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The Treatment of Energy Efficiency in Integrated Resource Plans:

A Review of Six State Practices

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1. Acknowledgements

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2. Foreword

RAP has been writing about and collecting information on integrated resource planning (IRP) for twenty years. We at RAP have always felt that a comprehensive, analytic, and transparent process to assess utility resource choices would be in the best interest of consumers and that regulators would credit practicing utilities, with a sound IRP as a foundation, with making reliable decisions. RAP staff generally have noted that energy efficiency as a power system resource among other (mostly supply) resources appears under-used compared with its value to customers and society.

In this paper, RAP extracts information from our work in six states in the U.S. to examine state practices for integrated resource planning and energy efficiency. We examined how these state practices work together and are in some cases converging. Our analysis shows that there remain divergent practices on how IRP or a similar planning process is implemented, but that in many states there is regulatory attention to making changes to these IRP processes. For energy efficiency to be an effective power system resource, practices that integrate it into resource planning will be necessary. Our research indicates that those practices exist, but are not widely-used.

As an aside, this work does not consider a broader version of planning that considers the full integration of transmission and distribution (T&D) investment for reliability and congestion management and thus does not consider state practices integrating energy efficiency into these practices. This area was the subject of a RAP report from earlier in 2012.[1] While this offers the prospect for further work, researchers might hope for more positive examples of energy efficiency and its cousins, demand response and distributed generation used for T&D planning purposes before embarking on such a project.

Richard Sedano
RAP Principal and US Programs Director

[1] Sedano & Neme (2012).

3. Introduction

The purpose of this paper is to investigate the interrelationship between a state's treatment of energy efficiency and its Integrated Resource Planning ("IRP") process.[2] IRP is a process that identifies options for meeting customers' anticipated needs for electric service in a way that addresses multiple objectives that may be imposed by legislation, Public Utility Commissions, environmental concerns, or customer concerns. In theory, this process puts all options on the table, evaluates them equally against a set of certain objectives, and chooses a portfolio of resources that best meets those objectives. Again, in theory, all resources, from both the supply side and the demand-side, would receive comparable treatment in the IRP process.

Energy efficiency is an important resource, often the lowest cost resource available to planners; it mitigates a variety of risks, such as the risk of impending carbon legislation and other environmental regulations affecting air and water quality; energy efficiency brings multiple benefits in addition to offsetting energy consumption, such as relieving stress on and deferring required investments into transmission and distribution systems; further, energy efficiency can be acquired in a manner that mirrors the addition of supply side resources (i.e., as an Energy Efficiency Power Plant[3]). Given these values, it would make sense for planners to treat energy efficiency like any other resource in the IRP. Doing so would allow energy efficiency to compete dynamically for utility investments, just like other resources do.

To examine the interrelationship of energy efficiency and IRP processes, we reviewed practices in six geographically diverse states with different electricity market structures. Our research into the practices of these six states uncovered only one utility that engages in a process where energy efficiency is treated comparably to supply side resources within the IRP itself. The rest of the utilities had efficiency program goals set by some other process and imported these goals into the IRP process. This is not to say that the goals set by these other states were not influenced and informed by the IRP process. In fact, it is quite the contrary. The tools and analysis that are used for IRP proved to influence how the goals for these utilities were set and how those goals fit into the objectives of the IRP process. This paper is not intended to describe best practices but to illustrate the diversity of activities and goals present in the states.

It is not hard to see why energy efficiency has been treated differently than other resources in IRP. Energy efficiency is oftentimes less costly than the other available resources. By

[2] For the purposes of this paper, IRP is a broadly defined term encompassing other planning processes and exercises that are functionally about resource investment and integrated analysis of alternatives, even if it may not be strictly defined as an IRP. "Whether a commission employs integrated resource planning or integrated environmental-compliance planning, reviewing investments in an "integrated" manner is the key… ." Lazar & Farnsworth (2011).

[3] See, for example, Regulatory Assistance Project & The Earnest Orlando Lawrence Berkeley Laboratory's China Energy Group. (2010).

strict standards, it should be acquired as quickly as possible and before any other resources. However, there are practical and financial considerations governing the speed at which energy efficiency resources can be deployed. Programs can only be ramped up at a certain rate due to market acceptance constraints, upstream capacity for product development and know how, and allowing for the adaptation of the utility business model, among other reasons.[4] Moreover, while rates go up and bills go down, the rate impacts can be difficult for consumers to manage, and they can become a focus of political attention. So while IRP analysis can determine a potential for energy efficiency, and IRP analysis can determine cost effectiveness of programs and measures, other considerations and other objectives often dictate the pace of energy efficiency acquisition.

The question of pace – how quickly a certain amount of energy efficiency is pursued – then becomes more of a policy decision than a resource acquisition decision. As states have confronted this, they have developed differing policy responses to the issue. In some states, the legislature has set a level of energy efficiency acquisition that clearly establishes state objectives. In other states, Commissions have interpreted the legislative objectives to be goals or, in some cases, minimum levels of achievement. In yet other states, Commissions have set energy efficiency program levels, defined them as being consistent with state policy, and ordered utilities to achieve those goals. Finally, in some states utilities have set their own objectives and provided justification to the Commission supporting their decision. However, in all cases, there is a thread of IRP logic and analysis that informs such a decision. The translation of the IRP analysis to a specific numeric goal in legislation or in a Commission order is not always obvious, but the trail is there.

[4] See, for example, Ungar, et al (2012) and National Action Plan for Energy Efficiency (2008).

4. Analysis of State Practices

In the preparation of this paper, we reviewed energy efficiency and IRP practices in utilities from Arkansas, Colorado, Georgia, Idaho, Ohio, and Oregon. These states were chosen primarily based upon geographic diversity, but we also attempted to reflect the diverse nature of today's electricity markets in terms of whether the state allows competition at the retail level, the wholesale level, or both. Our research relied upon statutes, administrative regulations, Public Utility Commission case records, utility resource plans, and interviews with Commission or Consumer Advocate staff.[5]

For each state, we reviewed their authority for and treatment of energy efficiency in the planning process. We also reviewed the relationships between energy efficiency potential studies and resource planning, in an attempt to see how potential studies relate to the setting of energy efficiency savings targets. We also looked at whether states considered the risk-mitigating effects of energy efficiency.

4.1 Oregon

In Oregon, all nonresidential customers of the state's two largest electric utilities can choose a competitive retail electricity supplier, but there is no organized, competitive wholesale electricity market.

Senate Bill 1149 (1999) transferred administration of energy efficiency programs for the two largest regulated electric utilities[6] to an independent nongovernmental organization overseen by the Oregon Public Utility Commission. The Commission established the Energy Trust of Oregon to fulfill this role. Its programs are funded primarily by a public purpose charge on retail customer bills. Senate Bill 838 (2007), Oregon's renewable portfolio standard law, allows utilities to file for Commission approval of incremental ratepayer funding for cost-effective energy efficiency.[7] The Commission approves annual performance benchmarks for the Energy Trust, including savings goals which are informed by energy efficiency potential studies.

