Interstate Transfer of a DSM Resource: New Mexico DSM as an Alternative to Power from Mohave Generating Station

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ABSTRACT

Synapse analyzed a novel DSM-procurement alternative to replace power flowing to Southern California Edison from the coal-fired Mohave Generating Station in southern Nevada. At the direction of the CPUC, a team of researchers analyzed a set of supply alternatives to replace Mohave's output; Synapse examined the technical, commercial and institutional/regulatory aspects of an alternative comprised of DSM procurement in New Mexico coupled with a power purchase of "freed up" supply imported into California. The analysis focused on the commercial terms likely to allow such a transaction, the regulatory constraints associated with interstate DSM transfers, and the overall feasibility of the approach. The analysis found that net benefits result from DSM procurement result even with interstate transfers of the resource "output", but the allocation of these benefits among stakeholders – California and New Mexico ratepayers and utility company shareholders – can be complex and has a direct impact on the ultimate feasibility of the procurement. Also, the analysis found that allowing peak period DSM savings to effectively stay in New Mexico while flowing "baseload" power to California from New Mexico's share of "freed up" supply resources at Palo Verde simplifies the pricing arrangements.

Introduction

Synapse Energy Economics was retained as a subcontractor to Sargent and Lundy in the spring of 2005 to assist in an analysis of "alternatives and complements" to the Mohave Generating Station in southern Nevada. Mohave is a ~1,500 MW jointly-owned coal-fired station, and the lead owner and operator, Southern California Edison (SCE) was directed by the California Public Utilities Commission to study alternatives for SCE's customers' share of the plant (~785 MW) in the event of a shutdown, which did occur on December 31, 2005 pursuant to a consent decree resulting from an earlier suit brought against the owners of the plant.[1]

Description of Concept of Interstate Transfer of DSM Resource

This concept is based on the assumption that there are considerable low-cost efficiency resources in states neighboring California, and that SCE may be willing or directed to procure such resources (through DSM implementation coupled with a power purchase contract) depending on the overall costs in comparison to other alternatives.

As part of the study, potential DSM/EE resources available in the Western United States outside of California were reviewed. Interstate transfer of a DSM resource located in New Mexico or Arizona involves SCE "financing" the DSM implementation, coupled with power

[1]Mohave Environmental Consent Decree settled a federal civil lawsuit, CV-S-98-00305-LDG (RJJ), that was filed in 1997 by Grand Canyon Trust, Inc., Sierra Club, Inc. and National Parks and Conservation Association, Inc. against Edison and the other Mohave co-owners alleging various air quality violations at Mohave.

purchase arrangements under which the resultant available "freed up" power would be purchased by SCE. The exact nature of the "financing" or the way in which the contract terms define SCE's level of involvement in DSM implementation was not explored as part of the project. However, as long as there is a mechanism (specified in the DSM transfer / coupled power purchase contract) to ensure DSM savings - for example New Mexico or California regulatory mandate of energy efficiency savings verification – the authors do not believe it critical to specify *ex ante* a particular form of SCE involvement; that is up to the parties involved. For example, SCE could actually play a hands-on role in helping to set up or expand utility-scale DSM programs in New Mexico, and leverage their expertise; or not, if the parties don't need it or don't want it.

Specific DSM Transfer(s) Considered in the Mohave Study

In evaluating out-of-state energy efficiency resources that might be purchased to offset SCE's share of the Mohave generating plant, the study focused on energy efficiency resources available in the southwestern states. The possibility of purchasing similar energy efficiency resources from states in the Northwest (Oregon, Washington, Idaho, and Montana) was not included in this analysis primarily because energy efficiency programs, often very aggressive, in the Pacific Northwest have been underway for some years, resulting in significant electricity savings over the past two decades[2].

Other factors including transmission issues, the presence of the Palo Verde hub, and an expressed interest by a New Mexico utility favored a focus on the desert southwest. The presence of the Palo Verde hub as a point for import into California coupled with New Mexico entitlement to generation at the PV hub simplified the analysis by effectively eliminating the need to secure transmission from New Mexico to Palo Verde for a DSM resource.

