2025 DEMAND RESPONSE POTENTIAL ASSESSMENT

Grant County Public Utility District

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Introduction

This report summarizes the 2025 Demand Response Potential Assessment (DRPA) conducted by Lighthouse Energy Consulting and Nauvoo Solutions (the project team) for Grant County Public Utility District (Grant PUD). The DRPA estimated the cost-effective demand response potential for 2026 to 2045.

The DRPA generally followed the methodology used by the Northwest Power and Conservation Council (Council) in the 2021 Power Plan and included many of the same demand response (DR) products. This DRPA includes products in the residential, commercial, industrial, and agricultural sectors. The DR products impact both the summer and winter seasons and utilize a range of strategies, including direct load control, customer-initiated demand curtailment, and time-varying prices in order to effect reductions in peak demand. The DRPA did not consider potential DR among Grant PUD's data center customers. Given the size of these loads, there may be great opportunities for DR at these facilities, but this is an emerging practice and the ability of data centers to reduce or shift loads as well as the cost and incentives required are highly specific to individual data centers.

Background

The 2021 Power Plan defines DR as "a non-persistent intentional change in net electricity usage by end-use customers from normal consumptive patterns in response to a request on behalf of, or by, a power and/or distribution/transmission system operator. This change is driven by an agreement, potentially financial, or tariff between two or more participating parties."[1]

DR has not been widely used in the Northwest but has received increased interest in recent years. Growing capacity constraints associated with the closure of regional coal-fired power plants, increases in policies requiring the use of carbon-neutral or renewable energy such as Washington's Clean Energy Transformation Act (CETA), and operational limitations placed on the region's hydropower system are all driving a need for cost-effective generation capacity. DR offers a solution to reduce system demands, help integrate renewable resources, and alleviate congestion on transmission and distribution systems.

In addition, the CETA requires utilities to assess the amount of DR resource potential that is cost-effective, reliable, and feasible, and use that assessment to identify a target for DR in each Clean Energy Implementation Plan (CEIP). The first CEIP was due January 1, 2022, and updates are due every subsequent four years.

[1] Northwest Power and Conservation Council, *2021 Power Plan.* March 10, 2022. https://www.nwcouncil.org/fs/17680/2021powerplan_2022-3.pdf

Methodology

The project team developed this DRPA by identifying the DR products to be included in the assessment, quantifying their costs and benefits, and then quantifying Grant PUD's customer base that could adopt them.

Like a conservation potential assessment, the DR potential calculation process began with the quantification of technical potential, which is the maximum amount of DR possible without regard to cost or market barriers to limit participation. The assessment then considered market barriers, program participation rates, and other factors to quantify the achievable potential. Finally, the economic potential is quantified by applying a total resource cost (TRC) perspective cost-benefit test to the achievable potential. This methodology is discussed further below.

Demand Response Products

This DRPA included many of the same products as the 2021 Power Plan. These products cover a range of sectors, end uses, and product types. Although Grant PUD experiences its peak sales during the summer, capacity from DR in both summer and winter provides opportunities to reduce exposure to high market prices and capacity costs, sell excess capacity, and strengthen overall system reliability and stability. As a result, Grant PUD can benefit from demand reductions in both seasons. For this reason, the project team evaluated demand response products with impacts across both the summer and winter. The high-level categories of DR products included in this assessment are summarized in Table 1 below, which organizes the products by sector and implementation strategy.

Table 1: Demand Response Products

	Direct Load Control	Demand Curtailment	Time-Varying Pricing
Residential	• EV Charging • Grid-Enabled Water Heater • Water Heater Switch • Space Heating Switch • Space Cooling Switch • Smart Thermostat		• Time of Use (TOU) Pricing • Critical Peak Pricing
Commercial	• Space Heating Switch • Space Cooling Switch • Smart Thermostat	• Demand Curtailment	• Critical Peak Pricing
Industrial		• Demand Curtailment	• Critical Peak Pricing • Real Time Pricing
Agricultural	• Large Farm Irrigation DLC • Small Farm Irrigation DLC		

Direct load control (DLC) products are those in which the utility has direct control of the operation of applicable equipment. This could be achieved by adding switch controls to existing equipment or controlling equipment with integrated controls such as smart thermostats and grid-enabled hot water heaters. DLC products typically achieve high event participation rates as participation in an event is only limited by the success of the controlled equipment receiving and implementing any instructions to change its operation or customer intervention to opt out of a demand response event. Demand curtailment is like DLC but requires the intervention of customers to implement reductions in load. These products usually involve contracts between the customer and utility that detail the amount, duration, and frequency of load reductions. Time-varying price products rely on a variety of tariff-based strategies to encourage customers to respond to higher energy or demand prices. Participation in curtailment and price-based programs depends on customer willingness to shift energy usage, the expectations from the utility of how often and long events would occur, and the incentives for participating.

The project team customized the assumptions for these products to better reflect Grant PUD's service territory and projections of equipment saturations based on Grant PUD's 2025 Conservation Potential Assessment (2025 CPA). For example, the project team used the projections of future adoption of heat pump water heaters and smart thermostats from the 2025 CPA to estimate the number of homes with these technologies that could participate in related demand response programs.

Appendix I of this report includes a complete list of the products used in this assessment.

Customer and Sales Forecasts

Once the products were identified, the project team then quantified the customer base that could adopt the products. The project team, with support from Grant PUD, developed 20-year forecasts of customer sales and counts for each sector. Summaries of these forecasts are shown in Figure 1 and Figure 2. In the long term, approximately 40% of Grant PUD's sales (excluding data centers) are in the industrial sector. The remaining sales are approximately equally divided among the residential, commercial, and agricultural sectors. Compared to sales, the distribution of customer counts is more heavily weighted towards the residential sector, which accounts for nearly 90% of 2045 customers.

In the residential sector, customer counts and saturations of eligible equipment are the primary determinants of DR potential. In the non-residential sectors, the potential is largely determined by forecasted sales.

