A Level Playing Field For All Resources

21 September 2015
Hong Kong
Discussion Forum - Competition in Electricity Markets

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Introduction

• Important to create conditions to allow all resources to “compete” on an equal footing, including:
  – Traditional supply-side resources
  – Energy efficiency resources
  – Distributed resources.
• Big potential benefits.
• However, it won’t “just happen.”
• Policymakers and regulators need to work to develop appropriate regulatory structure.
Model of the Power Sector: Traditional

Source: HEI
Model of the Power Sector: Modern

Distributed Generation Resources

Demand Response

Energy Efficiency Resources

Source: HEI
Outline

1. Energy efficiency as a resource (or “fuel”) with many benefits
2. Role for utilities in mobilizing energy efficiency resources
3. Integrated resource planning
4. Incentive regulation
Energy efficiency as a resource (or “fuel”) with many benefits
Levelised Costs of Electricity Resource Options in the United States

Source: Lazard Ltd, 2013
A “Layer Cake” of Benefits from Electric Energy Efficiency

**Utility System Benefits**
- Power Supply
- T&D Capacity
- Environmental
- Losses and reserves
- Risk
- Credit and Collection

**Participant Benefits**
- Other Fuels
- Water, Sewer
- O&M Costs
- Health Impacts
- Employee Productivity
- Comfort

**Societal Benefits**
- Air Quality
- Water
- Solid Waste
- Energy Security
- Economic Development
- Health Impacts
Costs and Benefits of Implementing Energy Efficiency in Vermont

Note: Values are expressed as levelized USD/MWh.


Note: Externality values are drawn from Figure 11-9, *Implementing EPA’s Clean Power Plan: A Menu of Options*, NACAA. Graphic based on IEA (2014).
Total Resource Cost Test to Measure Energy Efficiency

• Most commonly used cost test.
  – Goal is to measure all costs and all benefits;
  – Energy benefits
  – Non-energy benefits
International Energy Agency 2014 Report

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States With Energy Efficiency Resource Standard (EERS)
2011 and 2012 Electric Efficiency Savings and Targets by State

% of Retail Sales

2011 Target
2012 Target
2011 Savings
2012 Savings

MA VT AZ RI IA MN CT ME OR HI WA NY MD CO CA MI PA NM OH IL IN WI AR NC* NV* TX Total
Energy Efficiency Obligations in the European Union

Note: Red indicates Member State is committed to implementing an EEO scheme; gray indicates Member State is adopting “alternative policies.”

Utility EE Funding

• Energy efficiency funding comes from customer electricity bills; similar to power plants.
  – United Kingdom: the costs of meeting the obligations are considered a “cost of doing business”; reflected in the prices charged to end-use customers.
  – California:
    • About 25% of utility energy efficiency portfolio budgets is funded by a “public benefits charge” that appears as a separate item on customer bills.
    • Remainder is funded through utility resource procurement funds — i.e., the same funds (paid by end-use electricity consumers) that would otherwise be used to pay for conventional power stations and grid expansion.
Growth of the US ESCO Industry

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Integrated Resource Planning (IRP)

• Around the world, as in Hong Kong, regulatory agencies are heavily involved in power sector planning.
• All of these places are grappling with the question of how to mobilize adequate low-emissions resources as well as sufficient flexibility to support variable renewables.
• “Best practice”: power sector plans that consider a full range of available resources – including EE and RE – and a full range of costs and benefits, including the social (“external”) costs of emissions.
Integrated Resource Planning (IRP)

• Goal of IRP is to identify least-cost resource mix (or “fuel mix”), including EE resources and RE resources.

• Should include:
  • Detailed analysis and credible modeling of projected growths in demand and projected costs of the various options for meeting that demand.
  • An open and transparent process that allows access for all stakeholders to this data is critical to the success of the process and goals.
  • Consideration of many possible resource mixes, in order to identify best option.
Northwest Power and Conservation Council Modelling and Planning Process

Case Study: Resource Cost Curve from an Actual IRP

Note: “conservation” is energy efficiency.

Source: NW Power and Conservation Council.
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Incentive Regulation

• How to mobilize utilities for energy efficiency?
• Many years of experience in various parts of US with “performance-based regulation.”
• Basic idea is to change the utility business model by changing the way utility earns revenue.
• Hong Kong has some elements of this, but there are additional things to consider.
Incentive Regulation

• Traditional regulatory practice creates an environment in which the utility is able to earn more profit by selling more electricity.
• Because of this, the utility is essentially in competition with the customer, as well as with private sector companies that provide energy replacing services, to supply the energy needs of that customer.
• This can greatly impede the ability of the marketplace to achieve the optimal least-cost solution for energy services.
• Growth of distributed renewables compounds the challenge of net lost distribution revenues for utilities.
Incentive Regulation

Strategies include:

• Revenue regulation (‘decoupling’). Goal is to break the link between utility kWh sales and utility revenue.

• Incentives/penalties for meeting/missing targets and obligations.
Figure 8: Decoupling Mechanisms in the United States

AUGUST 2013

Legend
- Adopted Gas Decoupling (22)
- Pending Gas Decoupling (3)
- No Gas Decoupling (26)
- Adopted Electric Decoupling (16)
- Pending Electric Decoupling (3)
- No Electric Decoupling (32)

Source: NRDC, http://www.nrdc.org/energy/decoupling
Case Study: Developments in Mainland China

Some promising developments:
• “Efficiency Power Plants” (能效電廠) under construction.
• Obligation on grid companies to meet EE targets since 2011.
• New power sector reform initiative includes new approach to grid company regulation.
  • Revenue regulation is being implemented for grid companies. (Known as “transmission and distribution price reform 輸配電價改革”)
  • Potential to significantly change gridco incentives vis-à-vis EE and DG.
  • Positive incentives for grid company EE performance to be piloted.
• Power sector reform also raises possibility of improvements to power sector planning.
• Targets for distributed renewable energy.
Conclusions and Suggestions for Hong Kong

• EE and distributed DG can lower costs, risks, and environmental damage... but won’t “just happen”. Need new approaches for planning, policy, and regulation.

• Relevant regulatory approaches have been developing over decades and are at the center of policy discussions in the US, EU...and mainland China.

• Planning: “fuel mix” options should consider wide range of options. In particular, the mix should include EE resources and distributed RE.
  • This will serve to contain cost and risk (such as the risk of fuel price fluctuation).

• Power companies in HK can play a productive role in promoting EE.
  • Policymakers will likely first have to pay attention to the incentives faced by the power companies - and consider mechanisms such as revenue regulation.
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 sector. 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.raponline.org

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