



Central Valley Electric Cooperative, Inc.

A Touchstone Energy® Cooperative 

2019 INTEGRATED RESOURCE PLAN

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2019 Integrated Resource Plan
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UTILITY BACKGROUND

Central Valley Electric Cooperative, Inc. (CVEC) is a consumer owned, RUS utility serving over 15,300 meters. Central Valley Electric serves members in Eddy, Chaves, and portions of Lea and Otero counties in southeastern New Mexico. CVEC derives its current power needs from purchase contracts provided by Southwestern Public Service Company (SPS), Western Area Power Administration (WAPA), and Western Farmers Electric Cooperative (WFEC).

CVEC's peak demand for 2018 was over 131 megawatts (MW), with energy sales over 849 million kilowatt hours (kWh). The historical growth rate for CVEC in the past 3 years has been an estimated average of 0.5 percent for capacity and an estimated average of 1.05 percent for energy.

With the utility industry changing as rapidly as it has in the past couple of years, namely the creation of the Southwest Power Pool (SPP) integrated market, it has been difficult to make specific long term plans because of the uncertainty in the industry. All future long-term plans will be considered through WFEC. When CVEC first energized its lines in October 1938, the co-op purchased all of its wholesale power from SPS. In 2009, SPS gave notice that it was going to cancel its contract with the co-op. CVEC and SPS entered into a Replacement Power Sales Agreement (RPSA) that will allow CVEC to incrementally reduce wholesale power purchases over an extended period. This reduction in wholesale power will be done in four different phases as discussed below. In an effort to secure future wholesale power, CVEC has become a member of Western Farmers Electric Cooperative (WFEC), a generation and transmission cooperative headquartered in Anadarko, Oklahoma. In 2014, CVEC assigned the SPS RPSA to WFEC.

2018 UTILITY PROFILE DATA

System Peak:	131,650 KW	Date: June 2018
Energy Sales:	849,924,301	
Annual Load Factor:	77.5%	

Generation and Purchases:

A. Contract Energy Purchases	
1. Southwestern Public Service	626,892,877
2. Western Area Power Administration	13,832,300
3. Western Farmers Electric Cooperative	292,862,000
4. Net Metering Purchases	8,273
B. Total Purchases (without losses)	893,259,493
C. System Losses	42,553,370
D. System Losses in Percent	4.76%
E. Total Energy to Customers	849,924,301

NOTE: SPS wholesale rate charges losses for deliveries from generation bus to delivery points.

Number of Customers & Energy Delivered By Customer Class:

<u>Customer Class:</u>	<u># of Customers:</u>	<u>kWhs:</u>
Residential	5,720	79,317,986
Commercial	1,120	23,903,468
Irrigation	713	66,468,405
Industrial	3,768	627,373,491
Oil Wells	4,052	50,132,434
Office		781,822
TOTALS	15,373	847,977,606

LOAD FORECASTING INFORMATION

In 2018, CVEC, in conjunction with WFEC, updated its Load Forecast. This forecast will be used as a basis for engineering studies, financial forecasts, system planning and other special studies. This forecast is reviewed annually to update projections on systems load. The forecast is provided to WFEC, SPP and SPS for planning purposes.

The contract with SPS, as a total power provider, has historically been beneficial to Central Valley Electric. Scheduling for unexpected load changes due to weather conditions or variations in customer loads is unnecessary for CVEC because any unforeseen additional power requirements are supplied by SPS by virtue of a transmission agent agreement, as long as system limitations are not exceeded.

EXISTING ENERGY RESOURCES

A good starting point when evaluating and comparing alternative supply and demand-side resources would be to review CVEC's current energy sources, allocations, and pricing. As mentioned earlier, Central Valley Electric receives power from Western Area Power Administration (WAPA), SPS and WFEC. These power deliveries are listed below.

Western Area Power Administration:

WAPA's current contract with Central Valley Electric Co-op runs through 2024. CVEC's demand and energy allotment fluctuates depending upon water flows and other restrictions.