Energy Efficiency Potential in the Desert Southwest

The study's analysis began with a review of a recent study of the economic potential for energy efficiency in the southwest by the Southwest Energy Efficiency Project (SWEEP 2002). This potential includes energy efficiency available from both SBC-based utility energy efficiency programs and non-utility programs, such as implementation of appliance efficiency standards, market transformation efforts, public sector efforts, building codes, rate reform, and tax incentives.[3] The SWEEP study provides a detailed and comprehensive assessment of the efficiency potential in six southwestern states (Arizona, Nevada, New Mexico, Colorado, Utah, and Wyoming) and provides a useful starting point for the analysis. Synapse focused on the information provided for Arizona, New Mexico and Nevada.

The SWEEP study provides a useful indication of the *total* potential for cost-effective energy efficiency in the region.[4] However, the electric utilities in Arizona, Nevada, and New

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[2]The results of over two decades of energy efficiency programs in the Northwest are summarized in several documents, available from http://www.nwcouncil.org/energy/rtf/consreport/2004/Default.asp, that comprise the Northwest Power Planning Council's Utility Conservation Achievements Reports: 2004 Survey. This survey, for example, estimates that "[s]ince 1978, regional electricity conservation programs have saved about 2,925 [average] megawatts, more than enough electricity for two cities the size of Seattle".

[3] See pages 5-26 through 5-29 of the SWEEP Study.

[4] See the SWEEP study for descriptions of the analytical methods used to estimate the total potential for cost effective energy efficiency. The study states that measures were considered "cost-effective" if the cost of conserved energy was less than the retail price of electricity, and they used a 5 percent real discount rate when computing the cost of conserved energy. The study states "aggressive" but potentially achievable implementation rates were used for cost-effective energy efficiency measures.

Mexico would not be able to implement this level of energy efficiency savings for the purpose of selling power to SCE for several reasons. First, electric utilities would only be able to implement SBC-Based Energy Efficiency Programs.[5] Second, the SWEEP study assumed very aggressive implementation activities, and electric utilities might not have the interest or the capacity to pursue energy efficiency resources at this very aggressive level. Third, the utilities in these three states are already undertaking energy efficiency activities for their own customers, and thus have fewer efficiency resources available for selling to other utilities.

The SWEEP energy efficiency estimates, therefore, were adjusted to account for these three factors, and to develop an estimate of the "readily available utility efficiency," i.e., the amount of efficiency that a utility could implement — using standard industry energy efficiency programs — for the purpose of selling power to SCE. The results of this analysis are presented in the table below. Note that the energy savings in the table (in GWh) are cumulative and include efficiency savings from activities from all the previous years. For example, the savings in 2010 are a result of the efficiency investments from 2006 through the end of 2010.

For each state, the first row in the table presents the estimates from the SWEEP study of the total electricity efficiency savings potential in each state. The next row is a rough estimate of the portion of that total potential that can be obtained through utility-run energy efficiency programs. This estimate was derived by simply taking one-third of the total efficiency potential, since the Study indicated that SBC policies will result in anywhere from 32% to 36% of the total efficiency savings.

The third row for each state presents the "easily achievable" utility efficiency potential. This represents the portion of the total utility potential that could be achieved with moderate, as opposed to aggressive, investment and activity levels. It accounts for the fact that utilities might not have the interest or capacity to obtain all the cost-effective energy efficiency savings that are achievable, and that some efficiency measures are more difficult to implement in practice than to assess in theory. This analysis assumed that the easily achievable utility efficiency potential will be one-half of the SWEEP estimate of the total utility efficiency potential. In other words, the savings in the third row are equal to one-half of the savings in the second row.

The fourth row for each state presents an estimate of the amount of energy efficiency savings that is likely to be developed as a result of utility and regulatory policies in place today. For example, Arizona Public Service Company (APS) recently prepared a DSM Program Portfolio Plan that is expected to result in an average of $16 million per year of investment for 2005–2007 (APS 2005), with 2010 cumulative savings estimated to reach roughly 651 GWh.[6]

The fifth row for each state in the table presents the estimate of the readily available utility efficiency savings. It was derived by subtracting the savings of the existing utility efficiency policies from the readily achievable utility efficiency. This estimate provides a rough indication of the amount of efficiency that could be developed by electric utilities and sold to SCE.