Figure 1: Sales Forecast by Sector

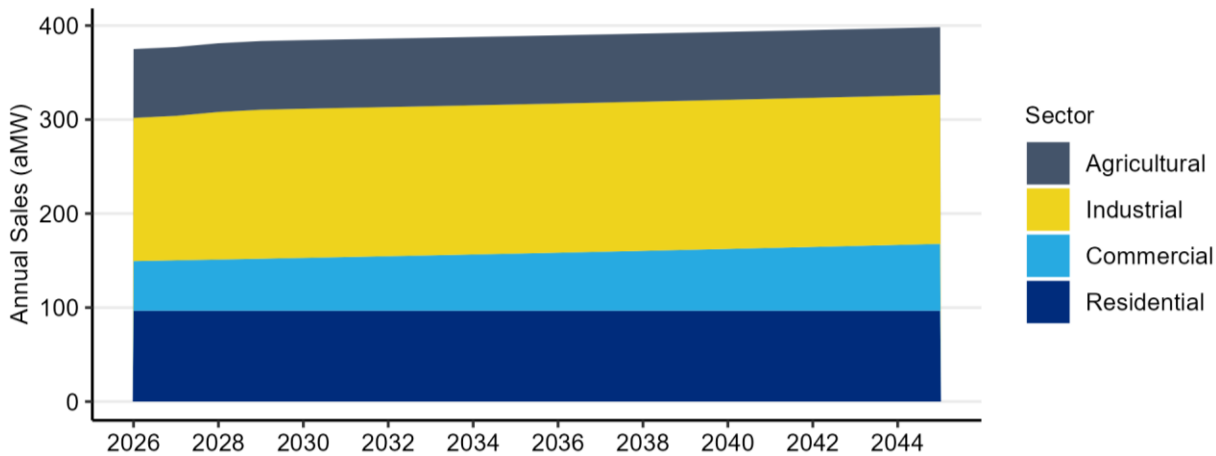
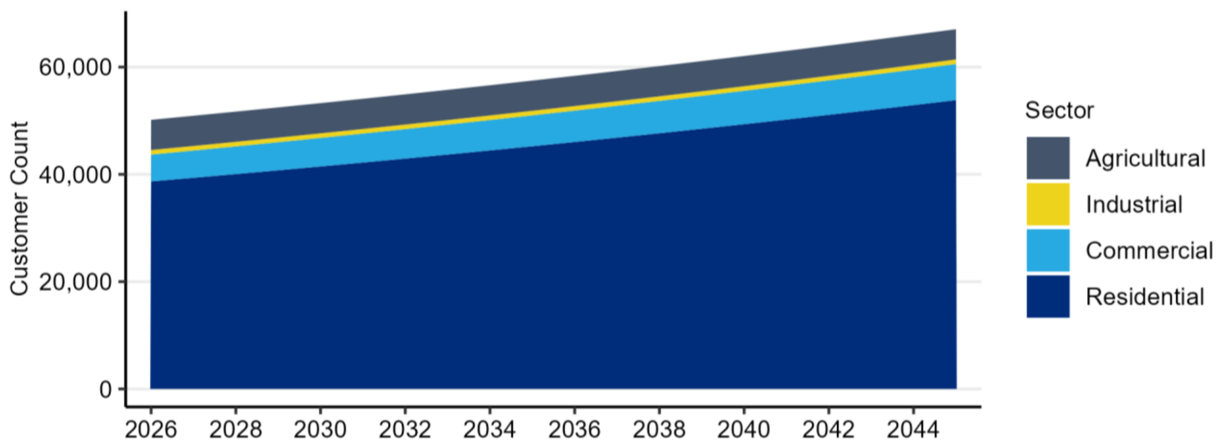


Figure 2: Customer Count Forecast by Sector

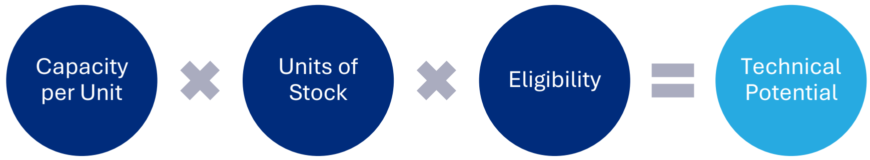


Technical Potential

The project team quantified the technical DR potential by a combination of bottom-up and top-down methodologies, depending on how the impact of a given product was quantified. In products where the impacts are quantified in terms of an assumed demand impact per unit, the bottom-up methodology is used. For example, smart thermostats have an assumed demand impact of approximately 1 kilowatt per thermostat in the winter. Products with percentage-based impacts use the top-down method. For example, residential time of use rates are modeled on a top-down basis using an assumed demand reduction of approximately 3% during winter on-peak periods. These methodologies are described further below.

In the bottom-up method, illustrated in Figure 3, the per-unit demand reduction estimate for each DR product was multiplied by the number of technically possible opportunities. The number of opportunities was determined by multiplying the units of stock, such as the number of homes, by an eligibility factor. This factor quantifies the share of units that are eligible to install the DR product or participate in a program. The factor is typically determined based on the share of buildings with the appropriate equipment installed. For example, in quantifying the potential associated with a residential smart thermostat demand response program, the eligibility factor would be the share of homes in Grant PUD's service territory with a smart thermostat installed.

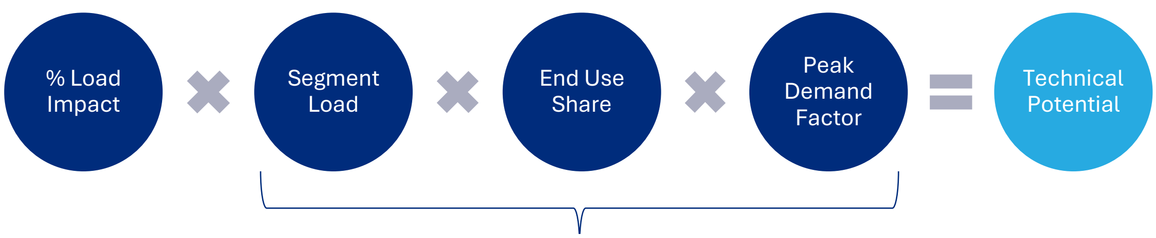
Figure 3: Bottom-Up Technical Potential Calculation



This analysis used the capacity values determined by Council in the 2021 Power Plan or through additional research and analysis conducted by the project team. Stock unit counts were developed from data provided by Grant PUD, Census data, and regional stock assessments. Finally, the eligibility factors were determined by a combination of data from Grant PUD's 2025 CPA and the 2021 Power Plan. The project team used projections of the future adoption of technologies such as smart thermostats and heat pump water heaters from Grant PUD's 2025 CPA to inform the future potential identified in this DRPA.

