – India

In India, there is growing government and private sector interest in energy efficiency and renewable energy policies as key ingredients in a low-carbon, sustainable development path. RAP, which helped train the first generation of regulatory commissioners and staff in India in the 1990's, has provided information on international best practices in these areas and we anticipate becoming more involved in the near future.

About RAP – Other Regions

Our work in Chile, Dubai, Samoa, the Philippines, Brazil, Egypt, Kyrgyzstan, Mauritius, Ghana and other countries has helped to develop national energy guidelines and regulatory reforms, extend electric service to rural areas and provide low-income energy assistance. As a consultant to the Asian Development Bank, RAP has worked to strengthen the regulatory frameworks to help countries in the Asia-Pacific region boost energy efficiency and develop renewable energy resources.

Customer Demand for Renewable Energy

- ⚡ Many customers are interested in having renewable energy available to them, but access to renewable energy options remains largely dependent on economy-wide public policy, not personal behavior.
- ⚡ We suspect the demand is there but supply & access are not.
- ⚡ If customers could easily access renewable energy, there would be an increase in reliance on renewable energy on a small & large scale. Signals for broader public policy support for renewables (RPS, fiscal actions) would be more clear.
- ⚡ How do we make renewable energy options mainstream for the customer?

Customers Can Help Drive the Market, They Need Signals

- ⚡ Barriers are regulatory, financial and complexity.
- ⚡ We need to remove unnecessary barriers, provide better financial tools and make it simple.

Ideas for Engaging the Customer

- ⚡ Through the Utility Provider:
 - Renewable Portfolio Standard
 - Renewable Energy Check-off on Utility Bill
 - Requiring long-term contracts for renewable energy
 - Community Wind Projects
- ⚡ Through the Market:
 - Customer Aggregation in Deregulated Markets
 - Industrial Buy, Though in Vertically Integrated Markets
 - Retail Competition

Ideas for Engaging the Customer (Cont'd)

⚡ Through Customer Empowerment:

- Simple interconnection standards
- Net metering – paired with dynamic pricing
- Siting and Permitting
- Renewable Energy Credit Purchase Program
- Tax credits for customer-installed renewable energy
- Loan funds
- Solar leases

ENGAGING THE CONSUMER

**THROUGH THE
UTILITY
PROVIDER**

Renewable Portfolio Standards

- ⚡ Established by statute, law or order
- ⚡ Requires utility to procure a certain annually graduated percentage of load from renewables for a period of years
- ⚡ Often allows utilities to purchase Renewable Energy Credits on the market to meet benchmarks where it is economically more efficient than self-supplying
- ⚡ Often includes penalty payments for non-compliance that are placed in a special fund, for example to promote energy efficiency or advanced renewable technology.

Renewable Energy Check-Off On Utility Bill

- ⚡ Utility offers customers the opportunity to purchase a portion of power needs through a designation on utility bill
 - Percentage available can vary providing customers with the ability to designate how much to pay for renewable energy
 - Customer pays incremental cost for procuring renewable energy unless fossil fuel prices at a particular time are higher than the price of renewable energy

Pros & Cons of Renewable Energy Check-Off

- ⚡ It allows customers to obtain renewable energy in the quantity it desires (based on the utility offering) in an easy manner
- ⚡ The demand for renewables helps expand the market
- ⚡ Good alternative where no RPS, but can be done *in addition to* RPS, however, a good tracking system is required to avoid double counting
- ⚡ Utilities get RECs from the aggregated procurement
- ⚡ The market value of the REC should be subtracted from the price to the customer

Problems to Resolve With Renewable Energy Check-Off

- ⚡ Customer awareness
- ⚡ Sends message to customer that renewables are more expensive even though renewables may not be most expensive supply source in utility portfolio

Requiring Utilities to Enter Into Long Term Contracts For Renewables

- ⚡ Renewable Energy Developers, such as independent wind companies, need financing to build their units (nonrecourse financing) Banks typically want the assurance of a stream of revenues to pay back the loans
- ⚡ Long-term contracts provide the guaranteed revenue streams by setting forth income from sale of renewable energy
- ⚡ Long-term contracts provide price certainty/stability for utility
- ⚡ Utility unwillingness to enter into contracts can create a major barrier to financing, construction and availability of renewable resources
- ⚡ Long-term contracts can produce better prices than short term REC purchase