The next-to-the-last row in the table presents the estimate of the amount of energy efficiency savings (in GWh) in Arizona and New Mexico that could readily be made available for sale to SCE. The final row presents the amount of capacity (in MW) that this level of savings might represent. This level of capacity was estimated using the results of the SWEEP study,

[5] There is also precedent for electric utilities implementing substantial market transformation programs, often at very low cost per unit savings. This potential is not included in this report. Electric utilities might be able to undertake activities to implement the other policies listed in the table. However, they are less able to have a direct influence on these policies, and thus they have been left out of our analysis.

[6] This estimate includes actual efficiency saving from 2003 and 2004, because the potential savings estimates in the SWEEP study are based on load and efficiency data as of 2002.

which found that in the entire Southwest region 99,038 GWh of energy savings (in 2020) would result in 16.9 GW of capacity reduction. This simplified relationship of capacity to energy was used to estimate the capacity savings in the table, and is only a rough estimate.[7]

Readily Available Utility Efficiency Potential in Arizona, Nevada, and New Mexico (GWh)

Arizona	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
SWEEP Total Efficiency Potential	7,253	9,104	10,961	12,822	14,690	16,792	18,900	21,014	23,134	25,260
SWEEP Utility Efficiency Potential	2,393	3,004	3,617	4,231	4,848	5,541	6,237	6,935	7,634	8,336
Readily Achievable Utility Efficiency	1,197	1,502	1,808	2,116	2,424	2,771	3,119	3,467	3,817	4,168
Existing Utility Efficiency Policies	221	328	436	543	651	759	866	974	1,081	1,189
Readily Available Utility Efficiency	976	1,174	1,373	1,572	1,773	2,012	2,252	2,494	2,736	2,979
Nevada										
SWEEP Total Efficiency Potential	3,251	3,967	4,686	5,407	6,131	6,910	7,692	8,477	9,264	10,054
SWEEP Utility Efficiency Potential	1,073	1,309	1,546	1,784	2,023	2,280	2,538	2,797	3,057	3,318
Readily Achievable Utility Efficiency	536	655	773	892	1,012	1,140	1,269	1,399	1,529	1,659
Existing Utility Efficiency Policies	449	682	691	933	945	1,216	1,250	1,541	1,582	1,803
Readily Available Utility Efficiency	88	-27	82	-41	67	-75	19	-142	-53	-144
New Mexico	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
SWEEP Total Efficiency Potential	2,173	2,650	3,125	3,598	4,069	4,561	5,052	5,541	6,028	6,513
SWEEP Utility Efficiency Potential	717	875	1,031	1,187	1,343	1,505	1,667	1,829	1,989	2,149
Readily Achievable Utility Efficiency	359	437	516	594	671	753	834	914	995	1,075
Existing Utility Efficiency Policies	27	33	40	47	53	60	67	73	80	87
Readily Available Utility Efficiency	332	404	476	547	618	693	767	841	915	988
Total: AZ+NV+NM (GWh)	1,396	1,551	1,931	2,078	2,457	2,629	3,039	3,192	3,597	3,823
Total: AZ+NM (GWh)	1,308	1,578	1,848	2,119	2,391	2,705	3,019	3,335	3,650	3,967
Total: AZ+NM (MW)	223	269	315	361	407	461	514	568	622	676

Note: Arizona retail electric sales in 2004 were approximately 67,000 GWh (EIA Electric Power Annual with 2004 data), thus the projection of 2,424 GWh of "easily achievable utility efficiency" is notably conservative (0.04%), at since it's not uncommon for good utility DSM programs to save on the order of 0.8% of projected annual retail sales.