The Oregon Commission established integrated resource planning for all regulated utilities in Order No. 89-507 (1989) and updated guidelines and requirements in Order Nos. 07-002 (2007)[8], 08-339 (2008, treatment of environmental costs) and 09-041 (2009 rulemaking). The Commission mandates a least-cost planning regime, but that does not mean an exclusive focus on cost. The Commission explicitly defines this process to be one that identifies resources that provide the best mix of cost and risk. Utilities must evaluate all known demand-side resources as part of the planning

[5] A list of the sources relied upon is contained in 6. Appendix A: Sources.

[6] Pacific Power and Portland General Electric together account about two-thirds of statewide electricity sales and serve three-quarters of Oregon's retail electric customers. A small portion of Eastern Oregon is served by Idaho Power, which administers its own energy efficiency programs.

[7] Except from customers using more than 1 average megawatt annually at a site.

[8] As corrected by errata Order No. 07-047.

process, on a consistent and comparable basis with supply side resources.

The Commission acknowledges IRPs filed by utilities that meet procedural and substantive requirements and seem reasonable at the time. Acknowledgement does not equate to a prudency decision on cost recovery. Rather, resource actions consistent with an acknowledged IRP may support favorable ratemaking treatment of the action. Similarly, in a cost recovery proceeding, the utility must explain and justify any resource investment that is inconsistent with the acknowledged plan.

Oregon is among the four states served by the Northwest Power and Conservation Council ("the Council") established by the federal Northwest Power Act.[9] Among other duties, the Council publishes a 20-year electric plan that serves as a guide for Bonneville Power Administration and its customer utilities in the region. The Council published the Sixth Power Plan in 2010. While the Oregon Commission relies primarily on periodic, utility-specific energy efficiency potential studies required under its IRP guidelines when reviewing energy efficiency actions in the filed utility plans, the Council's regional plan drives best practices in the region and is a reference against which utility plans may be measured. The Sixth Plan recommended energy efficiency be deployed aggressively, meeting 85 percent of the new demand for electricity during the next 20 years. The plan's energy efficiency targets include savings of 1,200 average MW by 2015, and 5,900 average MW by 2030.[10]

PacifiCorp operates Pacific Power in parts of Oregon, Washington and California and Rocky Mountain Power in parts of Utah, Idaho and Wyoming. PacifiCorp conducts a unified IRP process for all of its service areas. What follows is a review of PacifiCorp's general IRP practices.

PacifiCorp is the only utility in RAP's survey that models energy efficiency in a comparable manner to supply side resources. That means the utility models price/quantity pairs of energy efficiency resources as it would supply side resources and allows those price/quantity pairs to compete against other resources on an equal basis. This presumes, of course, that PacifiCorp has an accurate understanding of the amount of achievable energy efficiency in its service territory and how much it will cost to acquire that energy efficiency. PacifiCorp's 2011 IRP relies upon three sources for this body of information: (1) an Assessment of Long-Term, System-Wide Potential for Demand-Side and Other Supplemental Resources study completed in June 2007, (2) a 2011 update of that same study conducted by The Cadmus Group, and (3) the Northwest Power and Conservation Council's regional energy plan.

[9] The Council is a regional entity that helps the Pacific Northwest states make critical decisions that balance the multiple purposes of the Columbia River and its tributaries, including electric power issues.

[10] An average MW is the energy produced by the continuous operation of one megawatt of capacity over all of the (8,760) hours in a year.

The potential studies provide an estimate of the size, type, timing, location and cost of demand-side resources technically available in the service territory. The review analyzes customer segments, facility types, and unique energy efficiency measures across each of the states PacifiCorp serves.[11] This yields, after all of the combinations and variables are combined, data for over 18,000 measures, as illustrated in Figure 1.

The potential study follows a two part methodology. First, a forecast is made of anticipated consumption levels, calibrated against actual historical sales. Next, the technical and achievable efficiency impacts are calculated using the technical impacts of specific energy-efficiency measures, allowing for market constraints that affect customer uptake of measures. PacifiCorp assumes that a measure's base efficiency will shift to whatever the prevailing code is at the time of the measure's termination (i.e., when a light bulb wears out, it will be replaced by a light bulb of the efficiency level required by the code at that time). This assumption results in improving average baseline efficiency for classes of measures. PacifiCorp also assumes that when an energy efficient measure fails prematurely, it will be replaced by a measure of comparable efficiency. PacifiCorp does not incorporate an anticipation of improving codes and standards over the course of the planning period; rather, the utility only includes improvements that it knows will occur in the planning period. The impact of this methodology is that baseline usage will gradually decline as equipment is slowly replaced with more efficient units that comply with code.

Sector	Measure Counts
Commercial	133 unique 11,576 permutations across segments
Residential	126 unique 4,671 permutations across segments
Industrial	67 unique 1,733 permutations across segments
Irrigation	3 unique 15 permutations across segments
Street Lighting	12 unique 60 permutations across segments

Figure 1 EE Measure Counts (Base Case)
Source: Cadmus Group, Inc. (2011)

PacifiCorp relied on the Council's assumptions regarding how much of the technical potential actually becomes achievable potential. The Council assumes that by the end of a 20-year assessment horizon 85 percent of the technical potential for non-lost opportunity resources and 65 percent of lost-opportunity efficiency resources will be achievable, so PacifiCorp adopted these assumptions.[12,13]

All of this demand-side resource information from the potential studies is then converted into supply-curves by type of demand-side management (DSM) resource. Supply curves represent the quantity, availability, and cost

[11] Oregon is the exception, as will be discussed later.

[12] Lost-opportunity refers to an efficiency measure or efficiency program that seeks to encourage the selection of higher-efficiency equipment or building practices than would typically be chosen at the time of a purchase or design decision. See NAPEE. (2007).

[13] See Northwest Power and Conservation Council. (2007).

attributes of the resource. Capacity-based measures are grouped into two categories: Class 1 DSM – dispatchable demand response programs – and Class 3 DSM – mainly pricing programs. Energy efficiency measures are called Class 2 DSM. The following discussion focuses on Class 2 DSM.[14]

The potential study identified some 18,000 measures. The company elected to consolidate measures into just nine cost bundles, grouping them according to their levelized costs, to make modeling easier.[15] Additionally, a 15 percent cost adder for administration, levelized over the life of the measure, was added to the total resource cost, a practice comparable to what the company does for supply side resources.

Applying the nine cost bundles across the states where PacifiCorp operates, projected over the 20-year planning period, and assigning the measures to load areas within each state, resulted in 1,400 Class 2 DSM supply curves modeled for the IRP. Importantly, the company applied two cost credits to energy efficiency resources - a transmission and distribution investment deferral credit of $54/kW-year and a stochastic risk reduction credit of $14.98/MWh. These credits represent savings the company would capture from reducing electricity consumption through the use of energy efficiency measures over supply side measures.