Below are the 2018 energy purchases from WAPA:

	<u>Energy</u>		<u>Energy</u>
January	1,196,081	July	1,174,627
February	1,088,810	August	1,252,016
March	1,218,919	September	936,490
April	1,284,964	October	1,129,000
May	1,166,965	November	1,094,173
June	1,085,745	December	1,204,510

Total: 13,832,300

Energy Charges: \$0.01219 per kWh

Southwestern Public Service:

SPS has been serving CVEC for 80 years. However, SPS chose not to renew the co-ops purchase power agreement. In response to this decision by SPS, the co-op has acquired all necessary regulatory approval and has joined WFEC. CVEC will continue to own and maintain its transmission and distribution system, just as it does now, and the immediate, short-term and load following power requirements will continue to be provided by SPS through the summer of 2022. CVEC and SPS, by way of the RPSA, have agreed to incrementally step away from the wholesale power relationship over an extended period of time. The incremental step away of wholesale power purchases are as follows:

- June 1, 2012, CVEC took 29 MW off the SPS generation system
- June 1, 2017, CVEC took an additional 26 MW off the SPS generation system
- By 2022, SPS will only provide CVEC a total of approximately 45 MW
- By 2024, SPS will only provide CVEC a total of approximately 30 MW
- By the end of 2026, CVEC will receive all of its wholesale power from WFEC

Western Farmers Electric Cooperative began providing wholesale power to CVEC in June 2012, and in 2014, CVEC assigned the SPS RPSA to WFEC. The SPS RPSA does allow for CVEC to reduce up to 5 percent of the Phase I and Phase II capacity reductions by demand side resource programs and an additional 5 percent through renewable energy programs.

Scheduling of WAPA power and additional load requirements for CVEC are currently handled by SPS personnel. This allows CVEC to utilize its resources more efficiently by eliminating the need for a full-time planner/power scheduler. With so many unknown variables in forecasting loads it can be financially disastrous if a utility misses a daily or hourly forecast. CVEC’s demand charge is based on the actual delivery amount or 65 percent of the previous twelve month peak, whichever is greater.

Below are the 2018 energy purchases from SPS:

	<u>KW Billed</u>	<u>Energy</u>		<u>KW Billed</u>	<u>Energy</u>
January	79,423	50,661,731	July	75,234	55,630,581
February	75,308	45,629,728	August	70,847	54,511,473
March	71,480	53,492,922	September	85,924	51,654,356
April	81,462	52,047,346	October	85,237	51,147,352
May	76,683	53,513,533	November	81,163	51,405,880
June	76,650	54,292,079	December	79,312	52,905,896

KW Billed Total: 938,723
Energy Total: 626,892,877

Capacity Charges: \$7.87 to \$7.92 per KW
(average of \$7.90 per KW)

Western Farmers Electric Cooperative (WFEC):

On June 1, 2012, CVEC took 29 MW off the SPS system. A Purchased Power Agreement (PPA) with WFEC was negotiated to provide for CVEC’s first incremental load reduction of wholesale power from SPS. On June 1, 2017, WFEC started providing an additional 26 MWs to meet the Phase II load reduction required by the SPS RPSA.

Below are the 2018 energy purchases from WFEC:

	<u>KW Billed</u>	<u>Energy</u>		<u>KW Billed</u>	<u>Energy</u>
January	24,500	22,320,000	July	49,500	30,408,000
February	25,500	20,480,000	August	49,500	28,992,000
March	27,500	23,346,000	September	27,500	23,456,000
April	27,500	24,528,000	October	24,500	22,320,000
May	30,500	25,608,000	November	27,500	21,948,000
June	49,500	26,928,000	December	22,500	22,528,000

KW Billed Total: 386,500

Capacity Charges: \$7.58 to \$7.76 per KW

Energy Total: 292,862,000

IDENTIFYING OTHER RESOURCE OPTIONS

There are several supply-side and demand-side options to consider. Each option must be evaluated to determine cost effectiveness and compliance with the WFEC wholesale contract. Financial issues, as well as environmental issues, societal issues, and concern regarding future natural resources must be considered in planning for the future. CVEC's wholesale contract with WFEC stipulates that WFEC will provide all supply side power.

Supply-Side Options

Over the years Central Valley Electric's philosophy has been to refrain from ownership in any type of generating facility, however prior to CVEC's RPSA with SPS and membership in WFEC, CVEC did conduct an economic analysis of the available options to meet the long term wholesale power needs. The economic analysis performed by EnerVision of Atlanta, Georgia, indicated a purchase power agreement was more favorable than constructing a generation resource. WFEC will be contracting and/or constructing generation resources to serve CVEC's loads and CVEC will have equity ownership in WFEC.

WFEC will conduct all power plant evaluations on behalf of its membership including CVEC. Issues to consider in power plant construction would be member's rates, long term economic conditions, availability of capital and the associated interest rates, social, and regulatory issues.