In summary, by 2010, there are at least 2,394 GWh of energy and 408 MW of capacity available from Arizona and New Mexico. To put this in perspective, SCE's share of the Mohave

[7] The capacity savings may well be considerably higher than this if sufficient emphasis is placed on efficiency measures that save energy during peak periods.

generation is roughly 5,700 GWh per year, and its share of the Mohave capacity is 885 MW. Thus, by 2010, energy efficiency from Arizona and New Mexico could replace over 40% of the energy and over 45% of the capacity from the Mohave plant. This is a very conservative estimate of the potential to replace Mohave with efficiency resources, as a result of the adjustments made above. A highly motivated utility could obtain more than the easily achievable efficiency savings identified here.

Discussion of Possible Purchase Power Arrangements with A Neighboring Utility – Regulatory and Financial Concerns

To investigate the feasibility and practicality of the DSM resource / power purchase alternative/complement, discussions were held with PNM Resources of New Mexico. The aim of these conversations was to obtain feedback on the willingness of parties to participate in the DSM resource procurement, and to determine the key issues facing potential utility partners considering a DSM/power purchase arrangement with SCE.[8] In particular, Synapse sought to obtain information on the regulatory and institutional concerns or barriers that may exist, and to determine the commercial factors that would influence the pricing arrangements that would accompany the DSM implementation/power purchase alternative. Another goal was to determine the likely range of prices or at least the driving factors in price determination before completion of the final report.

The conversations did not result in confirmation of any particular commercially acceptable pricing arrangements or price bounds. However, PNM did maintain an expression of interest in the concept. The conversations did reveal major concern about how the New Mexico Public Service Commission might view any arrangements that did not allow for freed-up generation capacity to remain available to New Mexico jurisdictional ratepayers. Based on this perspective, the DSM resource analysis conducted for the project presumed significant retention of "freed-up" peaking capacity for the host utility in the neighboring state; the issue of whether to retain peak load savings in the source state is addressed in the next section.

Approach to Analysis of the DSM Resource

The approach used to analyze the DSM resource first determined the range of DSM implementation costs and then considered the interaction between the DSM resource and the power purchase contract that must be coupled with the resource in order to physically flow the resulting "freed up" energy to SCE territory. A spreadsheet model was developed to test the assumptions used. The model allowed for an analysis of the way in which DSM peak shaving benefits would provide value to any potential partnering utilities. It was determined that the simplest and most effective demonstration of the DSM technology option concept would be to construct a power purchase arrangement that flowed "flat" or baseload power to SCE equivalent to the total annual energy saved by the DSM measures installed in the partnering utility's service territory, while simultaneously allowing the benefit of peak load reduction beyond that "flat" to accrue to the partnering utility. This was determined after first investigating alternative models that "flowed" the DSM savings profile directly to SCE.

[8]Synapse thanks the PNM personnel for the time taken to speak with us on the issues. PNM was aware that all discussions were focused on establishing a "proof of concept", or disproving such a concept, and that no commercial implications were to be taken from any of the information provided in the Report.

SCE customers will be made better off, or at least will not be harmed, if the DSM technology option is no more expensive than the next available alternative, accounting for the value of the power during peak and off-peak periods. In the example used to illustrate the DSM technology option, the DSM contract price was set equal to $70/MWh for a 24 x 7 flat baseload product flowed into SCE territory from the Palo Verde hub; this is somewhat less than existing estimates for SCE avoided costs[9], and less than the costs for some of the other supply alternatives. Thus, SCE customers remain at least neutral to the DSM option if a partnering utility is willing to receive $70/MWh for a 24 x 7 product. As the example shows, the peak reduction benefits together with the revenues received from a contract price of $70/MWh appear to be adequate to provide enough incentive to a partnering utility to consider the transaction. Under this construct, the $70/MWh contract price paid by SCE is the total compensation to the partnering utility both to fund the DSM and to pay for the (financially coupled) purchased power flowed to SCE.

The partnering utility's customers who directly participate in the DSM program offerings will be made better off through bill savings resulting from DSM measure installation. Utility management and those partnering utility customers who choose not to participate in any DSM program will not see any rate impact, as long as the benefits flowed to the partnering utility, plus its net production cost savings from reduced load offset the cost of DSM programs and the lost revenues from the DSM savings.