COMMUNITY WIND

- Wind developers lease land on family farms to construct wind turbines and pay annual leasing fee per turbine
- Wind developer enters into contract with local utility to buy output
- After the cost of the turbine has been fully recovered by wind company or after an agreed to number of years, ownership of wind turbine reverts to farmer
- Creates revenue stream for struggling farmers
- Creates low-cost manner to site wind
- Done in Minnesota

ENGAGING THE CONSUMER

**THROUGH THE
COMPETITIVE
MARKET**

Customer Aggregation in Competitive Markets

- ⚡ Some deregulated states like California, Massachusetts and Ohio, for example, permit customers to aggregate to create a purchasing pool
- ⚡ Aggregation can be through opt-in or opt-out; can be organized by local governments or private retail or consumer/environmental groups for example
- ⚡ The Aggregator can establish a competitive bid for a percentage (1-100%) of power supply to come from renewable energy
- ⚡ Contracts can be for short-term or can result in locking in long-term price

Industrial Buy-Through in Vertically Integrated Markets

- ⚡ Large data centers in Utah wanted access to renewable energy
- ⚡ Utah legislature passed legislation allowing large industrial customer to by-through to the competitive market and procure renewable energy
- ⚡ Customers by-passing the utility sends strong message to utilities to offer this product
- ⚡ Loss of sales for utility if large amount of existing load leaves the system can be an issue
- ⚡ Limited to large customers only

RETAIL COMPETITION

- In deregulated markets, a number of suppliers offer retail customers a renewable energy product
- For example, Community Energy offers PECO customers a variable rate of \$.1039/kwh for a solar/wind product or \$.099/kwh for a wind and water product compared to PECO's \$.1055/kwh rate

ENGAGING THE CONSUMER

**THROUGH
CUSTOMER
EMPOWERMENT**

Interconnection Standards

- ⚡ For non-utility generators and residential customers alike, interconnection standards are critical
 - Requirements must be simple to understand and meet and be reasonable to protect utility system without imposing undue conditions
 - Fees need to be reasonable and not create barriers
 - Timelines for approval must be reasonable so as not to stall project – Deadlines can be imposed through rules

Net Metering

- ⚡ Customers install their own sources of renewable energy to reduce their load on the Utility System
- ⚡ Standard example: residential customer installs solar panels that can typically cut in half the amount of energy purchased from the utility
- ⚡ Net-meters capture how much electricity the customer is buying from the utility; how much electricity the customer is using internally; and how much it is selling back to the utility

Pricing Under Net-Metering

- ⚡ Running the meter in two directions – In most instances the utility measures how many kwh were produced and nets that against how many kwh were purchased from the utility to create a monthly net bill
 - Example: Customer produces 300 kwh but consumes 800 kwh; Customer utility bill is for 500 kwh
 - Example: Customer produces 700 kwh but consumes 500 kwh; Customer receives a credit on the next bill for 200 kwh

Pricing Under Net-Metering (Cont'd)

- ⚡ Another mechanism involves measuring the kwh sold to the utility and compensating the customer based on the utility's generation tariff
- ⚡ Less lucrative for customer because it does not value the kwh produced by utility the same as the kwh produced by customer
- ⚡ Theory is that customer should not be compensated at full rate which includes transmission, distribution and other riders
- ⚡ Example: Ohio

Siting and Permitting

- Mainly an issue for renewable energy developers
- Can be an issue for solar installers when each municipality has different rules/procedures for installing renewable facilities
- Need streamlined statewide standard for small-scale customer renewable energy installations

Renewable Energy Credit Purchase Program

Example: Program negotiated by Ohio Consumers' Counsel (OCC)

- ⚡ Utilities provide one-stop shopping for customers to learn about net-metering, interconnection and the opportunity to sell their RECs to the utility. Prominent utility web page mandatory
- ⚡ The price for the RECs was negotiated between OCC and the utility, approved by the PUCO, then tariffed. (The price was based on the weighted average price of RECs purchased through an RFP in that calendar year. If no RFP, schedule of prices would be agreed upon.)