Pursuant to a state mandated Renewable Portfolio Standard, in 2015, no less than five percent of CVEC's retail electric sales must include renewable energy. This will increase at a rate of one percent per year until 2020, at which time the renewable portfolio standard will be 10 percent. In 2018, CVEC received approximately 70 percent of its wholesale power from SPS, and 8.35 percent of that power was a mix of bundled energy and green tagged power from renewable energy resources. The remaining 30 percent of CVEC's wholesale power came from Western Farmers Electric Cooperative (WFEC), and in 2018, 7.88 percent was allocated from solar power generated from the Caprock Solar Facility near Tucumcari, NM.

CVEC retired 67,994 Renewable Energy Credits (REC) to meet the 8 percent RPS compliance requirement in 2018. CVEC will retire RECs sufficient to meet the 9 percent RPS requirement for 2019.

As of December 31, 2018, CVEC has 16 members who have interconnected solar systems, ranging from 6 KW to 32 KW. In 2018, CVEC purchased 8,273 kWhs from these interconnected solar systems.

WFEC purchases power generated by the 25 MW Caprock Solar Project located near Tucumcari in Quay County. In 2018, CVEC purchased 23,063 MWhs of solar energy generated from the Caprock Solar Project.

WFEC maintains a well-balanced and diversified portfolio of generation resources that include owned facilities and capacity and energy provided through power purchase agreements. WFEC's current renewable portfolio includes generation consisting of 50 MW of solar generation, 705 MW of wind generation, and 260 MW of hydroelectric generation. WFEC is under contract to have an additional 250 MW of wind generation come online by the end of 2019 and an additional 220 MW of solar come online by the end of 2020. WFEC will continue to maintain a diversified portfolio of both renewable and fossil fuel resources.

Demand-side Options

Demand-side management (DSM) programs are designed to reduce the demand for power or to shave high demand peaks. Many utilities in need of additional capacity and energy consider DSM programs as an alternative to increased generation, because these programs are more cost effective than new generation. Additionally, the SPP bills for network transmission service and schedule 11 base plan upgrades based on peak demand. Less generation will result in fewer air pollutants and will help preserve natural resources for future generations. Obviously, less consumption also means fewer revenues for utilities which could possibly influence retail rate structures.

Central Valley Electric is dependent on power sales to maintain financial stability in order to continue to provide low cost power to its consumers. CVEC is a not-for-profit, consumer owned cooperative; therefore, it is faced with the difficult decision of considering DSM programs that are cost effective while having to deal with the issue of lower revenues. Raising rates or redesigning rates are one way to compensate for the lost revenue but that does not always benefit the majority.

Central Valley Electric currently has several programs in place which are considered to be Demand Side Management Programs. The co-op will continue to evaluate these program benefits to the co-op and its members. The programs in place consist of:

Marathon Water Heater Energy Efficiency Program

Water heating accounts for about nine percent of the energy consumed in the home. Using hot water efficiently enables members to save energy and money. By selling Marathon Water Heaters, CVEC is encouraging members to install energy efficient electric water heaters.

Marathon Water Heaters are advertised to be 95 percent efficient, with the strongest tank in the residential water heater industry. The tanks have a lifetime warranty, and will not rust or corrode. The tank design is a seamless blow-molded polybutene inner tank wrapped in 2.5 inches of filament-wound fiberglass. These water heaters are great for brutal well water conditions, and have no stand-by heat loss.

In April 2009, CVEC began collecting a Renewable Energy and Energy Conservation fee. New Mexico Public Regulation Commission Rule 572 gives co-ops the ability to recover some costs from the state. Currently, CVEC pays one-half percent of its operating revenue to the Commission for inspection and supervision fees. In accordance with Rule 572, CVEC can recover that fee by collecting one percent of additional revenue from its members. The funds collected from the state and CVEC members must be used for renewable energy and energy efficiency programs that benefit CVEC members. CVEC's Board of Trustees decided not to collect the one percent of additional revenue from its members in 2018. The board felt the fund was well established to fund current and future renewable energy and energy conservation programs.

Because this fund is available to use on energy efficiency programs and to encourage members to install energy efficient water heaters, CVEC offers its members a 60 percent discount off the co-ops purchase price of Marathon Water Heaters.

Since the program started in September of 2009, CVEC has sold 417 energy efficient Marathon water heaters (as of December 31, 2018). That is a potential estimated annual wholesale demand savings to the co-op of 9.19 KW, or \$871.21 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$571.25 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$1,442.46.

There is also a potential energy savings to CVEC members of 119,933 kWh, or \$8,005.77 (based on CVEC's 2018 residential rate of \$0.066752 per kWh). The demand and energy savings will continue to increase as the co-op continues to sell water heaters.

