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Energy Efficiency: The Benefit of Treatment as a Resource in Integrated Resource Plans

August 2015

Executive Summary

Overview

- Energy efficiency (EE) programs are becoming more prevalent in the utility industry as an environmentally friendly option
- In this document, we explore how EE is being recognized as a serious option in long-range resource planning
 - Historical drivers behind the implementation of EE programs and the traditional treatment of this resource in IRPs
 - New factors behind the more prevalent use of EE that justify a more rigorous modeling of this resource in IRPs
 - Impacts on importance of EE when viewed vs. treated as a demand forecast assumption
- This document is second in a series of two around the topic of the use of new generation resources, like EE, in Integrated Resource Planning (IRPs):
 - Best Practices in Integrated Resource Planning

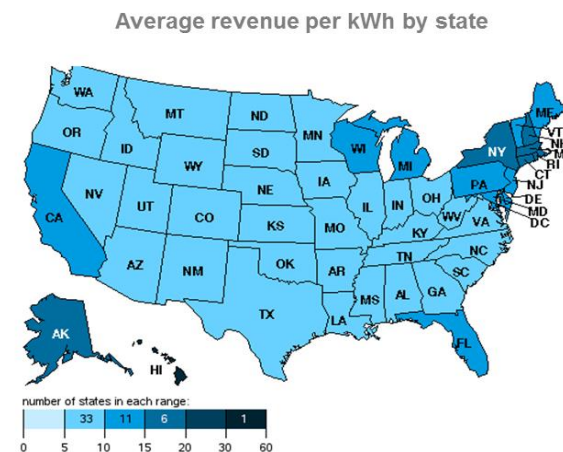
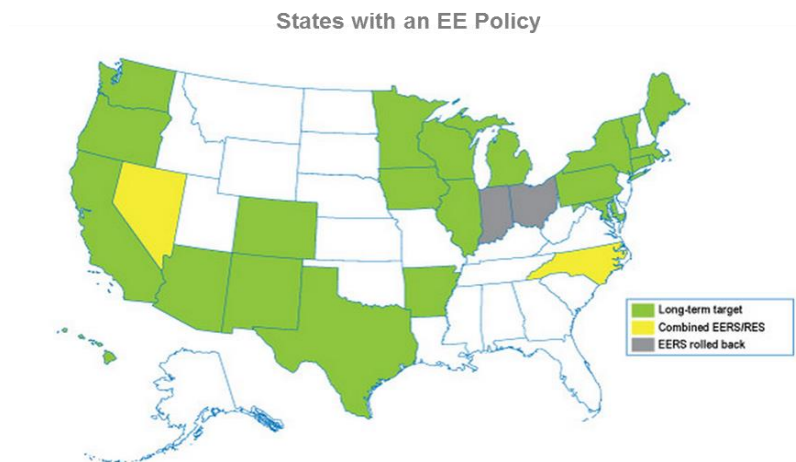
Key Conclusion

- EE can have a greater role in integrated resource plans if it is treated as a resource and optimized as part of the portfolio rather than treated as an assumed offset to demand

ScottMadden has vast experience assisting utility clients with improving their analysis and understanding the potential impacts that distributed energy resources like EE could have in their generation portfolio

Historically, Energy Efficiency Use by Utilities Has Been Largely Driven by Externally Driven Policies...