In the top-down method, the technical potential was determined by multiplying each DR product's assumed load impact by an applicable load basis. The impact is the estimated demand reduction, expressed as a percentage, and the load basis is measured in units of demand. The load basis was determined by multiplying the load of a given customer segment by the share of load within the impacted end use. For example, with products controlling HVAC equipment, the load basis is calculated by multiplying the overall load of the customer segment and the share of energy used by HVAC equipment. Finally, a peak demand factor converts annual energy consumption values into an average demand, based on the expected number and duration of DR events, and their coincidence with Grant PUD's expected system peaks. This calculation is shown in Figure 4.

Figure 4: Top-Down Technical Potential Calculation



The load impact assumptions and end use shares were taken from the 2021 Power Plan or developed from research conducted by the project team. The segment loads within each sector were developed from sector-level forecasts developed with Grant PUD. The project team calculated the peak demand factors based on 2021 Power Plan load shapes and their coincidence with Grant PUD's system peaks.

Achievable Potential

The project team quantified the achievable potential for each product by adjusting the technical potential to include considerations for program and event participation rates and program ramp up. Program participation is the proportion of eligible customers who participate in a DR program while event participation quantifies the share of program participants that engage in any given DR event. For DR products enabled through DLC, the event participation rate depends on the success of the controlled equipment responding to the control signal and reducing demand as well as participant opt-outs, while for other types of programs this factor considers the likelihood of human intervention.

The annual rate of DR program adoption was based on ramp rates. Ramp rates consider whether a program is starting from scratch or already has traction in the market and how long it will take to reach its maximum participation levels. This assessment generally used the ramp rates used in the 2021 Power Plan, where most products were given a ramp rate that reflects a 5- or 10-year ramp up period.

The calculation of achievable potential is the same for both bottom-up and top-down methods and is shown in Figure 5.

Figure 5: Achievable Potential Calculation

Economic Potential

The economic potential was determined by applying a TRC-based cost-effectiveness screening to the achievable potential described above. To perform this screening, the project team estimated the costs of capacity avoided through demand response for Grant PUD and compared those to the estimated program costs for each product. Table 2 summarizes the costs and benefits included in the cost-effectiveness calculation.

Table 2: Demand Response Costs and Benefits

Costs	Benefits
• Program setup costs • Operation and maintenance costs • Equipment costs • Marking costs • Program incentives[2]	• Avoided generation capacity costs • Avoided capital costs of capacity expansions on the transmission and distribution systems

[2] While program incentives are not included in the Total Resource Cost perspective for most demand-side resources, for DR programs some portion of the incentive is assumed to represent a DR program participant's burden or inconvenience in participating in a program. For example, in the residential sector, 25-35% of the incentives are included as a cost.

These costs and benefits are projected over 20 years, based on each product's projected participation and associated demand reductions.

This assessment assumes that DR events can be called with perfect anticipation of peak demands. In implementing a DR program, utilities typically specify a maximum number of events per season that will be called. This gives participants an upper limit of what may be asked of them but also provides utilities with a number of events to call when forecasted demands are high. However, challenges still exist in deciding the dates and hours to call DR events, and any peak events occurring when DR events were not planned may result in reductions in the ultimate cost-effectiveness of a DR program.

Results

This section documents the results of the DRPA. It begins with the summer and winter achievable potential, followed by a discussion of the costs and economic potential.

Summer Achievable Potential

In the summer, Grant PUD has approximately 69 MW of achievable demand response available by 2045, which is 5% of Grant PUD's estimated 2045 summer peak demand.

Most of the potential is in the agricultural sector, which totals nearly 46 MW in the last year of the study period. The second largest sector is the residential sector, which provides 16.8 MW of capacity savings in 2045. The remaining potential in the commercial and industrial sectors is approximately 6.5 MW in total. Although nearly 60% of sales are in the commercial and industrial sectors, the agricultural and residential sectors offer greater potential due to the higher proportion of flexible load in these sectors and coincidence of load with peak demands. Commercial and industrial facilities have less ability to reduce or shift their loads and participation in demand response programs is assumed to be limited.

Figure 6 shows the annual achievable summer potential by sector.

Figure 6: Annual Achievable Summer DR Potential by Sector

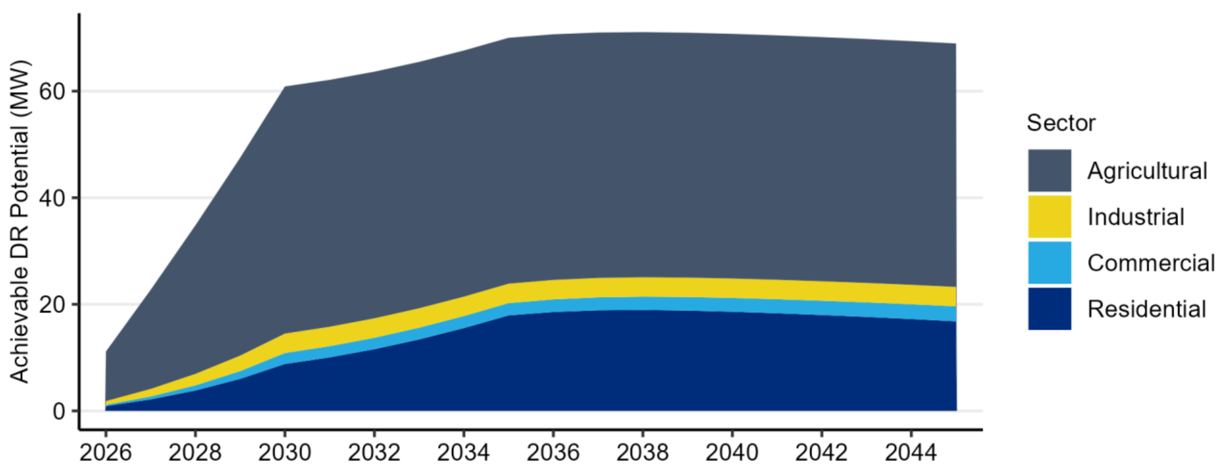


Figure 7 shows the breakdown of summer DR potential by end use: space cooling, water heating, EV charging, and an "all" category. The "all" category represents pricing products and curtailment strategies that are not tied to a single end use, as well as irrigation products. As a result, this category accounts for nearly 80% of the total achievable summer potential.

The changes in potential over time for each end use reflect the different initial ramp rates as well as changes in the saturation of eligible equipment. For example, the growth in potential from EV charging is driven by the forecasted adoption of electric vehicles. The DR potential in water heating is impacted by the adoption of heat pump water heaters, which provide energy savings throughout the year but less callable load reductions for demand response.