The resulting Class 2 DSM cost bundles, broken out by state and by $/MWh breakpoint, are represented in Figure 2.

These cost bundles were then entered into the IRP modeling, where they competed for selection like supply-side resources based on the cost to procure a given amount of the resource. Class 2 DSM fared well in this competition. As of 2011, Class 2 DSM made up 0.8% of PacifiCorp's resource mix, but the IRP projects that by 2020 Class 2 DSM will jump to 8.2% of the mix.

Oregon is the one outlier in this process because the Energy Trust of Oregon provided the company with three cost bundles to use in its modeling for the two load areas in Oregon. This resulted in another 120 Class 2 DSM supply curves to factor into the IRP.

[14] It is important to note that the idea that measures form a static supply curve is wrong. In reality, because the cost of delivering a given measure depends on how it is programmed, the supply curves are flexible. If a measure is bundled with other measures in different ways, the cost of the measure can vary quite a bit.

[15] The company will be exploring alternative approaches for the next planning cycle following objections to the bundling methodology raised by Oregon Commission staff and others.

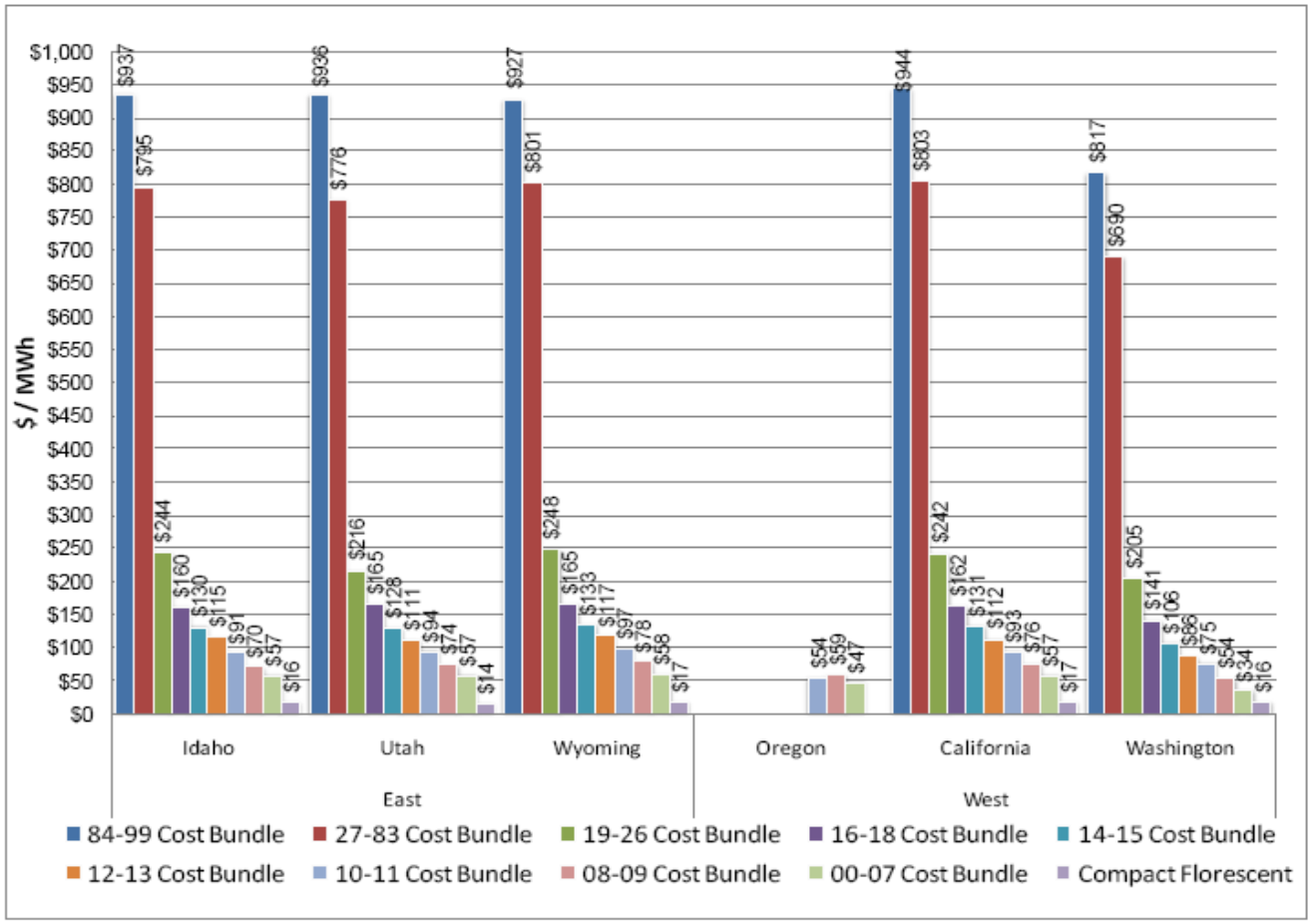


Figure 2 Class 2 DSM Bundles and Bundle Prices
Source: PacifiCorp (2011).

Portland General Electric (PGE) used a different methodology in its 2009 IRP, adopting the amount of demand-side resources required to hit the targets contained in the Energy Trust of Oregon's (ETO) Strategic Plan. PGE and ETO work together closely to assess the potential for energy efficiency in PGE's service territory, sharing information back and forth so as to fine-tune assumptions and forecasts. The potential savings that they collectively agreed upon was consistent with, and in some instances exceeded, projections in the Council's Power Plan. The amount of savings was then adopted as a decrement against PGE's forecasted load. The company planned to acquire the supply side resources needed to serve the remaining load after the DSM was deducted. The collaboration between PGE and ETO is ongoing, and PGE works with ETO to maximize energy efficiency program success between planning periods to ensure targets are achieved.

4.2 Idaho

Idaho does not allow electricity market competition at the retail level, and there are no organized electricity markets. Idaho's IRP process was established in 1989 by the Idaho Public Utilities Commission through Order No. 22299. There have been several utility-specific additions to the IRP guidelines since then, but Order No. 22299 remains the primary authority for IRP in Idaho.

The IRP requirements cover three Idaho electric utilities: Idaho Power, Avista, and PacifiCorp (doing business as "Rocky Mountain Power"). Utilities are required to submit a Resource Management Report (RMR) every two years, with a 20-year planning horizon. Utilities that complete a formal IRP for other states are permitted to submit that plan in fulfillment of the Idaho requirement.

Order No. 22299 does not require specific types of least cost planning or integrated resource planning. Rather, the Order requires that utilities submit a RMR describing the planning activities they do undertake; the Order limits the role of the Commission to performing prudence reviews of the RMR submitted by the utilities. The RMR provides the Commission with the utility's proposed course of action, and the Commission acknowledges that plan given the situation as it stands at the time of the filing. However, the utility must still make DSM filings and filings for a Certificate of Public Convenience and Necessity prior to acquiring supply side resources; these additional filings allow the Commission to take into account changing circumstances and exigencies. Most frequently, the acknowledged IRPs are used as justification/support when the utility files for a Certificate of Public Convenience and Necessity or when a DSM filing is made.