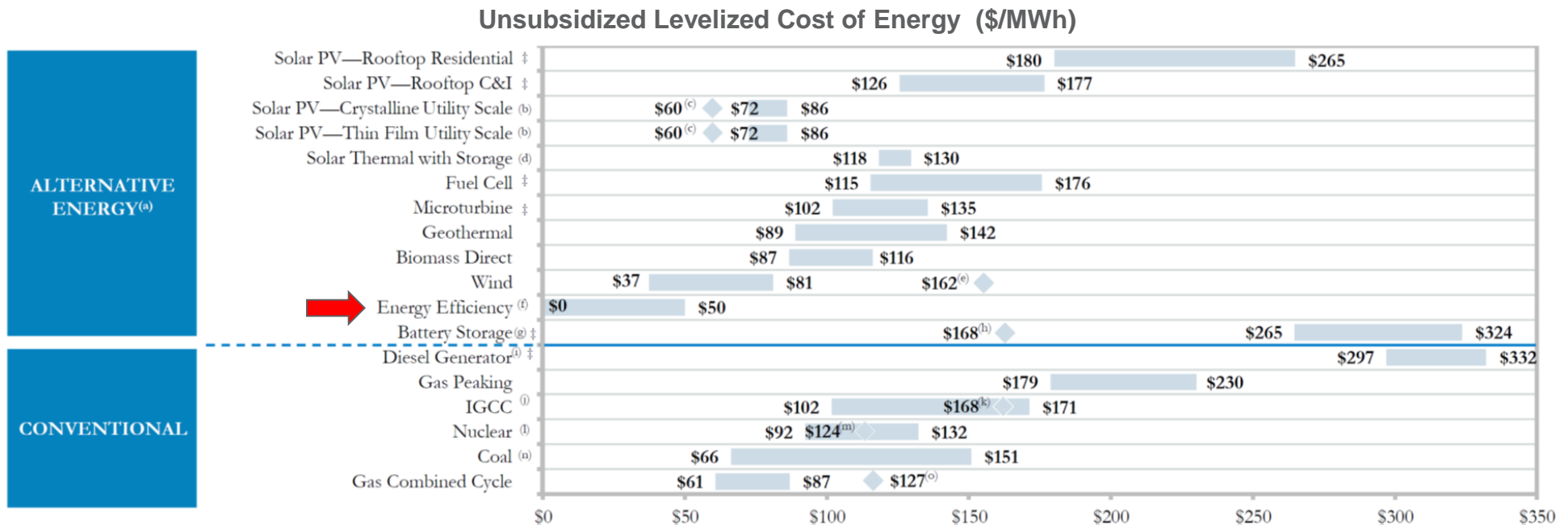
- EE programs have existed for many years, generally directed at industrial customers and, in some states with a high cost of electricity, targeting retail customers as well
- The primary drivers behind the penetration of EE have been:
 - State policy: In general EE achievement is higher in areas with Energy Efficiency Resource Standards (EERS)
 - Rates: High costs make EE more attractive
 - Technology and implementation cost



- As shown above, some of the leading states in EE are CA, MN, MA, and NY, where there is a combination of mandated EE targets and high cost of energy
 - Targets are typically expressed in terms of an Annual Energy Savings Rate (= $\frac{\text{Incremental Annual Energy Savings}}{\text{Prior Year Retail Energy Sales}}$)
 - Strongest EERS are in MA, RI, and VT targeting an annual energy savings rate of about 2.5%
- Southeastern states, with less policy support, have seen less EE penetration

...However, Energy Efficiency Can Be A Very Competitive Resource on Its Own Merit

- Traditionally, EE is incorporated into IRPs as an offset to demand forecasts, usually at an assumed level consistent with current policy
 - EE is traditionally treated as an “input” to IRP limited to current requirements
- However, EE can be viewed as a resource used to serve demand
 - As the graph below shows, EE compares favorably to other generation resources on the basis of unsubsidized levelized cost of energy*
- As a consequence, an increased use of EE may be expected if utilities include EE on equal footing in the IRP evaluation of their optimal generation portfolios



*Note: While EE can be an important way to serve demand as part of the IRP portfolio, EE cannot be viewed as a perfect substitute to other forms of capacity

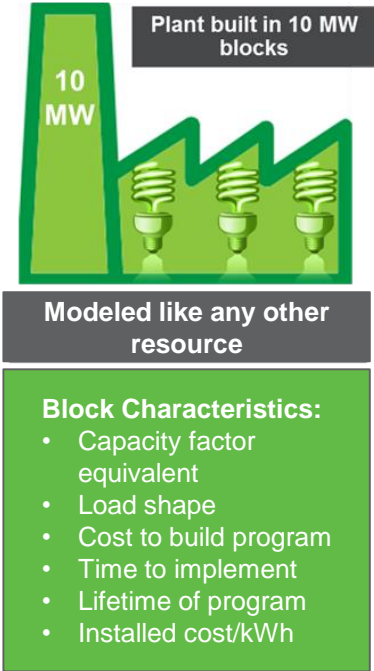
Sources: Lazard 's Levelized Cost Of Energy Analysis – Version 8.0, September 2014

Some Utilities Are Using New Approaches in Their IRPs to Fairly Evaluate the Use of EE

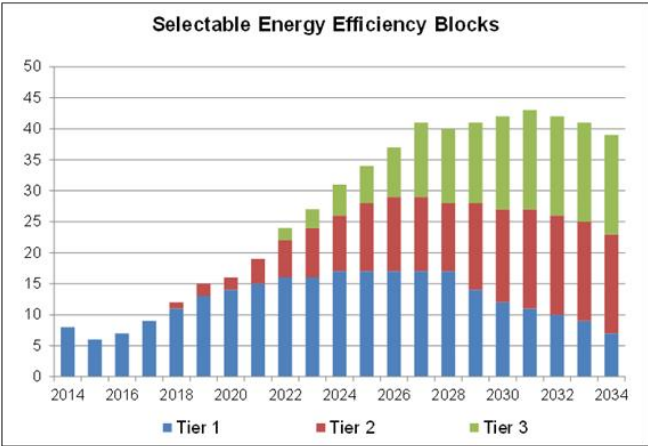
A few utilities are starting to model EE resources as selectable options competing on equal grounds with the rest of the resources. These include: TVA, Puget Sound, and NYSGE.