Growth in the "all" end use is based on the assumed rollout of curtailment and pricing programs. The flattening of this potential after 2030 indicates that the programs are fully rolled out. In addition, unlike other end uses, the potential in this end use is not impacted by future changes in equipment adoption.

Figure 7: Annual Achievable Summer DR Potential by End Use

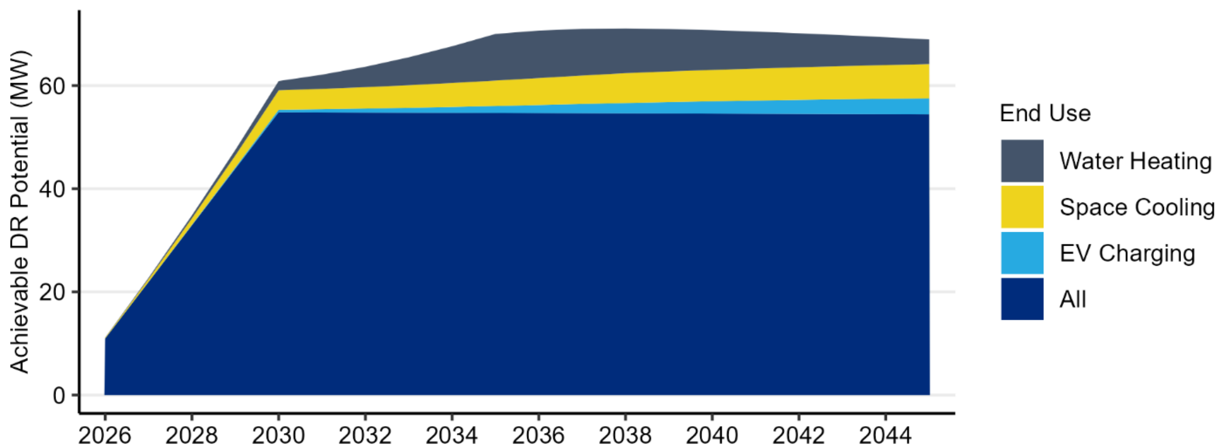
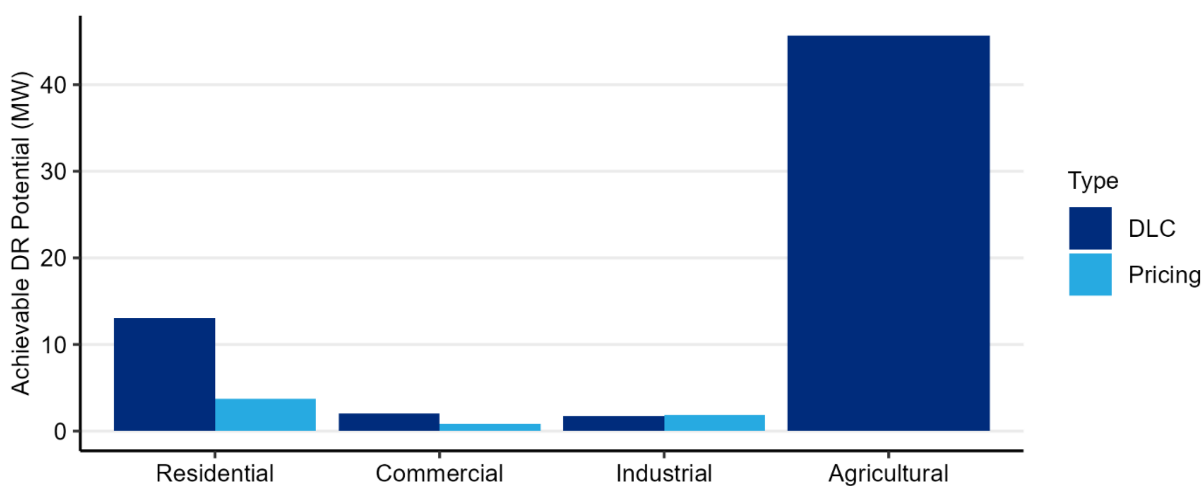


Figure 8 shows how this potential breaks down across the various product types within each sector. Agricultural DLC products offer the vast majority of achievable potential, followed by residential DLC products. The commercial and industrial demand curtailment products are classified as DLC products in this figure.

Figure 8: Achievable Summer DR Potential by Sector and Type



Winter Achievable Potential

The estimated achievable winter DR potential is summarized by sector and year in Figure 9. The total 20-year winter potential is 21 MW, which is approximately 2% of Grant PUD's estimated 2045 winter peak demand.

Because there are no agricultural DR products in the winter, nearly all of the potential is in the residential sector, which grows to 17.1 MW by 2045. The remaining potential is comparably modest, with 1.3 MW from the commercial sector and 2.6 MW from the industrial sector.

Figure 9: Annual Achievable Winter DR Potential by Sector

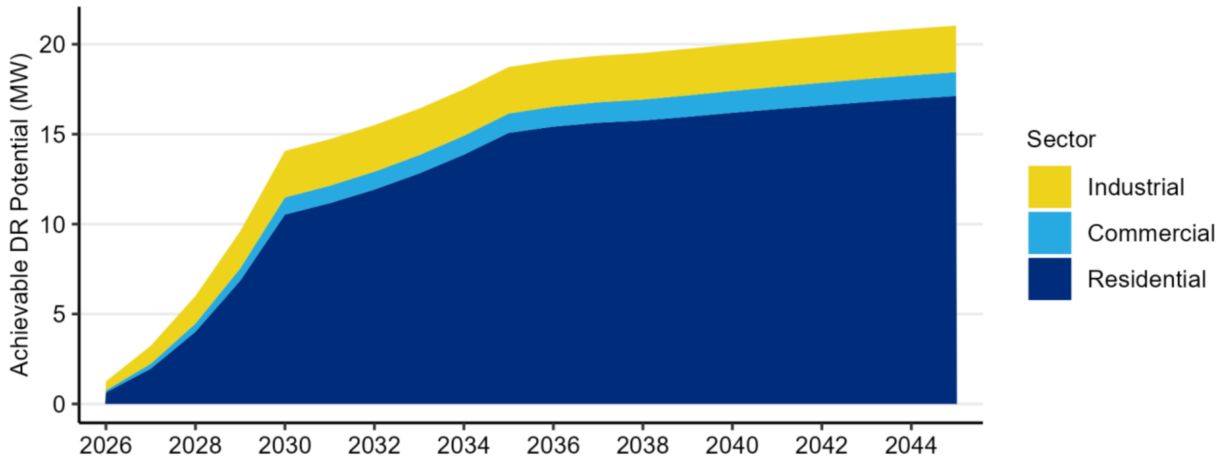


Figure 10 shows how this potential breaks down by end use. There are two key differences between this distribution and what was shown above for the summer. First, the "all" category is approximately 90% lower than in summer, reflecting the absence of irrigation DR. Second, the space heating end use provides nearly 2 MW more potential in 2045 than space cooling. This is driven by higher energy consumption from residential heating equipment during winter peak periods.