The total amount of money CVEC spent on this program in 2018 was \$24,586.78.

Commercial & Industrial Lighting Rebate Program

According to the U.S. Energy Information Administration, lighting accounts for more than 20 percent of energy usage in commercial buildings in the United States.

Energy efficient lighting can help CVEC members save money on their energy bills; at the same time it can help the co-op lower wholesale power demands, thereby reducing the need for additional generation. Therefore, commercial and industrial members who are building new (new construction), or replace/upgrade (retrofit) are eligible for a rebate. Efficient lighting options include but are not limited to: T8 fluorescent, T5 fluorescent, compact fluorescent lighting (CFL), light emitting diodes (LED), and plasma.

Retrofit Rebates

The rebate on lighting projects is determined by comparing the actual lighting KW usage with the proposed KW lighting usage to be installed for existing buildings. The rebate amount is \$450 per KW reduced.

New Construction Rebates

The rebate for new construction is 40 percent of equipment cost (labor costs not included) for members installing LED, CFL or plasma lighting.

Since the program started in August of 2011, CVEC has given 33 rebates for commercial and industrial lighting projects. As of December 31, 2018, there is a potential estimated annual wholesale demand savings of 383.94 KW, or \$36,397.51 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$23,865.71 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$60,263.22.

There is also a potential energy savings to CVEC members of 576,211 kWh, or \$34,365.80 (based on CVEC's 2018 large commercial rate of \$0.059641 per kWh). The demand and energy savings will continue to increase as more members take advantage of this rebate program.

In 2018, CVEC paid out \$7,879.25 in rebates for the Commercial and Industrial Lighting Rebate Program.

Home Energy Audit Program

A home energy audit is the first step in assessing how much energy a home consumes, and it can be used to evaluate what measures need to be taken to make the home more energy efficient. CVEC believes air infiltration and duct efficiency are two areas that can be assessed in a home energy audit that has the potential to lower a home's energy use and promote better air quality within the home.

In 2018, CVEC contracted with Precise Building Performance, a qualified company, to perform the free home energy audits. This company does not make any improvements to the home. Instead they provide a detailed report on the home and let homeowners know where they are losing heating and cooling and what they can do to correct the issues. The member is then given a free Energy Efficiency Kit (provided by CVEC). This kit includes weather-stripping, a caulk gun, caulk, and various other items to help members address the issues found during the energy audit. Because CVEC doesn't know what measures, if any, members take to address any issues found during the home energy audit, it is difficult to estimate demand and energy savings.

This program is available to all CVEC residential members who have a home set on a permanent foundation.

The program started in September 2012, and as of December 31, 2018, there have been 269 homes that have received this free home energy audit. Based on calculations from the homes where audits were performed and demand and energy savings could be estimated (prior to 2018), there is an estimated annual wholesale demand savings of 221.28 KW, or \$20,977.34 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$13,754.76 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$34,732.10.

There is also a potential estimated energy savings, from energy audits performed before 2018 of 630,144 kWh, or \$42,063.37 (based on CVEC's 2018 residential rate of \$0.066752 per kWh). The demand and energy savings will continue to increase as more members take advantage of the Home Energy Audit Program.

In 2018, CVEC spent \$5,010.00 on home energy audits for 21 members.

Heating & Air Conditioning Rebate Program

According to the U.S. Department of Energy, heating and cooling accounts for about 20 percent of the energy consumed in the home. CVEC wants to encourage members to install energy efficient heating and cooling products when constructing new buildings or remodeling existing buildings. Therefore, CVEC offers an Air Source and Ground Source Heat Pump rebate program.

Ground Source Heat Pumps (GSHP) Rebate – GSHPs use the constant temperature of the earth as the exchange medium instead of the outside air temperature. This allows the system to reach fairly high efficiencies (300%-600%) on the coldest of winter nights. System life is estimated at 25 years for the inside components and 50 plus years for the ground loop. (SOURCE: U.S. Department of Energy).