Energy efficiency potential studies are performed in Idaho every two to three years by a third party contractor hired by the utility. Idaho has few formal requirements regarding how these studies are to be undertaken.

A review of Idaho Power's practices provides an example of utility practice in Idaho.[16] Nexant, Inc. produced a demand-side management potential study for Idaho Power's service territory in 2009. The study considered residential, commercial, industrial, and irrigation rate classes. Nexant first calculated a baseline energy consumption model for each class, relying on data provided by the utility, regional reports, and end-use surveys. Nexant then identified appropriate energy efficiency measures from DSM databases, such as the Regional Technical Forum and the Database for Energy Efficient Resources, and screened those measures using the Total Resource Cost test and the Utility Cost test. Finally, Nexant identified the achievable potential by incorporating the cost effective measures into the baseline and applying market penetration rates.[17] The results of the study are shown in Figure 3.

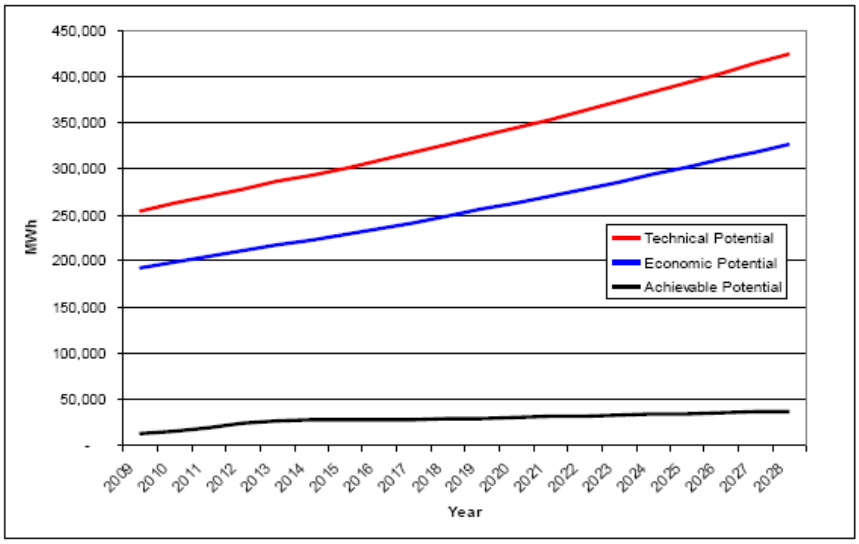


Figure 3 Idaho Power Residential Electricity Potential Savings Forecast
Source: Idaho Power Company (2010).

Idaho Power determines how much energy efficiency will be included in its IRP in a somewhat opaque process. As noted, Nexant's method for identifying how much economic potential is achievable relies upon market penetration calculations that are not explicitly made available in the potential study itself. In Volume 2 of its Potential Study, Nexant calculates that residential achievable savings from 2009-2028 are 36,779 MWh, commercial achievable savings from 2009-2028 are 82,126 MWh, and industrial achievable savings from 2009-2028 can range anywhere from 59,868 to 104,722 MWh.

Idaho Power states that the same method is used to screen existing and new energy efficiency programs. This method includes screening programs and potential savings measures by sector to see if the levelized cost of the energy efficiency program/measure is less than an alternative supply side resource. If the energy efficiency resource is lower cost than supply-side resources from a levelized cost perspective, then the hourly shaped energy savings are included in the IRP as a resource. This is presumably how the amount of energy efficiency pursued over the planning period is determined. The authors were unable to identify exactly where this

[16] Rocky Mountain Power's practices fall under the prior description of PacifiCorp.
[17] The market penetration rates Nexant used are not identified in the study. It is interesting to note that based on its review of historical achievements, the Northwest Power and Conservation Council assumes that 85% of economic potential for non-lost opportunity resources and 65 percent of economic potential for lost-opportunity resources is achievable. Nexant seems to think much lower levels are achievable (see Figure 3).

analysis and target setting occurs in the IRP itself.

What is clear is that, once these targets for energy efficiency acquisition are set, they are essentially imported into the IRP as a load decrement over the planning horizon.[18] Idaho Power discusses its approach to adjusting its load forecast to accommodate energy efficiency in Appendix A of its IRP. The company relies on load adjustment methodologies promulgated by Itron that adjust the utility's load forecast to account for past and future energy efficiency activity and the impact that activity has on consumption levels. For its commercial, industrial, and irrigation sectors, the company relied on Itron's "DSM trend" method. For the residential class, the company relied on Itron's SAE model, which places an emphasis on end-use information for adjusting the forecast. The methods recognize that historical DSM and DSM trends are embedded in the sales data; thus, the only reason to adjust the forecast is if there is an expectation that those historical DSM efforts will either intensify or relax going forward. Once the forecasts are adjusted for DSM activity, the company then plans for the supply side resources it will need to serve the remaining load.

Idaho has no regulations requiring utilities to analyze the risk mitigating potential of energy efficiency. However, Idaho Power does analyze a variety of risk factors – natural gas prices, renewable energy certificate prices, carbon cost, load variations, DSM variations, and capital costs. DSM risk is of interest here. Since the variability of DSM uptake by customers has a major impact on load levels, the company analyzes the risk of DSM program variability. The company did a quantitative risk analysis of the impacts of DSM program participation ranging from eight percent lower than expected up to four percent higher than expected. They then factored this into their decision making process, although how it is factored in is somewhat opaque.

4.3 Colorado

In Colorado there is no electricity market competition at the retail level, and there are no organized electricity markets. Colorado established its IRP process through administrative regulations at Code of Colorado Regulations, Title 4, § 723-3-3600.19. IRP filings are required to occur every 4 years and are to cover a time period of 20 to 40 years (utilities have the discretion to choose the time frame within that 20 to 40 year window). The Public Service Company of Colorado (doing business as "Xcel") and Black Hills Energy are the two investor owned utilities covered by the IRP requirement.

The stated purpose of IRP is "to establish a process to determine the need for additional electric resources by electric utilities subject to the Commission's jurisdiction and to develop cost-effective resource portfolios to meet such need reliably." Commission rules define a "resource" to mean supply-side or demand-side resources used to meet electric system requirements.

[18] According to our interview with Commission staff, Avista plans in a similar manner. We have already discussed how PacifiCorp conducts its planning.

[19] In Colorado, the IRP is referred to as the Electric Resource Plan.