Example: Modeling of EE in TVA's 2015 IRP

- EE was modeled as blocks of 10 MW plants selectable by the model
- Three primary sectors were considered: residential, commercial, industrial
- The number of blocks available at any given time was based on TVA's market studies and experience in previous campaigns



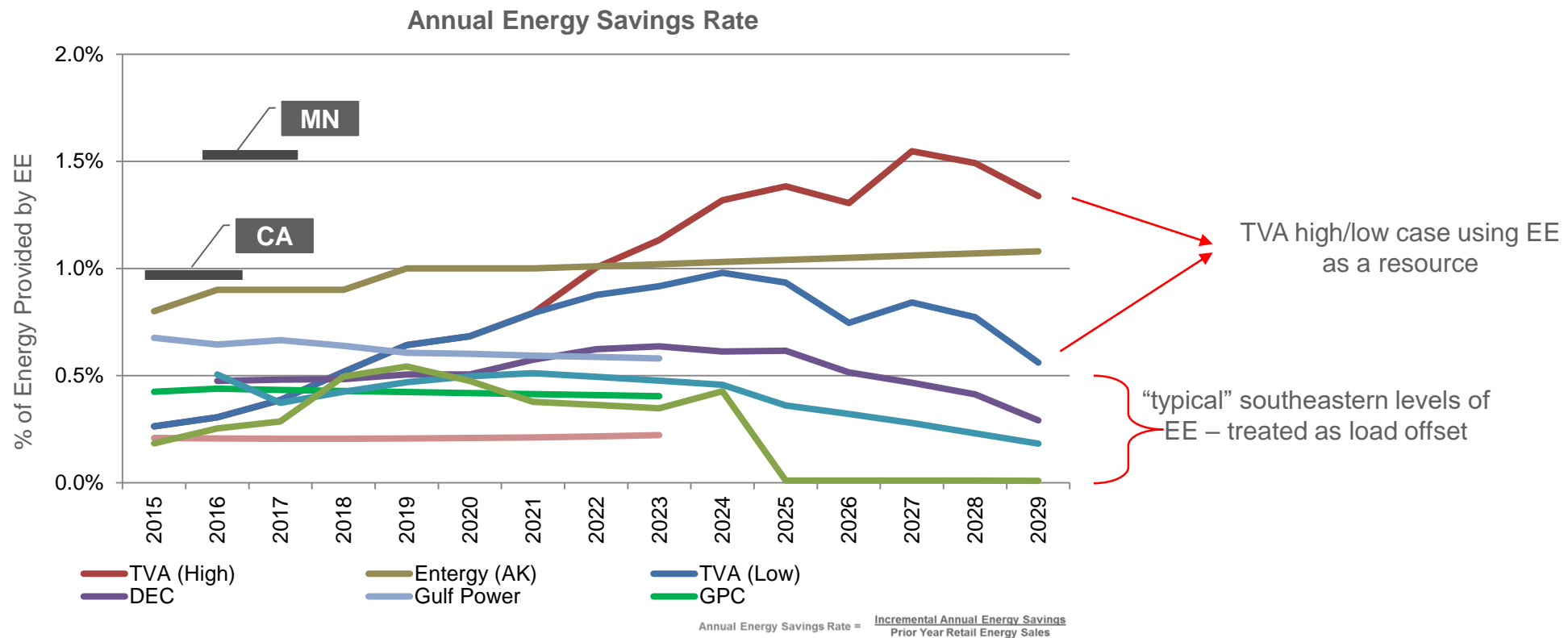
Block Parameters	Residential	Commercial	Industrial
MW per Block	10	10	10
GWh per Block	50	59	72
Ramp Rate (Yr 1 - 5)	25%	25%	25%
Ramp Rate (Yr 6 - 15)	20%	20%	20%
Ramp Rate (Yr ≥ 16)	15%	15%	15%
Max Blocks per Year	23	12	8
Lifespan Tier 1	17	15	12
Lifespan Tier 2	13	13	10
Lifespan Tier 3	13	13	10
Initial Cost Ranges (Millions)	\$20.7 to 38.0	\$11.6 to 33.4	\$11.5 to 33.0



Source: TVA

EE Can Have a Greater Impact When Included as a Resource in an IRP

- A comparison of EE in IRPs among southeastern utilities indicates that TVA's approach to modeling of EE as a resource can yield:
 - Significantly higher percentage of energy provided by EE than southeastern states with low policy support
 - Comparable levels to states with high rates and the most aggressive policy targets (CA, MN, and AK)



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