Residential Program (Includes manufactured homes on permanent foundation)

Ground Source Heat Pump (GSHP) Rebate

- ◆ Up to \$2,500 per ton rebate
On site verification required
- ◆ Minimum Specifications – specifications based on 2nd stage values:
 - Closed Loop: ≥ 15.5 EER & ≥ 3.3 COP
 - Open Loop: ≥ 18.0 EER & ≥ 3.6 COP

GSHP Split Systems:

- ◆ Up to \$2,500 per ton rebate
On site verification required
- ◆ Minimum Specifications:
 - Closed Loop: ≥ 15.9 EER & ≥ 3.3 COP
 - Open Loop: ≥ 18.0 EER & ≥ 3.6 COP

GSHP to GSHP:

- ◆ Up to \$2,500 per ton rebate
On site verification required
- ◆ Minimum Specifications:
 - Closed Loop: ≥ 3.0 EER Increase & ≥ 3.3 COP
 - Open Loop: ≥ 3.0 EER Increase & ≥ 3.6 COP

Air Source Heat Pump (ASHP) Rebate

- ◆ Up to \$175 per ton rebate
- ◆ Minimum Specifications:
 - Minimum SEER of 16
 - Minimum HSPF of 8.5
 - Backup/Supplemental heat can be Natural Gas or Propane

Commercial and Industrial Program/School Program

Ground Source Heat Pump (GSHP) Rebate

- ◆ Up to \$2,500 per ton rebate
On site verification required

- ◆ Minimum Specifications:
 - Closed Loop: ≥ 15.5 EER & ≥ 3.3 COP
 - Open Loop: ≥ 18.0 EER & ≥ 3.6 COP

In New Mexico there is a 30% (maximum \$9,000) tax credit for installing a GSHP (expires December 31, 2020). There is also a federal tax credit for installing GSHP which expires December 31, 2021.

* EER – Energy Efficiency Rating is how many British Thermal Units (BTU) per hour are used for each watt of power it draws.

*COP – Coefficient of Performance is heat delivered (output) in BTUs per hour divided by the heat equivalent of the electric energy input. The higher the COP, the higher the efficiency of the equipment.

*Seasonal Energy Efficiency Ratio (SEER), which is the total heat removed from the conditioned space during the annual cooling season, expressed in Btu, divided by the total electrical energy consumed by the heat pump during the same season, expressed in watt-hours.

*Heating Season Performance Factor (HSPF), which is the total space heating required during the heating season, expressed in Btu, divided by the total electrical energy consumed by the heat pump system during the same season, expressed in watt-hours.

Since the co-op started offering a geothermal heat pump rebate in 2015, three systems have qualified for rebates (as of December 31, 2018), with an estimated annual wholesale demand savings to the co-op of 11.51 KW, or \$1,091.15 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$715.46 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$1,806.61. The demand savings will continue to increase as more members take advantage of this rebate program.

In 2018, CVEC spent \$17,500 on ground source heat pump rebates.

Since the co-op started offering an air source heat pump rebate in 2015, six rebates have been issued (as of December 31, 2018), with an estimated KW savings of 18.43 KW, or \$1,747.16 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$1,145.61 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$2,892.77. The demand savings will continue to increase as more members take advantage of this rebate program.

In 2018, CVEC spent \$1,925.00 on air source heat pump rebates.

New Mexico Energy Smart Program

Mortgage Finance Authority (MFA) is a quasi-public entity responsible for administering housing programs for low to moderate income families throughout the state of New Mexico. One of the programs that MFA manages is the NM Energy Smart Weatherization Assistance Program. The program reduces energy costs for low-income families by improving the energy efficiency of their homes while ensuring their health and safety. The program targets low income, elderly individuals, people with

disabilities, and families with young children for services. A range of repairs and improvements are offered to home owners including sealing common home air leaks, installing smoke and carbon monoxide detectors throughout the home. Low income households typically spend 17 percent of their total income on energy versus 4 percent for other households. With NM Energy Smart improvements, homeowners can save up to an average of \$400 per year. Improvements include, but are not limited to, insulating ducts, attics, walls, and crawlspaces; installing energy efficient windows, ventilation, doors, water heaters, refrigerators, furnaces, and light bulbs. There are strict guidelines for qualification that are determined by MFA and only the person requesting the help can apply for assistance.

CVEC has partnered with the MFA to sponsor a specific number of homes, in the co-op's service territory, and the MFA matches the co-op's sponsorship fees. The MFA assumes all program administration and reporting requirements. CVEC works with their member during the process and monitors the progress, satisfaction, and finished services provided. Since CVEC started working the MFA and the NM Energy Smart program in 2015, the co-op has successfully worked with 28 members and their families to make energy efficient improvements to their homes. That is a potential estimated annual wholesale demand savings to the co-op of 19.9 KW, or \$1,886.52 (based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$1,236.98 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$3,123.50.

There is also a potential energy savings to CVEC members of 115,410 kWh, or \$7,703.85 (based on CVEC's 2018 residential rate of \$0.066752 per kWh). The demand and energy savings will continue to increase as the co-op continues to participate in this program.