Colorado House Bill 07-1037 (incorporated at § 40-3.2-104 C.R.S.) put in place an Energy Efficiency Resource Standard (EERS) with goals that are to be met by 2018. The statute requires the Commission to set both energy and demand savings goals for investor owned utilities. The statute set minimum goals of a reduction of at least 5 percent of their retail system peak demand measured in MW from a baseline year of 2006 and at least 5 percent of their retail energy sales measured in MWh from a baseline year of 2006. The statute also permits the Commission to increase each of the savings goals above the baseline. Regulated utilities are required to submit demand-side management plan (DSM) filings to the Commission on a schedule set by Commission order. Commission approval of DSM filings establishes the actual, incremental energy efficiency savings goals for each company. An example is provided in Figure 4.

The statute does not require a utility to perform a DSM potential study in coordination with an IRP or otherwise. Despite this lack of a legal requirement, Xcel had a potential study performed in 2010 by KEMA.[20] The study included an analysis of technical, economic, and achievable DSM program potential. As part of the achievable potential, an analysis was conducted of three different funding scenarios: scenarios where 50 percent, 75 percent, and then 100 percent of the incremental costs of the more energy efficient technology were paid out to customers. Some emerging technologies and behavioral-conservation approaches were also included in the analysis. The study took account of naturally occurring energy efficiency impacts, such as savings that result from normal market forces that would occur naturally in the absence of any market intervention.

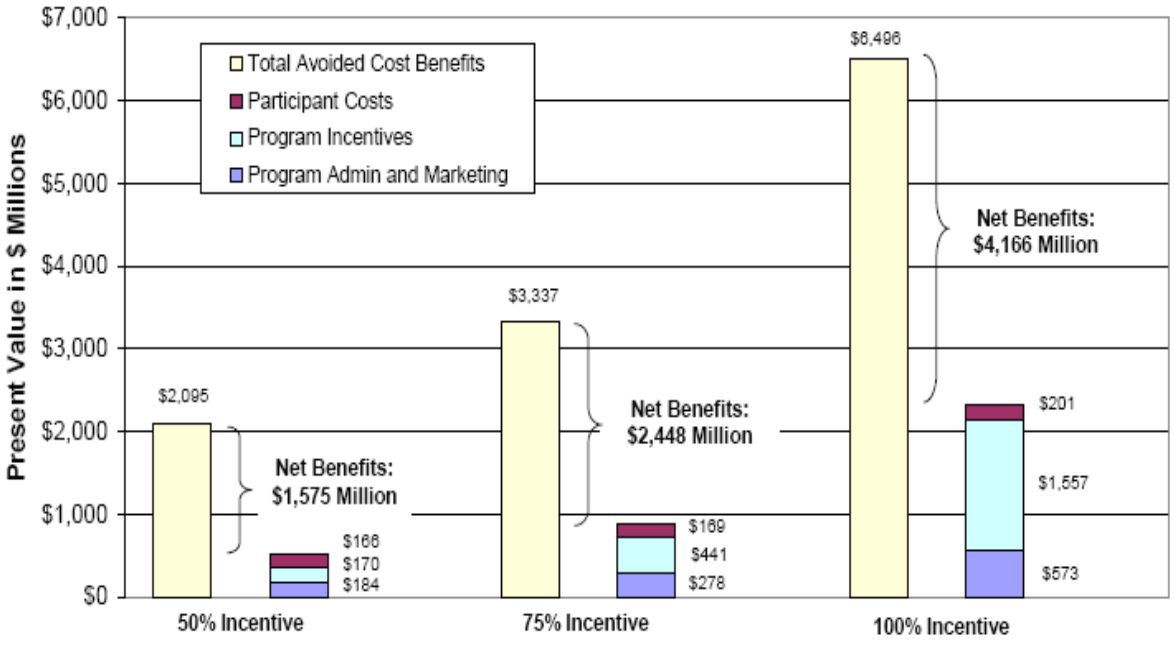
The study did not address the incremental energy efficiency gains that would occur due to the ongoing improvement of technologies and that would lead to increased savings over time. Also, the study did not include the ongoing efficiency gains resulting from improved equipment and building standards.

The results of the KEMA assessment are shown in Figure 5.

Year	% Sales Reduced	GWh Saved
2012	1.14%	330
2013	1.21%	356
2014	1.28%	384
2015	1.35%	411
2016	1.42%	441
2017	1.51%	472
2018	1.59%	504
2019	1.66%	537
2020	1.68%	549
Total		3,984

Figure 4 Energy Efficiency Targets for Xcel 2012-2020
PUC of the State of Colorado (2011).

[20] Black Hills also had a study done as part of its most recent DSM plan filing (Docket 12A-100E).



* Present value of benefits and costs over normalized 20-year measure lives; nominal discount rate is 7.9 percent, inflation rate is 1.5 percent.

Figure 5 Summary of Achievable DSM Potential
Source: KEMA, Inc. (2010).

As noted, the EERS established a minimum requirement but empowered the Commission to establish additional goals. These increased goals, above the minimum established in statute, have been set in DSM proceedings. In the case of Xcel, there is a two stage DSM process. One docket addresses policy issues, including goal setting. The DSM plan, which is filed in a second docket, shows what measures and resources the company will use to meet the goals approved by the Commission.[21] In each case, the utility imputes the most recently approved goals into the IRP. When calculating its resource needs for planning purposes, the utility subtracts energy efficiency savings from the base load forecast as part of getting to the firm obligation load or actual resource need. In practice, goals are set in a reciprocal process between the Commission, the company, and other interveners across the DSM filings. Setting DSM goals is informed by what the potential study reveals, but the potential study is not the only determining factor; it is one factor the Commission considers. The Commission also looks to the company's past performance, the company's resource needs, the cost-effectiveness of the DSM measures, accepts the input of other interveners in proceedings, and considers whether and when the Commission will have an opportunity to revisit the goals. All of these factors weigh into the decision on how

[21] For Black Hills, the goal setting is part of the planning docket. In that sense, it is a single phase process.

much energy efficiency to require from the utility.

Xcel serves as a good illustration of this back and forth process. Xcel's initial DSM targets were set in a 2007 DSM filing (Docket 07A-420E); these targets surpassed the statutory minimum set by House Bill 07-1037. In that same proceeding, the Commission ruled that Xcel should pursue aggressively all cost-effective DSM, that DSM is a resource, and that it is a more cost effective resource than new generation resources. In the company's 2007 IRP filing, the Commission required the company to assume energy efficiency savings sufficient to meet its goals as part of the modeling in its resource planning. In 2011, the Commission revisited Xcel's energy efficiency goals. It rejected the goals proposed by the company and, instead embraced higher goals recommended by an intervener, the Southwest Energy Efficiency Project. The 2011 IRP then incorporated those goals into the calculation of the resource need, again as one of the input modeling assumptions.

In practice during the IRP, the company generates its load forecast and then includes its DSM plan targets as a load decrement, pursuing supply side resources for the balance of the load forecast. Thus, while Colorado's process does seek to pursue fairly aggressive energy efficiency goals, it is not a process that treats energy efficiency as a resource in the IRP process itself, as we described for PacifiCorp in Oregon. Rather, an energy efficiency target is set in a DSM proceeding, and then the company is required by the Commission to procure enough energy efficiency resources to hit that target.

