Integrated Resource Planning

Presentation to Minnesota Sustainable Growth Coalition

Regulatory Assistance Project

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About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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Today’s Major Points

• Welcome
• Introduce the Regulatory Assistance Project (RAP)
• Utility Regulation Basics
• Why is Resource Planning Important?
• IRP – A Quick Look at Structure and Elements
• The Public’s Role
• Concluding Thoughts
Medieval England Accommodations

- Business “affected with the public interest”
- Prices regulated due to monopoly stature

New Inn, Gloucester, 1454
US Origin: Munn v. Illinois (1877)

- Grain elevators charging monopoly prices to farmers
- Supreme Court ruled “affected with the public interest” and subject to price regulation
Series of Later Court Decisions

- Prudent investment rule
- Utility entitled to a return comparable to companies with similar risks
- “Just and reasonable” standard
  - No class of customers shall be unduly discriminated against; tied to cost of service
- Intervenors have limited rights
Roles of Utilities

- Provide service to anyone who requests it
- Adhere to strict safety standards
- Adhere to reliability standards
- Provide adequate service
- Be responsive to customer needs
Investor-Owned Utilities (IOUs)

- ~10% of US utilities, 65% of customers
- Privately owned, publicly-traded (usually)
- Profit-making enterprises, financed by shareholder equity and bondholder debt
- Economically regulated by state public utility commissions (PUCs)
- Examples: Duke Energy Carolinas, Mississippi Power, Southern California Edison
Electric Membership Cooperatives

- Mostly rural, 14% of customers
- Owned by members, not-for-profit
- Governed by Board of Directors elected by the members
- Less (or no) PUC oversight – varies by state
- Examples: Jackson (GA) EMC, Northern Virginia Electric Coop, Delta Montrose Electric Association (CO)
Public Power Utilities

- 12% of customers
- Owned by taxpayers, not-for-profit
- Governed by locally elected officials or their designees
- Less (or no) PUC oversight – varies by state
- Examples: Sacramento Municipal Utility District (CA), Orlando (FL) Utilities Commission, Burbank Water and Power (CA)
Asset Ownership

• Vertically Integrated Utilities
  • Own generation, transmission, distribution
  • Serve retail customers

• Generation & Transmission Utilities (G&Ts)
  • Own generation and transmission
  • Sell power at wholesale to other utilities
  • No (or few) retail customers

• Distribution Utilities
  • Own distribution, sometimes transmission
  • Buy power from other utilities or from markets
  • Serve retail customers
Segments of Electric Service

Wholesale vs. Retail Segments of Electricity Service

1. Generating Station
   Electricity is typically generated by a steam- or hydro-driven turbine at the power plant.

2. Step-Up Transformer
   The power is then ramped up to high voltage for long-distance transmission.

3. Transmission
   Next, a series of high voltage lines transmit the electricity through the power grid.

4. Step-Down Transformer
   Power is then reduced to a lower voltage for use in homes and businesses.

5. Subtransmission Customer
   The electricity then passes through a series of switches to distribution lines.

6. Customers
   Power is then delivered to customers via local lines.

Source: NY ISO
Competitive Wholesale Power Markets

Integrated Resource Planning

https://www.havi.com/supply-chain-management/planning
Why is IRP important and where does it come from?

- Late 1970’s
  - Huge cost overruns on coal and nuclear units
  - Delays in in-service dates created shortages
  - Price increases made energy efficiency an attractive option

- 1979 Three Mile Island accident
  - 60 nuclear units canceled
The Roaring 60’s and the Scary 70’s

- Load Growth
- + Inflation

Chart – historic CPI inflation United States (yearly basis) – full term
Result: Capital Overruns, Big Rate Increases
Integrated Resource Planning

States with Integrated Resource Planning or Similar Processes

- States with an IRP rule and filing requirement: Blue
- States with a filing requirement for long-term plans: Green
- States developing or revising an IRP rule and filing: Brown
- States without filing requirements for long-term plans: White

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IRP-Related Factors to Consider
Energy Resource Decisions are About Benefits, Costs, and System Risks

There are varied risks to consider in system resiliency and reliability:

• Ability to serve peak load
• Ability to serve load (peak and otherwise) due to non-performance of generation or transmission
• Failure of generation or transmission due to extreme weather or malicious acts
Power Sector & Public Health
US Power Sector Air Emissions

Source: U.S. Energy Information Administration, Monthly Energy Review
Additional Electricity Sector Public Health/Environmental Regulations

- Greenhouse Gas Emissions
- PM2.5 Revisions
- Coal Combustion Residuals (Ash) Rule
- SO2 Revisions
- (Water) Effluent Limitation Guidelines
- 316(b) Cooling Water Rule
Other Changes in the Electric Industry
The Role of the Consumer in Grid Modernization

- Typical utility customers traditionally passive, not active, recipients of electric service
- Inhibits customer participation in DER and dynamic pricing, requiring significant change in customer understanding of how to use electric service
Customer Generation

- Wind, PV, some CHP
- Customer enthusiasm, potential large supply
Innovative & Efficient End Uses—Electrification is Underway

Photo credits: EPA Energy Star / Cassandra Profita/OPB/EarthFix
Integrated Resource Planning – Structure
Resource Plan—Stat. § 216B.2422

• Resource options to meet needs of customers over a forecast period

• With an explanation of supply and demand circumstances associated with each resource that would be used

• Existing, refurbished, new plant and equipment, contracts for power, controlled customer loads, and conservation
Resource Plan - cont.

- Explains costs, opportunities, barriers associated with meeting GHG goals
- Incorporates PUC-developed environmental costs associated with generation resources, and
- Contains a preference for renewable resources:
  - Public interest presumption against new or refurbished non-renewable energy facilities
- § 216B.2425 – Similar planning criteria for transmission and distribution systems, and separate distribution system planning docket
Aspects of IRP –

What do we need to know in order to plan?
Load Forecast
Fuel-Cost Forecast
Cost-Effectiveness Analysis
Existing Resources
New Generation Resources
New Transmission Resources
New Distribution Resources
New Energy Efficiency Resources
New Demand Response Resources
New Technologies
NOW--With all that Information? You Integrate Supply and Demand

Large utility IRPs include significant computer modeling for portfolio optimization
Integrating Supply and Demand

- Risk models account for unknowables, such as economic conditions, fuel costs, and weather
- Hundreds of resources may be examined for cost and load shape
Who’s involved?

Public Involvement

- Utility customers know things the utility does not know…and that its consultants do not know.
- Public involvement early in development of an IRP yields many benefits:
  - New ideas
  - Sense of what customers want
  - Sense of their willingness to sacrifice
  - Rankings of priorities: cost, environment, equity, and reliability
Public Involvement

- Public review of RFP responses before selection of contractors to conduct IRP
- Kick-off meeting
  - Immediately followed by stakeholder meetings
- Written input early enough to influence what is examined, and how it’s examined
- Stakeholder advisory group?
- Ability to review drafts before they solidify
- Public meetings prior to adoption of a plan, strategy, or policies
Does the IRP articulate a short-term action plan? (2–5 years)

Perhaps the most important element of an IRP:

- What existing resources will we retire?
- What new resources can we use?
- What EE and DR programs will we launch?
- What will we ask customers to do differently?
- What options will we study for the next cycle?
- How will we measure our success?
Remember

- Resource choices are not made simply on basis of costs (or prices); *lower-cost* resource is not always the *most valuable* resource

- How do we *determine the value* to us?

- *Resource planning* is the *public process* by which resource options are aggregated and compared to meet demand for service to produce highest value for lowest cost
Concluding Thoughts

• An *integrated* analysis is the point of IRP
• It’s a *public* process
• Use consistent economic assumptions that *evaluate* both *supply and demand-side* options to meet the utility’s needs at the best combination of cost, quality, and reliability
  • may not be least-cost plan
  • may not be lowest environmental impact
  • probably should not compromise reliability
  • might come out differently from what you expect
For More Information

- Preparing for EPA Regulations: Working to Ensure Reliable and Affordable Environmental Compliance, *Dave Farnsworth*, 2011
Thank you