Figure 10: Annual Achievable Winter DR Potential by End Use

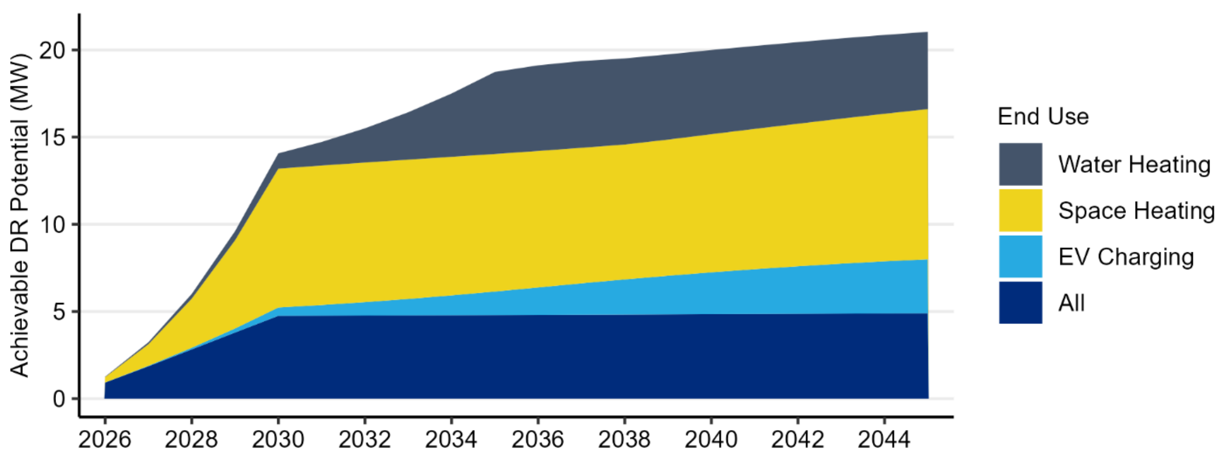
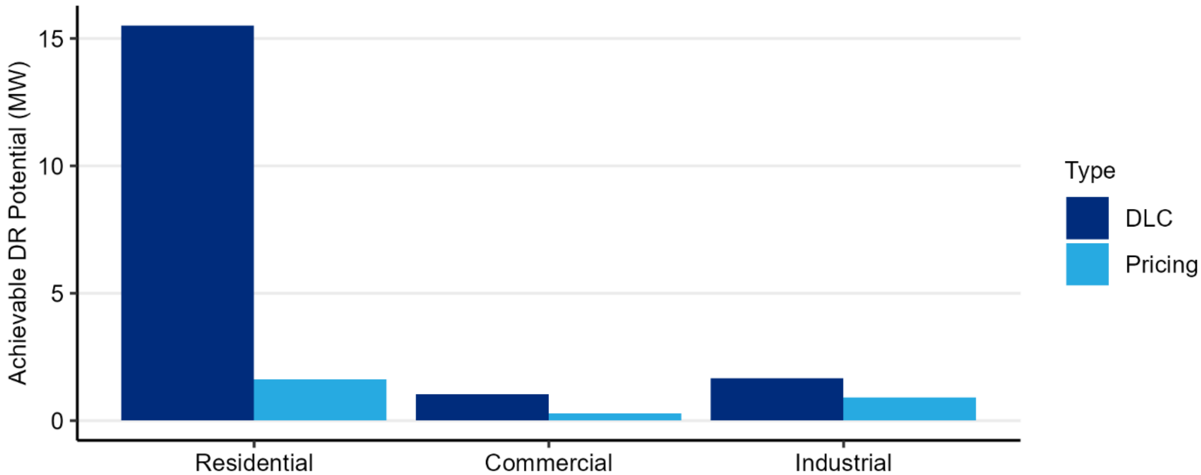


Figure 11 shows how this potential breaks down across the various product types within each sector. 73% of the winter 2045 achievable potential is associated with residential DLC products.

Figure 11: Achievable Winter DR Potential by Sector and Type



Costs

A demand response supply curve details the quantity of DR potential available at different cost thresholds. The supply curves for summer and winter DR are shown in Figure 12 and Figure 13, respectively. The products are ranked by levelized cost ($/kW-year), with the lowest cost product at the bottom. Moving up the supply curve, the incremental DR potential for each product is shown in dark blue and the cumulative potential from all previous products shown in light blue.

The horizontal axis reflects the 20-year DR capacity and the value at the end of each bar is the levelized cost of each product. The levelized cost calculations for summer products include credits for deferred distribution and transmission system capacity costs. Grant PUD's system peaks in the summer and these demands are likely to determine transmission and distribution capacity needs.

Figure 12 shows the two irrigation products and residential smart thermostats have the highest amounts of potential. There are nearly 46 MW available through the irrigation products and another 4.6 MW available through residential smart thermostats.

In addition to having the highest potential, the irrigation products and residential smart thermostats also have the lowest cost, with each having a levelized cost less than $10/kW-year. Note that although the residential EV charging and heat pump water heater products have higher costs, these costs may come down over time as the saturation of equipment increases and the cost of implementing a demand response program for these products can be shared among more customers.