Colorado rules require utilities to consider a variety of risks, like the risk of future increases in the cost of environmental compliance, for example. However, it does not explicitly require its utilities to assess the risk mitigation potential of energy efficiency.

4.4 Ohio

Ohio provides an example of a state that allows competition at the retail level, and a state that has a competitive wholesale market. This may mean that some of the generators are owned by distribution utility affiliates and some are owned by the distribution utility itself, both of which can have impacts upon resource acquisition decision making. Regulated distribution utilities in Ohio are responsible for the implementation of energy efficiency programs for all customers, even though they supply full services for only those customers remaining on standard offer service.

The rules governing resource plans are found in Ohio Administrative Code § 4901:5-5-06. It is a part of the long-term forecast report filed pursuant to § 4901:5-3-01 of the Administrative Code, which states that an electric utility shall include a resource plan as defined in § 4901:5-5-01. Historically, the statutory IRP language was eliminated with the advent of retail electric market competition in Senate Bill 3 in 1999. However, with the establishment of an EERS and Alternative Energy Resource Standard in Senate Bill 221 in 2008, the concept of "Resource Planning" was re-introduced in Ohio Revised Code § 4928.143(B)(2)(b) and (c).

Utilities are required to file an IRP only when they are acquiring new resources. Ohio utilities are moving to an unbundled model where customers are allowed to purchase

their own power supply, and the traditional utility only supplies distribution services. This move may make parts of this IRP requirement moot as procurement activities will be limited to standard service procurement auctions to supply power to customers who have not yet moved to select a supplier. The rule covers all investor owned utilities.

Ohio SB 221 creates an EERS that requires investor owned electric utilities to achieve a prescribed level of incremental energy savings each year through energy efficiency programs (See Table 1). The law sets a cumulative goal of 22.2 percent savings by the end of 2025. Utilities also must achieve peak energy demand reductions of one percent beginning in 2009, and an additional 0.75 percent per year, for a total 7.75 percent through 2018. The savings targets were developed by the legislature with input from the various stakeholders. Potential studies completed at the time were influential in setting the target energy efficiency levels but were not the only factor considered in developing the required level of savings.

Year(s)	Efficiency-Based Energy Reduction
2009	.3 percent
2010	.5 percent
2011	.7 percent
2012	.8 percent
2013	.9 percent
2014 – 2018	1 percent each year
2019 – 2024	2 percent each year
2025	Cumulatively 22 percent

Table 1 Ohio EERS Procurement Levels
Source: Ohio SB 221

The Public Utility Commission of Ohio conducts an annual review to ensure utilities are in compliance with the EERS. If it is determined that minimum requirements are not being attained, a penalty may be assessed, although, to date, utilities only have been ordered to make up any shortcomings in their next program year. Utilities may seek shareholder incentives as part of their energy efficiency cost-recovery. AEP Ohio and Duke Energy Ohio have been awarded incentives for achieving more than the required levels of savings. No incentives are awarded for achieving the prescribed levels of savings.

A market potential study that quantifies achievable savings is a key input to the integrated resource planning process, which considers the load forecast and both supply-side and demand-side resources. The market potential study is based on a baseline study completed in the service territory of the utility, informed by experience in energy efficiency program implementation performance, as well as benchmarking and best practices program analyses from other utility programs. Ohio has an expansive definition of energy efficiency in that it includes utility implemented T&D efficiency measures, as well as savings from industrial customers who opt out of utility programs and implement a self-directed program option.

In Ohio, a potential study is conducted every three years; results of one such study appear in Figure 6. Ohio Administrative Code section 4901:1-39-03 requires the study to determine the technical potential, the economic potential, and the achievable

potential of energy efficiency. The utilities are responsible for conducting the studies and generally contract with a third party to do so.

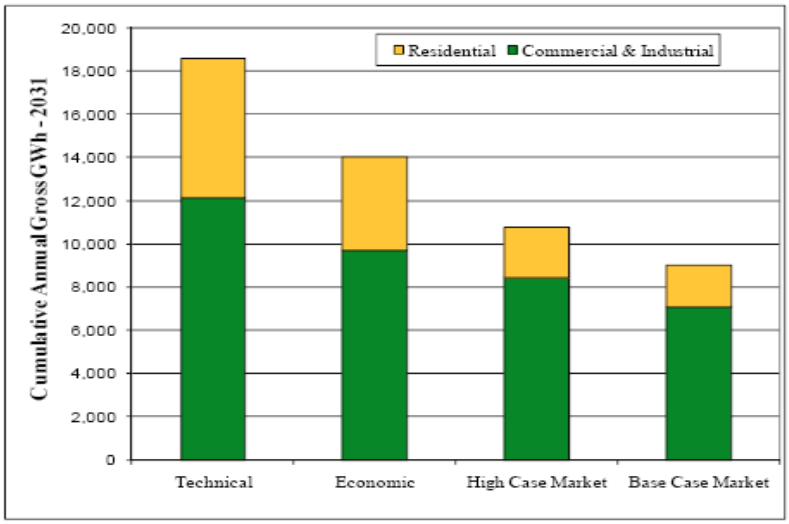


Figure 6 Cumulative Annual GWh Potential Energy Savings in 2031 - Ohio
Source: AEP Ohio 2012 to 2014 EE/ Peak Demand Reduction Plan: Exhibit A, (Volume 1).

The rules do not prescribe the range of efficiency measures that must be analyzed, but generally it is the goal of the utilities to undertake a comprehensive assessment of energy efficiency opportunities. Behavioral programs, smart meter enabled pricing impacts, and Combined Heat and Power penetration historically have been difficult to include in these studies. So even though Ohio utilities have undertaken behavioral programs, their impacts are not, at this point, included in potential studies, nor are they recognized in the Technical Resource Manual (TRM) for Ohio. The TRM contains predetermined savings values for certain measures, as well as protocols for determining savings for custom designed measures. By specifying savings and protocols up front, program design and savings verification are greatly enhanced for utilities and stakeholders.

For IRP purposes, at least in the short term, the legislature has created an EERS which governs utility procurement of energy efficiency resources. The Commission has stated that, in its opinion, the legislation represents a floor and the acquisition of all cost effective energy efficiency is the ultimate goal. AEP, for example, creates an IRP model for several states. For states with efficiency requirements, they assume that those requirements will be met and decrement their load forecast to reflect that level of achievement.[22]

4.5 Arkansas

Parts of Arkansas are served by a competitive wholesale generation market, while other parts do not have a competitive market, but are served by utility owned generation. For retail sales, distribution utilities have monopoly service territories throughout the state.

Arkansas Title 23-18-106 gives the Arkansas Public Service Commission broad "authority to adopt rules and regulations under which electric utilities shall seek Commission review and approval of the processes, actions, and plans by which the utilities:

[22] See Columbus Southern Power Co. & Ohio Power Co. (2010), pp. 67, 73.