CVEC has spent \$11,570.58 on this program in 2018.

This program has helped these families implement much needed weatherization repairs to their homes that they might not have otherwise been able to do. All home repairs were performed by subcontractors of the Southwestern Regional Housing Community and Development Corporation.

Variable Frequency Drives Program

This program was approved by CVEC's board of trustees in July 2015. The objective of the program is to promote energy efficient methods for motors and pump based systems using variable frequency drives (VFD). Members can receive \$100 per horsepower (HP) for installing VFDs to control end-use pump and motor equipment/systems up to 200 HP.

All installed VFDs, regardless of the HP, must meet or exceed the institute of Electrical and Electronics Engineers standard on Harmonic Control & Limitations (IEEE 519) for electric power systems. A minimum of a 12 pulse system is required; filters may also be required to prevent harmonic issues. Motors other than irrigation must have assumed annual load factors of at least 50 percent. Should the use of a VFD create unacceptable levels of harmonic distortion, the member will be responsible for resolving the issue to a level acceptable by CVEC.

Rebates are capped at \$75,000 annually for any one member.

Since the VFD program started in 2015, CVEC has issued 12 VFD rebates (as of December 31, 2018) with a potential estimated annual wholesale demand savings to the co-op of 371.08 KW, or \$35,178.38

(based on the 2018 average SPS generation demand charge of \$7.90). The estimated annual transmission demand savings to the co-op is \$23,066.33 (based on the average 2018 SPP transmission charge of \$5.18). The total generation and transmission demand savings to CVEC is approximately \$58,244.71. The demand savings will continue to increase as more members take advantage of this rebate program.

In 2018, CVEC spent \$65,000 on VFD rebates.

Four perspectives to consider when determining DSM programs:

Participant's Perspective

The cost would be the initial capital cost, ongoing operation and maintenance, and any removal cost for old equipment. The benefits are lower utility bills and rebates from utilities, if applicable.

Ratepayer Perspective

This affects those who do not participate in the program. They are affected if electric rates increase due to DSM programs, or would experience a slight reduction in allocated patronage capital margins for the year as the DSM programs increase expenses. The costs are revenue losses from the programs, utility cost for operating the program, and rebates paid, if applicable. The benefit to ratepayers comes from the reduction in wholesale capacity and energy purchases.

Utility Perspective

This deals with the financial impact on the utility. The costs are program costs, rebates, if applicable, and any additional supply cost. Lost revenue is not considered because it can be recovered through higher rates. Benefits are avoided capacity and energy cost.

Total Resource Cost Perspective

This looks at the overall cost and benefit to society. The environmental effects of generation are estimated to be a 10 percent external factor which is added to the cost of generation. The costs are the program cost, participant's cost, and supply cost, if any. The benefits are reduced capacity and energy cost, plus the 10 percent external factor for the environmental effects of generation.

The goal is to have all perspectives benefit from DSM programs, although in many cases, the ratepayer perspective does not benefit because not everyone participates in the program. Non-participants are affected negatively with rate increases to help cover lost revenues and reduced capital credits allocated. In reviewing the various DSM options, Central Valley Electric wanted to identify programs that had a short pay-back period and would benefit members. Central Valley Electric envisions that an Interruptible Rate program may be beneficial once full transition to WFEC occurs, and the evaluation of such a program is planned.

ENERGY EFFICIENCY OBJECTIVES

Energy efficiency is using less energy to provide the same service. Energy efficiency is not energy conservation, which is reducing or going without a service to save energy. Anywhere energy is used; there are opportunities to increase efficiency. In most cases, energy efficiency measures will pay for themselves over time in the form of lower energy bills.

How quickly they pay back their investment depends on a lot of factors, such as the cost of energy, and the overall use of the measure – for example, how many hours an appliance is in use. Weather is a factor when the measure is related to maintaining environmental conditions – in air conditioning, or heating for example.

Energy Efficiency Means:

- Using advanced and state-of-the-art technologies to provide better quality energy services with less energy.
- Getting the most productivity from every unit of energy.
- Getting the desired energy services – comfortable homes, profitable businesses, convenient transportation – with less energy use, less air pollution, and lower total cost.
- Using energy wisely.
- Eliminating energy waste.
- Using technology to easily reduce energy use without having to each day “remember” to do it yourself.

Energy efficiency is a valuable resource that creates a win-win solution on multiple fronts. One action equals five major consumer and societal benefits. It saves consumers money, increases comfort, protects the environment, and enhances the economy.