Figure 12: Summer DR Supply Curve (MW and $/kW-year)

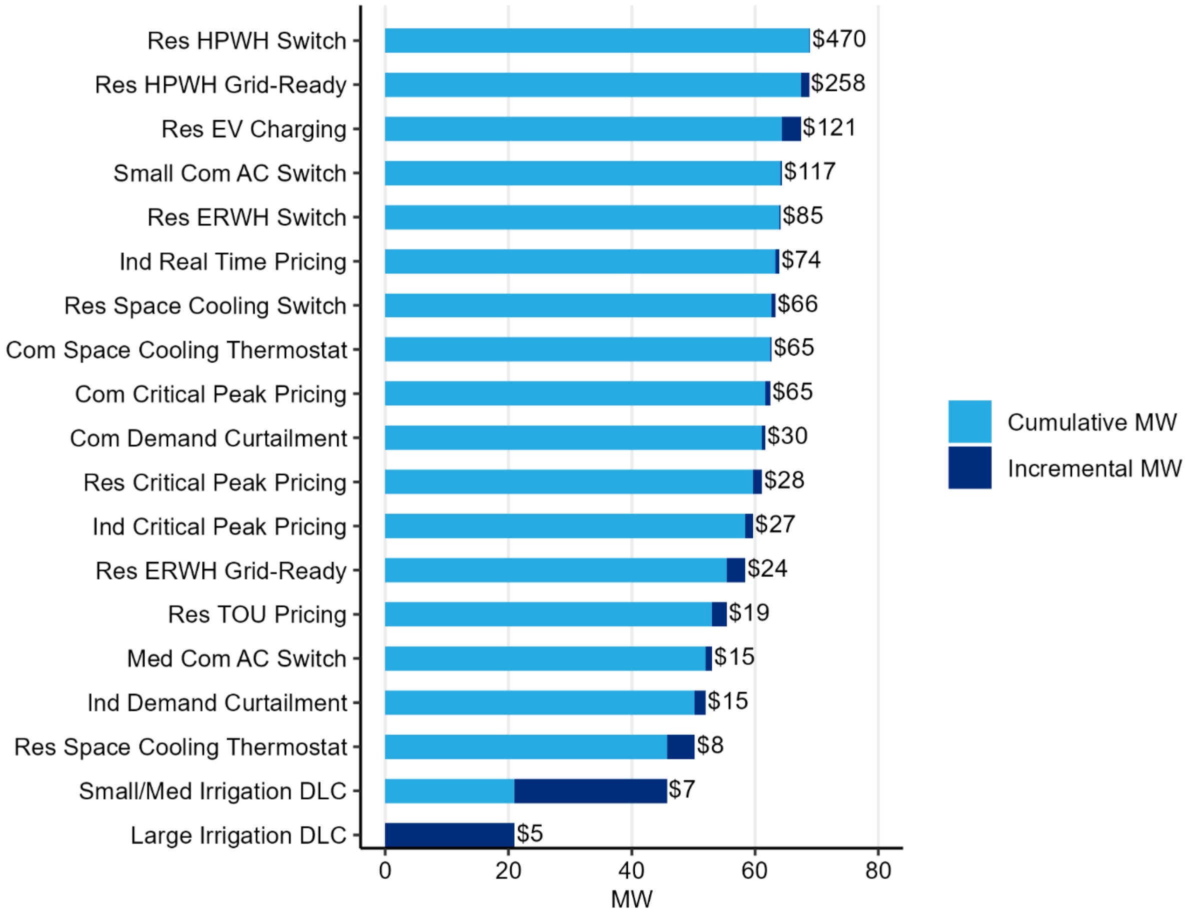
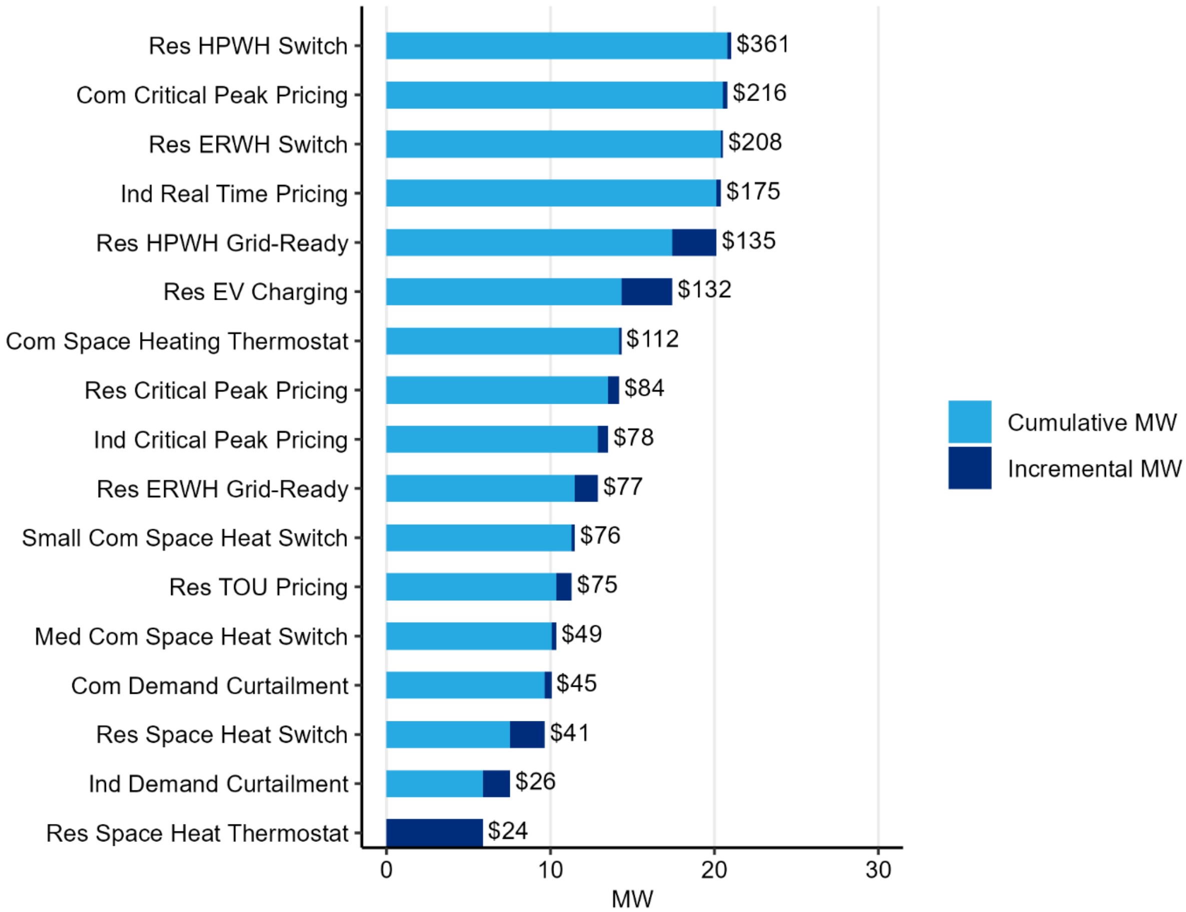


Figure 13 shows the supply curve for winter capacity. The ranking of products by cost is similar to the summer, but without agricultural products, the product with the greatest amount of potential is residential smart thermostats. The levelized costs of the winter products are generally higher than the comparable summer products because the demand savings are not coincident with Grant PUD's system peaks and do not receive credit for deferred transmission and distribution system costs.