1) Engage in comprehensive resource planning;
2) Acquire electric energy, capacity, and generation assets; or
3) Utilize alternative methods to meet their obligations to serve Arkansas retail electric customers."

With these powers the Commission develops requirements for public utilities and modifies them as circumstances change. To date, the Commission has chosen to develop only guidelines, rather than rules, to assist utilities in developing IRPs. More detailed planning guidelines have evolved, mostly through various decisions handed down by the Commission; in particular, expectations for planning studies have been laid out in a document entitled *Resource Planning Guidelines for Electric Utilities*. These guidelines were developed collaboratively and approved in a docket that defines resource planning expectations as a mixture of traditional resource planning and an exploration of demand management to meet load requirements.

The genesis of efficiency efforts in Arkansas was in the "Energy Conservation Endorsement Act of 1977," which sought to "encourage and enable utility customers to make the most efficient use of utility capacity and energy and to discourage inefficient and wasteful use of energy." This emphasis on conservation, as opposed to least cost utility resource acquisition, has persisted as Arkansas has developed programs for the regulated utility sector.

The guidelines also require that "the utility shall clearly state and support its objectives." This gives a utility a choice in determining the focus of the plan, its duration, and other features of the plan to support its decision-making objectives. The plan, once filed, is treated as informational, with no hearings or other public review of the plan and no formal adoption by the Commission.

Arkansas energy efficiency program rules require that electric and gas utilities in Arkansas under the jurisdiction of the Commission be responsible for the administration and implementation of cost-effective energy efficiency programs within their service territories.

In 2010, the Commission took testimony from each utility, the Arkansas Attorney General, Commission staff, and staff from the Audubon Society on whether it should set specific energy efficiency targets and, if so, how high. Based on that record (efficiency savings achievement at that time was in the range of 0.1 to 0.2 percent savings for electric utilities and no recorded savings for gas utilities), the Commission required all utilities to implement the greatest achievable amount of cost effective energy efficiency.

In Docket 08-144-U, the Commission required that, as a default for the years 2009 – 2011, savings of 0.25 percent, 0.50 percent, and 0.75 percent of sales would be required for electric utilities and 0.2 percent, 0.3 percent, 0.4 percent of sales would be required for gas utilities that would meet the requirements. The Commission required every utility to submit a plan to meet these new targets. While each utility must submit a plan, each utility has the right to explain why it is not cost effective to meet the target or why implementation may fall short and to request a waiver from those requirements. Because of various start up issues, several of the Arkansas utilities did not meet the goals set by the Commission.

In the context of IRP development, the energy efficiency targets are used as a decrement to the load forecast. The Commission is currently in the process of restructuring the energy efficiency requirements placed on the utilities. New goals have been proposed, primarily based on what other states and jurisdictions have been able to achieve with their programs. These goals, as proposed, will continue to ramp up the requirements for achievement in the programs of Arkansas utilities. In addition, the Commission has developed a checklist approach to assist in its determination regarding the adequacy of a proposed portfolio of programs. The seven criteria are as follows:

1. Provide, either directly or through identification and coordination, the education, training, marketing, or outreach needed to address market barriers;
2. Include adequate budgetary, management, and program delivery resources to plan, design, implement, oversee, and evaluate EE programs;
3. Reasonably address all major end-uses;
4. Address to the maximum extent reasonable the needs of customers at one time, in order to avoid cream-skimming and lost opportunities;
5. Take advantage of opportunities to address the needs of targeted customer sectors (schools, large retail stores, agricultural users, or restaurants) or to leverage non-utility program resources such as state or federal tax incentives, rebates, or lending programs;
6. Enable the delivery of all achievable, cost-effective EE within a reasonable period and maximize net benefits to customers and the utility; and
7. Have adequate evaluation, measurement and verification (EM&V) procedures to support program management and improvement, calculation of energy, demand and revenue impacts, and resource planning decisions.

Potential studies are not required in Arkansas, but most utilities do one in conjunction with an IRP (See Figure 7). The IRP guidelines contain specifications regarding components to be included in a potential study, if it is done. For example, the Commission has ordered, as a default, an 80% net to gross (NTG) multiplier[23] for all programs.[24] Following the IRP, and consistent with the energy efficiency program rules, the utilities make a filing demonstrating that combination of energy efficiency and

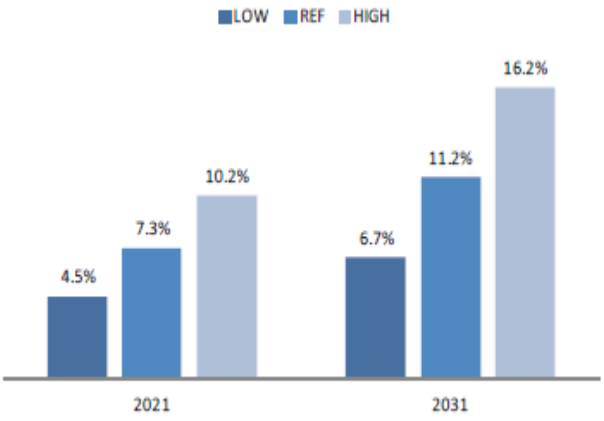


Figure 7 Cost Effective Achievable DSM at Entergy Arkansas – Potential Study: Cumulative Net MWh Savings Estimates as a percent of Sales (10 and 20 Year Estimates)
Source: Entergy Arkansas (2012).

[23] In 2012, all program NTGs are to be evaluated through an independent EM&V consultant.
[24] Except for CFLs which are evaluated at 63% NTG.

supply options which is shown to be the most cost effective.

In June 2012 (final report pending), ICF International completed an updated DSM Potential Study for Entergy Arkansas (EAI) covering the period 2012-2031, the results of which provided a basis for long-term planning. The ICF Study considered Low, Reference, and High program budgets on a full range of potential Arkansas DSM programs and associated DSM peak load and energy reductions. The purpose of the study was to provide to EAI load shapes and costs representing a reasonable set of long-run assumptions about achievable DSM program potential. The three energy efficiency scenarios will be modeled in EAI's IRP scenarios, which will allow demand-side resources to be compared against supply resources to inform long term planning decisions about EAI's portfolio selection.

Arkansas does not require its utilities to assess the risk mitigation potential of energy efficiency at this time.

It is appropriate to note that Arkansas, over the past several years, is a good example of a state that is undertaking a deliberate and orderly process to improve the practices of utility resource planning and energy efficiency program deployment. A review of current dockets before the Arkansas Commission suggests that more process evolution in each of these areas is likely. See, for example, Dockets 07-075-TF through 07-085-TF.

4.6 Georgia

Georgia does not have a competitive wholesale market. At the retail level, commercial and industrial electric customers with connected loads over 900 kW and located outside of a city can choose their electricity supplier. Georgia mandates its IRP through statute at O.C.G.A. § 46-3A-2, with the implementation of the IRP being guided by regulations at Georgia Administrative Code § 515-3-4.