When energy efficiency is combined with smart energy practices – such as turning off lights, TVs, computers, and electronics that are not in use – all of the benefits above are compounded.

Since 2015, CVEC has replaced over 14,000 meters with Advanced Metering Infrastructure (AMI) meters. These meters allow CVEC to automate processes like meter reading to save the co-op time, and money. The AMI meters bring in more usage information and this allows CVEC members to better track and compares usage patterns through the use of the co-op’s SmartHub tool.

SmartHub not only allows CVEC members to pay their electric bill online, but they can also get detailed information on their actual electric use. SmartHub allows members to view their current bill, along with bills from the previous month or even the previous years, if they want to compare usage. They can also chart their electric use monthly, daily or even hourly. This detailed information allows CVEC members to take steps to reduce their energy consumption and lower their bills.

2018 Energy Efficiency Goals

The following are energy efficiency goals for CVEC for the year 2018:

- CVEC will continue to educate members on the many advances in energy efficiency through any means available to the co-op. CVEC will provide ongoing information to members at the co-op and through outreach opportunities within the co-op’s service territory.
 - CVEC tries to educate members and the general public on energy efficiency measures in various ways. In 2018, CVEC hosted member appreciation events in Artesia and Roswell. At those events and at the co-op’s annual meeting we focused on educating people on all of the rebates and programs offered by CVEC. CVEC also offered a weatherization program in partnership with the Mortgage Finance Authority/New Mexico Energy Smart. This program helped members weatherize their homes with repair or

replacement of windows, doors, ductwork, vents, lighting and when necessary upgrading water heaters and refrigerators. CVEC also provides energy efficiency information in the co-op's monthly newsletter, the *Enchantment* magazine, bill inserts, new member packets, area Chamber of Commerce newsletters, in the co-op lobby, on the co-op website, e-mails, radio ads, local newspapers, local magazines, and word of mouth. CVEC was also regularly on a morning radio show in both Roswell and Artesia, letting people know about all of the energy efficiency programs available at the co-op. The CVEC Face Book page has been another avenue for the co-op to get information to members.

- CVEC will continue to actively work with the Grassroots projects sponsored by the New Mexico Rural Electric Cooperative Association.
 - CVEC is always ready and willing to ask members to help contact elected officials when an issue or concern arises that will effect co-op members. In 2018, CVEC urged members to comment on the Environmental Protection Agency (EPA) proposed Affordable Clean Energy Rule, which would eliminate the Clean Power Plan. The Affordable Clean Energy Rule is a more flexible approach that would put decision making back at the local level.
- CVEC will continue to actively seek geothermal HVAC installations for residential and commercial applications, while working closely with WFEC.
 - CVEC believes that geothermal heating and cooling is the most efficient way to heat and cool a home or business. Because of this, CVEC offers a hefty rebate to members who install geothermal heating and cooling. In 2018, CVEC advertised this rebate program in various ways, like the monthly newsletter, newspaper ad, magazine ads, social media, at all co-op sponsored events, etc. CVEC also paid for three people, who work for local HVAC businesses, to become certified through the International Ground Source Heat Pump Association (IGSHPA).
- CVEC will continue to monitor existing demand side programs and evaluate potential new programs to the benefit of the co-op membership.
 - CVEC is always looking for ways to help members save energy and money. CVEC continues to offer multiple programs including Air Source and Ground Source Heat Pump rebates, VFD rebates, C & I Lighting consulting and rebates, free home energy audits, energy efficient Rheem Marathon water heaters at a 60 percent discount to co-op members, as well as solar interconnection agreements. CVEC monitors the validity of all programs and will continue to look for demand reducing programs for all members.

2019 Energy Efficiency Goal

The following are energy efficiency goals for CVEC for the year 2019:

- CVEC will continue to educate members and the general public on energy efficiency measures through any means available to the co-op. CVEC will provide ongoing information to members at the co-op through outreach opportunities within the co-op's service territory.
- CVEC will continue to actively work with Grassroots projects sponsored by the New Mexico Rural Electric Cooperative Association and the National Rural Electric Cooperative Association.
- CVEC will continue to actively seek geothermal HVAC installations for residential and commercial applications.

- CVEC will continue to monitor existing demand side programs and evaluate potential new programs to the benefit of the co-op membership.
- CVEC will evaluate electric vehicle charging and applications.

LEAST-COST OPTIONS

The purpose of DSM programs is to help utilities lower loads because of the lack of available capacity and energy, avoid the high cost of new generation and transmission, and to help preserve natural resources.