The example described on the next page purposefully considered a conservative allocation of the DSM benefits by keeping the partnering utility customers "held harmless", i.e., there was no rate impact assumed on the partnering utility side. As indicated the example to follow, the partnering utility's "participating" customers receive considerable benefit through direct bill reduction resulting from the DSM measures.

Demand-Side Management as a Peaking Resource

In general, DSM resources have the potential to reduce peak load requirements in the service territories in which they are implemented, in addition to providing energy savings during shoulder and off-peak periods. For areas outside the Desert Southwest, there is considerable data available describing "DSM load shapes" and providing, among other details, annual load factors and coincident factors for DSM technologies.[10] However, the SWEEP study of the Desert Southwest region contained only an aggregate representation of the DSM's peak benefits. The actual DSM resource being evaluated is thus not defined with specificity. In particular, there is no list of the exact measures to be installed or of the technologies or behavioral changes to be promoted. Thus, there is no concrete set of DSM load shapes to evaluate for the DSM technology option. But that does not imply that the benefits of peak load reduction seen with DSM cannot be accounted for in the analysis undertaken for the DSM resource; the SWEEP study's aggregate "DSM load shape" can be used to approximate the peak load reduction benefit accruing to the "partnering" utility implementing the DSM measures. The example below accounts for the peak-

[9] Based on an examination of material included in "Methodology and Forecast of Long Term Avoided Costs for the Evaluation of California Energy Efficiency Programs", October 25, 2004, by Energy and Environmental Economics, Inc.; a review of the "Comparative Cost of California Central Station Electricity Generation Technologies", August 2003 by the staff of the California Energy Commission; and considering increased natural gas price trends.

[10] For example, the Northwest Power and Conservation Council posts publicly available savings and shape data on a wide array of DSM measures. These can be found at http://www.nwcouncil.org/energy/rtf/supportingdata/.

load reducing benefits of DSM by recognizing the higher value of energy saved during peaking periods.

Example of DSM Implementation / Purchase Power Agreement

The following simplified example illustrates how the economics behind the DSM implementation / power purchase agreement might work. Conceptually, the DSM alternative represents procurement of a resource that is less expensive, or at least no more expensive, than other supply options facing SCE. Simultaneously, the DSM technology option allows a partnering utility (for example, PNM or another southwest region utility) to sell additional energy at wholesale; that is, energy that is only freed up and available for sale because of the DSM procurement. Thus, the arrangement could become a win-win approach because of the existence of (1) low DSM resource costs; (2) higher SCE avoided costs, or higher SCE costs based on a comparison to other options; and (3) value to the partnering utility in the form of peak period benefits, if the power purchase contract is not “shaped” to reflect the actual DSM savings “load” profile. The example uses a flat 24 x 7 power purchase product coupled with DSM implementation and retention of DSM peaking benefits by the partnering utility. It illustrates one way to ensure that all stakeholders are at least neutral and some are made better off by the adoption of the DSM option. The example does not directly illustrate certain temporal aspects of the DSM resource, such as front-loaded costs and savings seen over the life of the DSM measures; it uses total resource costs (TRC) to represent the costs associated with a given megawatt-hour of energy savings.

The study scope for the DSM alternative does not include a detailed examination of the rate impacts affecting the neighboring utility ratepayers. In the example below, zero rate impact is assumed, when in reality there could be beneficial rate impacts if the savings associated with the use of the less expensive resource are shared not only between SCE and the partnering utility, but between SCE, the partnering utility, and the partnering utility’s regulated ratepayers.[11]

The example uses the information gleaned from the SWEEP study to posit a DSM total resource cost of $40/MWh, made up of a DSM cost to the utility cost of $30/MWh and a customer contribution of $10/MWh. The total annual contract quantity of 300 GWh/yr is based on an assumption that the DSM resource could ramp up to such a level of implementation over the course of five years. This quantity is chosen to illustrate the workings of the contract; it is considerably below the energy efficiency potential identified in the earlier section of this report; and it can be scaled up linearly at least to the “readily available utility efficiency” identified in the table.