Figure 13: Winter DR Supply Curve (MW and $/kW-year)



Cost Effectiveness

Table 3 shows the result of the cost-effectiveness screening for each summer DR product. Products are ranked in descending order by benefit-cost ratio. The 20-year DR potential for each product is also shown.

Large and small irrigation products and residential smart thermostat DR have cost-effectiveness ratios greater than or equal to 2.0. This indicates that the estimated benefits are double the estimated costs over the 20-year study period. These are also the products with the greatest amount of potential.

Other products with cost-effectiveness ratios greater than 1.0 include commercial and industrial demand curtailment, commercial space cooling switches, residential time of use pricing, residential grid-enabled electric resistance water heaters, and critical peak pricing in the residential and industrial sectors. However, some of these products are only marginally cost effective, with benefit-cost ratios just above the cost-effectiveness threshold of 1.0. The remaining products were not cost-effective.

Table 3: Summer Benefit-Cost Ratio Results by Product

Product Name	Benefit-Cost Ratio	Cumulative MW
Large Irrigation DLC	2.8	21.0
Small Irrigation DLC	2.6	24.7
Res Space Cooling Thermostat	2.4	4.6
Ind Demand Curtailment	1.8	1.8
Medium Com Space Cooling Switch	1.7	1.1
Res TOU Pricing	1.5	2.4
Res ERWH Grid-Ready	1.3	3.0
Ind Critical Peak Pricing	1.2	1.3
Res Critical Peak Pricing	1.2	1.4
Com Demand Curtailment	1.1	0.5
Com Critical Peak Pricing	0.6	0.8
Com Space Cooling Thermostat	0.6	0.2
Res Space Cooling Switch	0.6	0.6
Ind Real Time Pricing	0.5	0.6
Res ERWH Switch	0.5	0.3
Small Com Space Cooling Switch	0.4	0.2
Res EV Charging	0.4	3.1
Res HPWH Grid-Ready	0.2	1.3
Res HPWH Switch	0.1	0.2

In the winter season, the cost-effective products include residential thermostats and space heat switches, commercial and industrial demand curtailment, and space heating switches at medium-sized commercial buildings. This can be seen in Table 4.

Table 4: Winter Benefit-Cost Ratio Results by Product

Product Name	Benefit-Cost Ratio	Cumulative MW
Res Space Heat Thermostat	2.3	5.9
Ind Demand Curtailment	2.1	1.7
Res Space Heat Switch	1.4	2.1
Com Demand Curtailment	1.2	0.4
Medium Com Space Heating Switch	1.1	0.3
Res TOU Pricing	0.7	1.0
Small Com Space Heating Switch	0.7	0.2
Res ERWH Grid-Ready	0.7	1.4
Ind Critical Peak Pricing	0.7	0.6
Res Critical Peak Pricing	0.7	0.7
Com Space Heating Thermostat	0.5	0.1
Res EV Charging	0.4	3.1
Res HPWH Grid-Ready	0.4	2.7
Ind Real Time Pricing	0.3	0.3
Res ERWH Switch	0.3	0.1
Com Critical Peak Pricing	0.3	0.3
Res HPWH Switch	0.2	0.2

Summary

This report summarizes the results of the 2025 DRPA conducted for Grant PUD. The assessment included many of the same products and the same calculation methodology as the Council in the 2021 Power Plan. The project team customized the products and modified market assumptions to better reflect Grant PUD's service territory and aligned inputs with the projections of Grant PUD's 2025 CPA. The DRPA included products applicable to the residential, commercial, industrial, and agricultural sectors that use a variety of DLC, demand curtailment, and price-based strategies to target multiple end uses.

Overall, the assessment quantified nearly 70 MW of achievable summer DR capacity and 21 MW of achievable winter DR capacity in 2045. The products with the greatest achievable potential were residential smart thermostats and irrigation. These products were also identified as the most cost-effective products in the applicable seasons.

Since the costs of implementing a demand response program can be highly utility specific, the project team recommends that Grant PUD further refine the costs of implementing irrigation and residential smart thermostat demand response programs and re-evaluate the cost effectiveness before setting a target.

In addition to refining the estimates of its own implementation costs for the irrigation products, Grant PUD could reference Idaho Power's irrigation demand response program,[3] which has been active since 2004. For smart thermostats, Grant PUD could investigate costs of implementing a program in the summer or across both seasons. In this assessment some costs of DR programs were split between seasons where applicable, but it may be unrealistic to do so in practice. Accordingly, the cost effectiveness of a smart thermostat program as implemented may differ from the estimates in this assessment. The project team can assist Grant PUD with updating the estimates of cost effectiveness of these products, if desired.

This assessment did not evaluate demand response at Grant PUD's data centers due the emerging and highly site-specific nature of this practice. However, these facilities could provide significant demand reductions. The costs of alternative DR resources evaluated in this report can serve as a benchmark against which DR at data centers could be evaluated.

Note that recent legislative changes have amended Washington's Energy Independence Act, allowing utilities to count demand response towards the Act's renewable energy requirements. While this change was not included as part of this assessment, it may provide additional value for demand response, adding to the cost effectiveness of the products considered in this assessment.

[3] See https://www.idahopower.com/energy-environment/ways-to-save/savings-for-your-business/irrigation-programs/irrigation-peak-rewards/ for further details.