Georgia Power is effectively the only utility covered by the IRP requirement. The planning process is required to demonstrate the economic, environmental, and other benefits of the utility's demand-side and supply side choices, including those of energy efficiency and other demand-side resources. IRPs must be conducted and submitted for approval every three years, with a 20 year planning horizon.

There are no statutory requirements that regulated utilities in Georgia perform and file an energy efficiency potential study as part of the resource planning process, nor do the administrative rules make such a requirement. Georgia Power's 2010 IRP relied on an Achievable Energy Efficiency Potential Assessment 2007 study, but the Georgia Public Service Commission required, as part of the order approving Georgia Power's 2010 IRP, that the company conduct a new energy efficiency potential study prior to its 2013 IRP filing. The company contracted with Nexant and the Cadmus Group (collectively "Nexant") to perform the study in 2011-2012. That study is available for use in Georgia Power's upcoming 2013 IRP.

Despite the requirement that an IRP be conducted and approved by the Commission, approval of the IRP does not obviate the need for Georgia Power to file with the Commission a Petition for a Certificate of

Public Convenience and Necessity prior to actually acquiring any resources. Prior to acquiring either demand-side or supply side resources, the utility must first acquire Commission approval outside of the IRP context. Thus, as in other jurisdictions such as Idaho, the IRP serves as a general guideline to the utility for its resource acquisition. Going forward, conduct in accord with the IRP is one factor the Commission considers in making prudence determinations for cost recovery. If circumstances change to such a degree that following the IRP is not prudent, the utility can and must make mid-course corrections rather than relying upon the IRP.

There are no specific goals or concrete requirements, from either the Legislature or the Commission, mandating the acquisition of any particular level of energy efficiency. Rather, the Georgia Public Service Commission in its 2010 IRP Order mandated that energy efficiency be a priority resource in the IRP, and the Commission's order approved proposed budgets and kWh and kW savings projections for the 2011 to 2020 time period covered by the IRP Order. Even though the IRP lays out a projected path, any acquisition of a new supply-side or demand-side resource requires a filing for a Certificate of Public Convenience and Necessity.

The Commission's 2010 IRP Order mandates that Georgia Power continue to use a stakeholder process to assist in the development of DSM programs to be included in the IRP. The stakeholder group is known as the Georgia DSM Working Group. This working group helps the utility identify energy efficiency programs for implementation within the utility's service territory. However, this working group activity is on-going, and the main work of the stakeholder group is done before the Company files its IRP. The actual kWh and kW savings goals for energy efficiency are set by the Company, informed by interactions of the working group, and then approved by the Commission in the DSM filing. The kWh and kW load reductions associated with these energy efficiency programs are then incorporated as load decrements against the forecast in the IRP. The Company's modeling process used to develop the IRP does not allow for demand-side resources to compete face-to-face against supply-side resources in the resource planning models. The Company develops its forecast of energy efficiency program savings based upon how much the Company is willing to spend. The Company does not allow its resource planning models to select all cost effective energy efficiency and demand response potential.

When Georgia Power produces its load forecast for the IRP, it uses historical energy data. This data has in it the embedded effect of existing energy efficiency programs. The company analyzes what supply side resources it will need to meet that forecast load. The result of this analysis is called the benchmark plan. The company then integrates the proposed new demand-side programs and efforts. The integration step requires a re-examination of the need for generation additions identified in the benchmark plan as a result of including demand-side programs. Essentially, it determines what supply side resources are needed, given the savings from the demand-side programs.

Georgia does not require its utilities to assess the risk mitigation potential of energy efficiency.

5. Conclusion

Our review reveals a variety of ways in which integrated resource planning is conducted and an even greater variety of ways in which energy efficiency is treated within that process. Practices range from Oregon, where energy efficiency is treated comparably to supply side resources within the IRP itself, to those of the other states, where energy efficiency considerations are less integral to the IRP process and are more heavily influenced by other political or economic considerations. The range of approaches can and does result in a range of energy efficiency savings targets.

Our research reveals that jurisdictions that value energy efficiency can acquire significant levels of energy efficiency savings even if energy efficiency is not treated comparably to supply resources, but it requires concerted effort by the Commission to do so.

This review shows that, in a selection of states, some IRP processes do not really compare DSM and supply resources on an equal footing or in a dynamic fashion that permits the true strength of energy efficiency to come to the fore. Some processes simply deem a certain amount of DSM to be available, reduce the load forecast by that amount, and then fill the void with supply side resources, even if the deemed amount of DSM leaves potential savings on the table that are less costly than supply resources. This practice seems to forgo unnecessarily energy efficiency resources that could reap economic and environmental benefits for customers and achieve economic efficiency for utilities.

6. Appendix A: Sources

6.1 Interviews

Eddy Moore and Wally Nixon of the Arkansas Public Service Commission

Rebecca Lim and Keith Hay of the Colorado Public Utilities Commission

Jamie Barber and Shemetha Jones of the Georgia Public Service Commission

Bryan Lanspery of the Idaho Public Utilities Commission

Wilson Gonzalez of the Ohio Consumers' Counsel

Erik Colville of the Oregon Public Utility Commission

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7. Appendix B: Summary Tables

Table 1 IRP Enabling Authority

	Statute	Regulation	Case
Arkansas	X[25]		
Colorado		X[26]	
Georgia	X[27]		
Idaho			X[28]
Ohio	X[29]		
Oregon			X[30]

Table 2 Energy Efficiency Enabling Authority

	Statute	Regulation	Case by Case
Arkansas	X[31]		
Colorado	X[32]		
Georgia			X
Idaho			X
Ohio	X[33]		
Oregon	X[34]		

[25] Ark. Code Annotated § 23-18-106.
[26] 4 CCR 723-3-3600 et seq.
[27] O.C.G.A. § 46-3A-2.
[28] *In The Matter Of The Investigation By The Idaho Public Utilities Commission Into Idaho Electric Utility Conservation Standards And Practices*, Case No. U-1500-165, January 1989.
[29] ORC § 4928.143.
[30] *In the Matter of the Investigation into Least Cost Planning for Resource Acquisitions by Energy Utilities in Oregon*, Case No. UM 180, Order No. 89-507, April 1989.
[31] Ark. Code Ann. §§23-3-401 to 4.
[32] Colorado House Bill 07-1037.
[33] Ohio Senate Bill 221.
[34] Oregon Revised Statutes § 757.056.

Table 3 Frequency of IRP Filings

	Years
Arkansas	Every 3
Colorado	Every 4
Georgia	Every 3
Idaho	Every 2
Ohio	Intermittent
Oregon	Every 2-3

Table 4 Duration of IRP Plan

	Years
Arkansas	10
Colorado	20-40
Georgia	20
Idaho	20
Ohio	10
Oregon	20