If DSM resources were acquired up to the “readily available utility efficiency” seen in the table, it could conservatively replace approximately 42% of the annual energy and 45% of the capacity of SCE’s share of the Mohave plant. The 300 GWh/year leads to a peak savings of 51 MW, based on the peak savings to annual energy savings ratio found in the SWEEP study.

The example shows the assumed, negotiated contract particulars for the power purchase / DSM resource procurement. A contract price of $70 per MWh is assumed for transferred power; in practice, the price would be negotiated and likely outcomes would depend on the DSM implementation cost, SCE’s avoided costs, and the partnering utility’s cost structures with and without the presence of the DSM savings. The example is based on an assumed minimum level

[11] The timing of forthcoming rate cases, and the existence of policies related to “decoupling” of utility profits from utility sales will also affect rate impacts. We address institutional “decoupling” issues in a subsequent section.

of revenues required by the partnering utility to compensate for production costs and lost retail revenues while simultaneously reflecting an estimate of the benefits the partnering utility gains from peak load reductions and associated reduction in generation production cost to serve its retail load.

The example illustrates the tradeoffs between losing retail sales due to DSM installation and gaining wholesale sales through the power purchase component of the contract. In this instance, a retail price of $73/MWh has been used to demonstrate the effect of lost retail revenues. The current rate structure in the PNM service territory includes a retail rate of approximately $73/MWh or 7.3 cents/kWh. At a contract price of $70/MWh, the partnering utility would see a revenue increase (to partially offset the retail revenue loss) of $21 million per year. The $70/MWh contract revenue is used by the partnering utility to 1) install the DSM, at a utility cost of $30, and 2) provide the coupled power sale to SCE and receive revenues of $40/MWh.

The example includes an estimate of the peak load reduction benefit seen by the partnering utility. The peak benefit arises from three interacting effects: (1) the wholesale power purchase flows physical power equal to 34 MW for all hours of the year, while the DSM savings include 51 MW on average during peak times; (2) the partnering utility's overall system load profile is flattened (its annual load factor increases) due to the peak shaving effect of the DSM measures; and (3) the line loss benefits accrue directly to the partnering utility, which does not have to generate to compensate for the distribution system losses. Additional transmission level loss savings are likely in this particular case (given the location of the "freed up" power closer to SCE's load center, at Palo Verde), but have not been quantified and may not occur in other locations; nor have any additional beneficial effects associated with potential reduced distribution investment. For a 300-GWh transfer, the partnering utility offsets the lost retail revenue of $21.9 million per year with $21 million per year from SCE, and with $3.1 million per year in net DSM peak reduction benefit, arising from production cost savings, for a net gain of $2.3 million per year.

Lastly, the effect of the DSM measures on the partnering utility participating customer is shown below. In this example, the vast majority of the benefits accrue to these customers, for a total of $18.9 million net savings per year for the 300-GWh/yr quantities.

The allocation of the vast majority of benefits to participating customers of the partnering utility reflects an approach that minimizes the regulatory risk of interregional DSM transfers by ensuring that partnering utility ratepayers are held harmless when "freed up" power is used to meet out-of-state loads. This does not imply that such a benefits allocation is the only way to effect a DSM transfer; alternative allocation strategies are possible (e.g., increase the customer contribution) that retain the viability of the DSM option while possibly lowering the costs to SCE.