DSM programs may be used as a way to save energy. Whatever happens in the industry and as a result of load reductions in the RPSA, Central Valley Electric needs to consider what is best for the utility and the member's. The DSM programs listed above do have a positive benefit to cost factor, but are customers willing to spend the extra money to purchase the more efficient equipment if the utility does not provide rebates?

IRP ACTION PLAN

Traditionally, utilities have relied upon 20 year planning horizons in their decision making process. The days of long-term power planning are over with the creation of the SPP Integrated Market, and utilities are faced with a new set of rules that have not been completely outlined. With this uncertainty, power planning and utility decision making for the future are very difficult due to all utilities treading into unknown waters. Over the past several years climate change, greenhouse gas emissions and global warming have become topics of increasing interest in Congress and the utility industry. In an effort to address global warming issues, Congress could impose limits on the emissions of carbon dioxide from generation plants. These limits, along with high wind farm saturations, could make it economically unfeasible to build new coal-fired generation plants which are needed to meet the increasing demand for electricity, and could affect all electric utilities.

As a means of minimizing the uncertainty utilities are facing, integrated resource planning has been introduced to help utilities recognize their strengths and weaknesses more clearly in an era of unprecedented change. Understanding where the utility is positioned in terms of current and future resources, the price of those resources, and the reliability of those resources will help the utility prepare itself to meet future load requirements in an economically and environmentally safe manner.

Having an action plan as a roadmap will help Central Valley Electric meet the needs of its customers. With all the anticipated changes in the industry, CVEC is submitting a two-year and a five-year plan to include its plans for the future. These plans are intended to test the residential and commercial markets with technologies that will save customers money over time.

Two -Year Plan

The two-year plan will consist of the following goals and objectives:

- Central Valley Electric will continue to rely upon the existing SPS Replacement Power Sales Agreement and wholesale power purchases from WFEC to meet current and future power needs. This decision is based upon the following reasons:

1. The SPS RPSA is a contractual commitment until 2026.
2. WFEC is expected to acquire generation resources to meet CVEC's long term wholesale power requirements. CVEC will have an equity ownership in WFEC and started paying equity to WFEC. Additionally, WFEC has provided for CVEC's Phase I Load Reduction within the SPS RPSA that began June 1, 2012, and CVEC's Phase II load reduction that began June 1, 2017.
3. Power reliability has been good with SPS, as well as their handling of Central Valley Electrics scheduling and power needs. This allows the co-op to forego having a full-time forecaster and planner/scheduler for daily and hourly power requirements. WFEC will take over this function beginning in 2022.

Central Valley Electric Cooperative is recommending the above programs and will research ways in which we can incorporate additional energy efficiency programs.

Five-Year Plan

Preparing a five-year plan is done with much conservatism. Several different load forecasts, and financial forecasts, have been prepared based on different growth scenarios. CVEC does provide an annual load forecast to WFEC, SPP and SPS for planning purposes.

1. The Load Forecast Study is expected to be updated annually. A load forecast study was completed by Sharad Rastogi, P.E. with WFEC for 2016-2045 with annual adjustments.
2. WFEC will become CVEC's wholesale power provider in the future and therefore will have input into generation resource decisions as CVEC will have representation on the WFEC Board of Trustees to provide input on generation decisions.
3. In the event customer and utility needs change during this period, existing programs would need to be re-evaluated to determine if they are achieving the desired results. If not, then other customer programs would need to be evaluated.
4. CVEC will continue to evaluate current member tariffs and make periodic changes to accurately reflect wholesale and distribution cost drivers.

VALIDATION AND EVALUATION

Current projects such as the Marathon electric water heating program, the Home Energy Audit Program or the commercial and industrial lighting rebate program require different methods to validate present consumption versus projected savings. Many assumptions or estimations have to be made regarding the energy usage of various electric devices and consideration for the length of time that items are in use. Predicting the savings will be based upon manufacturer data estimates and comparing it to previous usage patterns.

ENVIRONMENTAL EFFECTS

Currently, Central Valley Electric Cooperative has two resources for its power supply. It would be reasonable to assume that the majority of Central Valley's power purchases from SPS or WFEC would come from fossil fuels. However, in 2018, 8.35 percent of CVEC's wholesale power from SPS and 7.88 percent from WFEC was tagged as renewable energy. Because all power is delivered through the SPP Integrated Market, it is difficult to determine from which generation source Central Valley's power needs are being met.

Action taken by Board:

On, February 27, 2019, CVEC's board of trustees voted to adopt this Integrated Resource Plan.