Appendix I: DR Product List

DR Product Info					
Sector	End Use	Product	Type	Impact	Methodology
Residential	EV Charging	Res EV Charging	DLC	Winter	Bottom Up
Residential	EV Charging	Res EV Charging	DLC	Summer	Bottom Up
Residential	Water Heating	Res ERWH Switch	DLC	Winter	Bottom Up
Residential	Water Heating	Res ERWH Switch	DLC	Summer	Bottom Up
Residential	Water Heating	Res ERWH Grid-Ready	DLC	Winter	Bottom Up
Residential	Water Heating	Res ERWH Grid-Ready	DLC	Summer	Bottom Up
Residential	Water Heating	Res HPWH Switch	DLC	Winter	Bottom Up
Residential	Water Heating	Res HPWH Switch	DLC	Summer	Bottom Up
Residential	Water Heating	Res HPWH Grid-Ready	DLC	Winter	Bottom Up
Residential	Water Heating	Res HPWH Grid-Ready	DLC	Summer	Bottom Up
Residential	Space Heating	Res Space Heat Switch	DLC	Winter	Bottom Up
Residential	Space Cooling	Res Space Cooling Switch	DLC	Summer	Bottom Up
Residential	Space Heating	Res Space Heat Thermostat	DLC	Winter	Bottom Up
Residential	Space Cooling	Res Space Cooling Thermostat	DLC	Summer	Bottom Up
Commercial	Space Heating	Small Com Space Heating Switch	DLC	Winter	Bottom Up
Commercial	Space Cooling	Small Com Space Cooling Switch	DLC	Summer	Bottom Up
Commercial	Space Heating	Com Space Heating Thermostat	DLC	Winter	Bottom Up
Commercial	Space Cooling	Com Space Cooling Thermostat	DLC	Summer	Bottom Up
Commercial	Space Heating	Medium Com Space Heating Switch	DLC	Winter	Bottom Up
Commercial	Space Cooling	Medium Com Space Cooling Switch	DLC	Summer	Bottom Up
Commercial	All	Com Demand Curtailment	DLC	Winter	Top Down
Commercial	All	Com Demand Curtailment	DLC	Summer	Top Down
Industrial	All	Ind Demand Curtailment	DLC	Winter	Top Down
Industrial	All	Ind Demand Curtailment	DLC	Summer	Top Down
Residential	All	Res TOU Pricing	Pricing	Winter	Top Down
Residential	All	Res TOU Pricing	Pricing	Summer	Top Down
Residential	All	Res Critical Peak Pricing	Pricing	Winter	Top Down
Residential	All	Res Critical Peak Pricing	Pricing	Summer	Top Down
Commercial	All	Com Critical Peak Pricing	Pricing	Winter	Top Down
Commercial	All	Com Critical Peak Pricing	Pricing	Summer	Top Down
Industrial	All	Ind Critical Peak Pricing	Pricing	Winter	Top Down
Industrial	All	Ind Critical Peak Pricing	Pricing	Summer	Top Down
Industrial	All	Ind Real Time Pricing	Pricing	Winter	Top Down
Industrial	All	Ind Real Time Pricing	Pricing	Summer	Top Down
Agricultural	All	Large Irrigation DLC	DLC	Summer	Top Down
Agricultural	All	Small Irrigation DLC	DLC	Summer	Top Down

Appendix II: Acronyms

AC	Air Conditioning
AMI	Advanced Metering Infrastructure
aMW	Average Megawatt
CEIP	Clean Energy Implementation Plan
CETA	Clean Energy Transformation Act
CPA	Conservation Potential Assessment
CPP	Critical Peak Pricing
CVR	Conservation Voltage Reduction
DLC	Direct Load Control
DR	Demand Response
DRPA	Demand Response Potential Assessment
ERWH	Electric Resistance Water Heater
EV	Electric Vehicle
HPWH	Heat Pump Water Heater
HVAC	Heating, Ventilation, and Air Conditioning
kW	Kilowatt
MW	Megawatt
TOU	Time of Use
TRC	Total Resource Cost

Appendix III: Detailed Results

Product	End Use	Levelized Cost ($/kW-year)	Benefit-Cost Ratio	4-Year Achievable Potential (MW)	10-Year Achievable Potential (MW)	20-Year Achievable Potential (MW)
Res EV Charging - Winter	EV Charging	$132	0.42	0.2	1.3	3.1
Res EV Charging - Summer	EV Charging	$121	0.35	0.2	1.3	3.1
Res ERWH Switch - Winter	Water Heating	$208	0.27	0.3	0.6	0.1
Res ERWH Switch - Summer	Water Heating	$85	0.48	0.6	1.3	0.3
Res ERWH Grid-Ready - Winter	Water Heating	$77	0.72	0.2	3.4	1.4
Res ERWH Grid-Ready - Summer	Water Heating	$25	1.30	0.5	7.4	3.0
Res HPWH Switch - Winter	Water Heating	$361	0.15	0.0	0.1	0.2
Res HPWH Switch - Summer	Water Heating	$470	0.10	0.0	0.1	0.2
Res HPWH Grid-Ready - Winter	Water Heating	$135	0.41	0.0	0.6	2.7
Res HPWH Grid-Ready - Summer	Water Heating	$258	0.17	0.0	0.3	1.3
Res Space Heat Switch - East	Space Heating	$41	1.36	4.2	4.1	2.1
Res Space Cooling Switch - East	Space Cooling	$66	0.60	1.2	1.1	0.6
Res Space Heat Thermostat - East	Space Heating	$24	2.29	0.6	3.3	5.9
Res Space Cooling Thermostat - East	Space Cooling	$8	2.40	0.5	2.6	4.6
Com Space Heating Switch - Small/East	Space Heating	$77	0.73	0.1	0.2	0.2
Com Space Cooling Switch - Small/East	Space Cooling	$117	0.36	0.1	0.1	0.2
Com Space Heating Thermostat - East	Space Heating	$112	0.50	0.0	0.1	0.1
Com Space Cooling Thermostat - East	Space Cooling	$65	0.61	0.0	0.1	0.2
Com Space Heating Switch - Medium/East	Space Heating	$49	1.14	0.1	0.2	0.3
Com Space Cooling Switch - Medium/East	Space Cooling	$15	1.74	0.5	0.9	1.1
Irrigation DLC - Large	All	$5	2.81	17.0	21.2	21.0
Irrigation DLC – Small / Medium	All	$7	2.59	20.1	25.0	24.7
Com Demand Curtailment - Winter	All	$45	1.24	0.3	0.4	0.4
Com Demand Curtailment - Summer	All	$30	1.13	0.3	0.5	0.5
Ind Demand Curtailment - Winter	All	$26	2.11	1.3	1.7	1.7
Ind Demand Curtailment - Summer	All	$15	1.77	1.4	1.8	1.8
Res TOU Pricing - Winter	All	$75	0.75	0.8	1.0	1.0
Res TOU Pricing - Summer	All	$19	1.54	1.9	2.4	2.4
Res Critical Peak Pricing - Winter	All	$84	0.67	0.5	0.7	0.7
Res Critical Peak Pricing - Summer	All	$28	1.17	1.1	1.4	1.4
Com Critical Peak Pricing - Winter	All	$216	0.26	0.2	0.2	0.3
Com Critical Peak Pricing - Summer	All	$65	0.61	0.5	0.7	0.8
Ind Critical Peak Pricing - Winter	All	$78	0.71	0.5	0.6	0.6
Ind Critical Peak Pricing - Summer	All	$27	1.22	1.0	1.3	1.3