lustrative Example of DSM Implementation / Purchased Power Arrangement

Contract Particulars and Assumptions	Value	Units	Comments/Definitions
Total Cost (TRC) of DSM (Cost of Saved Energy)	40	$/MWh	TRC - High end of range of observed costs
Customer Contribution	10	$/MWh	Estimate
Net Utility Cost of DSM	30	$/MWh	
DSM Resource Qty / Purchased Power Qty	300	GWh/year	Contract Quantity
DSM Resource Qty - Peak Savings	51	MW	Use aggregate peak impact factor from SWEEP
Negotiated or RFP-based Contract Price	70	$/MWh	Negotiated Contract Price or Result of RFP
Average MW Flow to SCE	34	MW	Average MW Flat Flow at 300 GWh per Year
Power Purchase Shape	24 x 7	Hrs/Week	Flat, Constant Power Flow All Year
Estimate of SCE Avoided Cost to Compute SCE Benefits	70	$/MWh	Estimate - to assume neutral impact on SCE
Average Annual SCE Impact (Customers and Shareholders)			
Resource Savings			
Avoided Costs	70	$/MWh	
Total Contract Price	70	$/MWh	
Price Difference, Avoided Costs - Contract Price	0	$/MWh	
Annual Quantity of Savings	300	GWh/year	
Net Savings	-	$/Year	Equal to Price Difference x Resource amount
Estimate of Average Annual PNM Shareholder Impact			
Revenue Loss Impact Before Peak Reduction Benefit			
Payment from SCE	70	$/MWh	Contract Price
Quantity Wholesale Sale to SCE	300	GWh/year	Contract Quantity
Total Revenue Increase from Purchased Power Contract	21,000,000	$/Year	Contract price x quantity flowed / saved
Retail Rate	73	$/MWh	Approximate based on current rates
Quantity Lost Retail Sales	300	GWh/year	
Lost Retail Revenues from Effect of DSM	21,900,000	$/Year	Contract quantity x retail price
Revenue Loss Impact Before DSM Peak Reduction Benefit	(900,000)	$/Year	Revenue incr. from PP less lost retail revenues
Estimate of DSM Peak Reduction Benefit			
On Peak Costs of Generation	80	$/MWh	Estimate based on PV Market
Off Peak Costs of Generation	35	$/MWh	Estimate
Share of DSM Savings Occuring During Peak Periods	67.0%		Estimate
Share of System Load On-Peak without DSM	70.0%		Estimate
Share of System Load On-Peak with DSM	69.3%		Estmate from DSM Savings % On-Peak Periods
Share of Power Purchase Contract Flow On-Peak	57.0%		Based on 6X16 on-peak definition, 52 weeks/year
System Size	30	10^6 MWh/Yr	Base to allow DSM GWH at 1% of retail load
T&D Loss Savings as % of Retail Load	5.0%		Estimate
Total Production Cost Savings Including Loss Effect	12,154,778	$/Year	Peak Shaving and Loss Effects - See Model
Total Utility DSM Costs	9,000,000	$/Year	Utility Costs x Resource Quantity
Net DSM Peak Reduction Benefit	3,154,778	$/Year	Delta Production Costs incl. T&D Loss Effect
Net Impact Including Peak Reduction Benefit	2,254,778	$/Year	Net Peak Benefit Less Revenue Loss Impact
Estimate of Average Annual PNM Participant Impact			
DSM Savings	300	GWh/year	
Retail Rate	73	$/MWh	
Gross Savings to Participating Customers	21,900,000	$/Year	Quantity x Retail Rate
Customer Contribution	3,000,000	$/Year	Per Unit Customer Contribution x Quantity
Net Savings to Participating Customers	18,900,000	$/Year	

Barriers to Implementation

The barriers to implementation of an interstate (or inter-utility) DSM transfer, as set out here, include:

- Actual or perceived economics of the transaction from the perspective of the partnering utility, in particular generation performance risk and DSM performance risk;
- Uncertainties with regulatory reception in the neighboring states;
- The challenges to increasing local efforts to undertake DSM opportunities; and
- The novelty of interregional DSM resource transfers.

The greatest barrier to implementation is likely the perceived economics of the transaction from the partnering utility's perspective, and the home state utility regulator. To make up retail lost revenues, the partner must be persuaded that the magnitude of peak savings effects is adequate to offset the portion of retail lost revenues not recouped through wholesale sales, while ensuring an adequate financial incentive for shareholders. The economics of the DSM option as illustrated in the example above are sensitive to peak and off-peak power costs and the ratio of those costs; to the negotiated price for the transfer; to the load shape of the DSM measures; to the estimated distribution loss savings; and to the level of customer contribution. All of these driving factors must be given careful attention by the potential partnering utility in determining whether the incentive is large enough to consider the DSM transfer.