Renewable Energy

Credit Purchase Program (Cont'd)

- ⚡ Provides a win-win program to help utilities meet their solar energy benchmarks and help customers take more control of their energy use by providing a stream of revenues to aid them and finance their solar installations

Renewable Energy Credit Purchase Program - Example

- AEP program negotiated informally with OCC (not part of a settlement) and paid customers as follows:

| Facility Type | \$ REC / Year |
|--------------------|------------------|
| Solar Photovoltaic | \$ 300 / 2011 |
| | \$ 262.50 / 2012 |
| | \$ 262.50 / 2013 |
| Wind | \$ 34 / 2011 |
| | \$ 34 / 2012 |
| | \$ 34 / 2013 |

Investment Tax Credits

- ⚡ Federal investment tax credits can provide a credit for customers to help offset the investment in renewables
- ⚡ Investment tax credits also help developers/bankers manage the cost of expanding more into the renewable energy arena

Loan Funds

- ⚡ Some states have established loan funds to provide grants and low/no interest loans to customers who want to invest in renewable energy
- ⚡ These funds are sometimes funded through an assessment on utility bills or through penalty payments for a utility failure to meet RPS benchmarks or through assessment on customer bill
- ⚡ Administered by state government agency
- ⚡ Subject to being raided to balance the budget

Property Assessed Clean Energy (PACE) Financing Program

- ⚡ Allows local governments to issue low interest loans to members of the community through municipal bond financing
- ⚡ Customer loans used for renewable energy installations or energy efficiency
- ⚡ Customer pays back loan through property assessment
- ⚡ Loan runs with the property, not customer
- ⚡ In flux due to concerns by Fannie Mae on loan priority

Solar Leases

- ⚡ Alternative to customer-owned generation
- ⚡ Solar leasing company installs and maintains solar installation
- ⚡ Customer pays solar leasing company for energy consumed at a fee that is lower than the utility bill
- ⚡ Solar company pays utility bill but keeps all revenues from net-metering and RECs

Policy Considerations For Proliferation of Custom-Owned Renewables

- ⚡ Smart meters need to be equipped with net-metering capability
- ⚡ California concern – With growing number of net-metering installations, utility sees a decrease in revenues for recovery of fixed cost where meters run in both directions
 - Potential to create a have/have not situation where those without renewable installations cover the fixed utility costs of those with renewable installations.
 - Need to balance social equity concerns without creating fees and disincentives for the development of customer renewable energy

Possible Solutions

- ⚡ Employ Ohio methodology of only crediting generation sales so all customers contribute to fixed distribution costs
- ⚡ Employ smart meters with net-metering capability to reflect true value of customer energy contribution to grid
- ⚡ Continue tax incentives to decrease cost & payback
- ⚡ Employ Renewable Energy Credit Purchase Program
- ⚡ Goal is to make solar financially feasible for most customers

How This Worked Financially

Assume a 3KW unit to meet half the energy needs of a typical household.

| | |
|---------------------------|---|
| 3 KW System..... | \$27,000 (note price is now much lower) |
| Investment Tax Credit.. | (9,000) |
| Customer Cost..... | 18,000 |
| Ohio Loan Fund..... | (9,000) |
| Customer Cost..... | \$9,000 |
| REC Sale..... | 4,500 (over 3 years approximately) |
| Customer Cost..... | \$4,500 |

Note: Revenues from net metering sales would further reduce the cost to the customer.

Policy Considerations for Utilities

- ⚡ Customer-generated or acquired renewable power competes with utility through reduced reliance on traditional utility provided generation
- ⚡ Reduces revenue stream to recover cost of generation investment
- ⚡ Puts unrecovered, not fully amortized cost of generation at risk – excess capacity sold into the market may be at a higher or lower rate than that recovered in rates
- ⚡ Utilities need to also recover revenues for fixed costs

Possible Solutions

- ⚡ Address the throughput incentive to make utility indifferent regarding lost sales from customer purchased renewables
- ⚡ Mechanisms such as Decoupling have been adopted to address lost revenues from energy efficiency and renewables
- ⚡ See RAP publications on Decoupling

Conclusion

- ⚡ Customers can play a significant role in developing the market for renewable energy
- ⚡ The key is to remove barriers to access and financing
- ⚡ Equally important is to consider impacts on utilities and nonparticipants in renewable energy to assure utility system security and fairness in rates paid by all consumers

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org



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