Summary of IRP Presentations from the Resource Planners Forum in Portland, OR

WIEB and Center for the New Energy Economy

June 13-14, 2018

https://westernenergyboard.org/wp-content/uploads/2018/06/06-13-14-18-wieb-cnee-resource-planners-forum-agenda-final.pdf

Presentation by Jeff Blend
Montana Energy Office at DEQ
July 31, 2018

Presentations Covered

- “Exploring the Relationship Between Planning and Procurement in Western U.S. electric utilities”-- Juan Pablo Carvallo, LBNL

- “Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”—Andrew Mills, LBNL

- “DER Planning at PGE”, Josh Keeling, Portland General Electric

- “Evaluating Battery Storage Technologies and Their Role in Integrated Resource Planning”—Mike Sheehan, Tucson Electric Power

HIGH-LEVEL IRP BACKGROUND FROM ADVANCED ENERGY ECONOMY (AEE)

https://blog.aee.net/understanding-irps-how-utilities-plan-for-the-future

- IRPs first started in the 1980s to better integrate energy efficiency into utility planning and respond to the unexpectedly high costs of developing nuclear plants and the oil embargoes of the 1970s
- Purpose is to facilitate utilities ability to meet future demand in a cost-effective way while ensuring reliable service
- Today, new technologies, changing market conditions, and new environmental regulations are making IRPs change with the times
- Today, an IRP is a roadmap to meet forecasted energy demand using both supply and demand side resources
- Today, 33 states - either by state statute or regulation - require utilities to file publicly available IRPs or their equivalent with their PUC. Most state PUCs have authority to review plans and reject them if they feel certain requirements have not been met
- IRP requirements and scope vary by state, but most commonly the planning horizon is 20 years, with a detailed implementation plan for the first few years and a required update every two to three years.

Exploring the Relationship Between Planning and Procurement in Western U.S. Electric Utilities

Juan Pablo Carvallo, Lawrence Berkeley National Laboratory

“Exploring the relationship between planning and procurement in Western U.S. electric utilities”

- IRP seeks to assure regulators and the public that utility investment decisions, given uncertainty, are as cost-effective as possible

- In principle, IRP should lead to affordable and reliable electricity service through cost-effective and risk managed resource acquisition
  - Example: The objective of SDG&E’s long-term planning process is to provide reliable electric supply to customers at the lowest possible cost and meet the state’s clean energy goals

- However, this premise has never been tested

“Exploring the relationship between planning and procurement in Western U.S. electric utilities”

- How do planned acquisitions compare to actual procurement?
- Is it important that planned and procured capacities and technologies are similar (or different)?
- If planned and procured capacities are different, then what is the value of IRP?

“Exploring the relationship between planning and procurement in Western U.S. electric utilities”

Study Results

- More wind and less coal than originally planned (2005-2015)
- A key objective of planning is to evaluate and manage uncertainty
- Retail choice is a major source of uncertainty for the utility (Community electricity aggregation)
- DSM programs performed better than anticipated

“Exploring the relationship between planning and procurement in Western U.S. electric utilities”

Study cont…

- Changes in RPS and DSM requirements explain higher acquisition of renewable resources and reduced load growth

- Connection between planning and procurement reflects regulatory preferences, but it is not explicit:
  - Nevada requires a connection
  - Washington/Oregon/Idaho do not

“Exploring the relationship between planning and procurement in Western U.S. electric utilities”

- There are calls to further increase complexity of IRP to include distribution system planning
  - This complexity may involve higher spatial resolution, subhourly representation, and increased risk analysis for preferred portfolio selection
  - Authors believe complexity should be balanced with transparency
  - May be better to move to a simpler, but “living” planning process
- The Resource Planning Portal (RPP)
  - https://resourceplanning.lbl.gov/login.php

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

Joachim Seel, Andrew Mills, Ryan Wiser--Lawrence Berkeley National Laboratory

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

- Motivating question is whether certain electric-sector decisions that are made based on assumptions reflecting low VRE levels will still achieve their intended objective in a high VRE future.

- Describes how various decisions may change with higher shares of VRE

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

CONCLUSIONS

- VRE additions enable modest firm capacity and strong non-VRE generation reduction

- Growth in VRE can decrease overall average wholesale market prices by $5-$16/MWh

- VRE are changing timing of cheap/expensive electricity and regularity/predictability of patterns:
  - Growth in frequency of very low priced periods (up to 20% of all hours in ERCOT)
  - Changing diurnal patterns especially with high solar
  - Increase in irregularity of wholesale prices especially with high wind

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

Conclusions-Continued

- Lower average energy prices will increase relative importance of rising capacity and ancillary service prices

- Magnitude and importance of these shifts depends on response of other market participants (changing aggregate load shapes, DR participation, storage)

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

Demand Side Asset Considerations

- Shift emphasis from commercial office AC to residential and street lighting
- Electric hot water heaters (with DR capabilities) may be better than gas in high wind generation areas
- Increased value in vehicle-2-grid and, with high solar, day-time charging infrastructure (i.e. at commercial locations rather than residential)
- Promote research on other processes that can use cheap electricity over short periods (e.g., air separation, oil refinery, pulp and paper, irrigation pumping, recycle smelting)

“Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making”

Appendix II: Supply-Side Asset Implications

- Increased role for reciprocating engines in high VRE future

- Increased role for storage, with duration depending on VRE type

- Wind and Solar: Shift location to areas that are better aligned with high-priced hours, adopt south-western orientation of PV modules, taller wind turbine towers with lower specific power ratings, colocation with energy storage

Regional Utility Efforts

Portland General Electric-“DER Planning at PGE”, Josh Keeling

- In a deeply decarbonized future, flexibility in the electricity system is provided by both generators and loads
  - Flexible Load
  - Energy Storage
  - PGE building out Integrated Operations Center (IOC) to monitor, control, optimize, and safely operate PGE's distribution system
  - Building the Virtual Power Plant to meet at least 6% of peak load by January 2021-- >77 MW flexible loads, 38 MW of energy storage, 135 MW standby generation
- Flexible EV charging and flexible water heaters show particular promise under the electrification pathways

Evaluating Battery Storage Technologies and Their Role in Integrated Resource Planning”—Mike Sheehan, Tucson Electric Power

- In January 2018, Arizona Corporation Commissioner (ACC) Andy Tobin proposed the Arizona Energy Modernization Plan (AEMP).
- This modernization plan sets a goal to target a 80% clean energy standard (including nuclear and energy efficiency) by 2050.
- The plan has provisions for energy storage, electric vehicle infrastructure, clean peak resources, and energy efficiency.
- The AEMP also has a bio-forestry goal to develop biomass facilities which are sourced from Arizona’s forests to mitigate future wildfires.
- The proposal targets a statewide goal of 3 GW large scale energy storage projects by 2030.
- The proposal will take 12 to 18 months to finalize through the ACC’s Integrated Resource Planning rulemaking process.

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