Regulatory barriers to implementation include the revenue risks partnering utilities face from home state utility commissions. The DSM technology option involves reduced retail sales and increased wholesale sales, with different revenue streams associated with each. Also, the retention of benefits associated with peak load reduction could flow through to ratepayers as a means of keeping the "freed up" capacity, or a portion of it, in the home state. This could reduce the effective shareholder incentive available to partnering utilities. The DSM transfer would also compete with existing neighboring state utility DSM efforts; at this time, the potential DSM savings far outstrips the efforts currently underway in Arizona, New Mexico, or Nevada, but local efforts could increase the cost of DSM measures incremental to those being captured by the home state itself.

Lastly, unless careful monitoring and verification of the energy efficiency savings is made part of the regulatory approval and the contract between the parties, it is possible that profit margin on the "financially coupled power purchase" could be made without achieving the DSM benefits, which is likely not an outcome desired by, say, California regulators; although such concerns would depend on the way in which peaking benefit risk is accounted for by the partnering utility. In the example used, actual peaking benefit and true MWh energy savings are critical for the partnering utility to achieve a profit margin.

Interaction of Interstate DSM Transfers and Decoupling

The example provided in the previous section uses retail lost revenues in estimating the benefits to the partnering utility for the DSM resource procurement / power purchase agreement. It is possible that under different forms of regulation in New Mexico (or other states that might be involved in potential DSM resource procurements), the existence of a rate-making structure that "decouples" a utility's profits from its regulated retail sales may help to reduce the lost margin often associated with lost revenues, and subsequently lower the contract price for the DSM resource (by lowering the risk of revenue recovery for the partnering utility). In this example, the retail lost revenues are mostly recouped through wholesale gained revenues. However, there may be circumstances in which the existence of a "decoupling" framework could help to put downward pressure on the price otherwise required to enter into a "DSM transfer" such as is contemplated herein.

Conclusions

The following conclusions can be drawn from the analysis of the interstate DSM transfer:

- A sufficient amount of cost-effective DSM resource potential exists in the states neighboring California for this resource to be considered as a potentially viable alternative or supplemental resource for SCE. In particular, relatively untapped, cost-effective DSM potential exists in Arizona, New Mexico, and Nevada.
- The overall economics appear attractive given reasonable and, in some ways, conservative assumptions made in the analysis of the resource. It is important to consider all of the benefits arising from the DSM alternative, given the existence of retail lost revenues and their effect on pricing requirements. For example, distribution system loss avoidance is a considerable benefit and should not be underestimated. The allocation of the benefits between utility customers and utility shareholders will affect the economics and could prove decisive to the viability of the DSM transfer.
- The proximity of the Palo Verde hub to the SCE territory, and the relative liquidity of wholesale power supply at the hub, makes it easier for utility companies located in the Southwest states to consider a commercial arrangement with SCE. In these instances, there is no need to secure transmission to deliver the DSM resource from the actual service territory of the partnering utility.
- The uncertain regulatory environment in partnering utility states and the novelty of interregional DSM transfers increase the perception of its risk compared to more standard DSM implementation considerations. Regulatory oversight and effective verification of the energy efficiency savings would be critical to acceptance and success.
- An interstate DSM transfer is made up of installed demand-side technologies and a coupled power purchase contract. It does not have the same cost structure as the supply options, and thus it is difficult to directly compare it to supply side alternatives, since computation of levelized costs was not part of the study. The alternative includes not just the installed DSM costs, but also negotiated premiums that may be required to address lost revenue or related institutional risks. In its simplest form, the DSM option looks like an all-in power purchase contract, whose price is subject to negotiation, and the study posits a baseload resource profile for this contract (although flowing DSM peaking benefits directly to SCE is possible). What is known is that the overall DSM resource costs are relatively low ($40/MWh based on total resource costs), that it provides peaking benefits in the partnering utility service territory, and that any ultimately negotiated price will rest heavily on these two factors.

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