Integrated Resource Plan Public Advisory Group

Meeting 4 – August 8, 2017

Existing Renewable Resources and Distributed Generation, Demand Response Programs and Options, Energy Efficiency, Load Forecast, and Rate Considerations

The Electric Company
El Paso Electric

Meeting Agenda

- Welcome and Introduction
- Public Advisory Process and Meeting Schedule
- Existing Renewable Resources and Distributed Generation (DG)/Demand Response (DR) Programs and Options
- Energy Efficiency (EE)
- Load Forecast
- Rate Considerations and Potential Impacts on Resource Planning Decisions
- Discussion

Welcome and Introduction

Presenters for this Meeting

- Maritza Perez: NM IRP Case Manager
- Paul Garcia: Manager of Renewables & Emergent Technologies
- Susanne Stone: Director of Energy Efficiency and Commercial Services
- George Novela: Manager of Economic Research
- Jim Schichtl: Vice President of Regulatory Affairs

Safety and Basics

- **Fire Escape Routes**
- **Please sign in. You will be added to our PAG distribution list**
  - Skype participants can email NMIRP@epelectric.com
- **Facilities**
- **Recording of Meetings**
- **Acronyms on last slide**

Safe Harbor Statement

Certain matters discussed in this Integrated Resource Plan ("IRP") public advisory group presentation other than statements of historical information are "forward-looking statements" made pursuant to the safe harbor provisions of the Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Such statements are subject to a variety of risks, uncertainties and other factors, most of which are beyond El Paso Electric Company's ("EPE" or the "Company") control, and many of which could have a significant impact on the Company's operations, results of operations, and financial condition, and could cause actual results to differ materially from those anticipated. Additional information concerning factors that could cause actual results to differ materially from those expressed in forward-looking statements is contained in EPE's most recently filed periodic reports. Any such forward-looking statement is qualified by reference to these risks and factors. EPE cautions that these risks and factors are not exclusive.

Management cautions against putting undue reliance on forward-looking statements or projecting any future assumptions based on such statements. Forward-looking statements speak only as of the date of this IRP public advisory group presentation, and EPE does not undertake to update any forward-looking statement contained herein, except to the extent the events or circumstances constitute material changes in this IRP that are required to be reported to the New Mexico Public Regulation Commission ("NMPRC" or "Commission") pursuant to its IRP Rule, 17.7.3 New Mexico Administrative Code.

Ground Rules

Meeting Rules and Guidelines

- **Meetings will follow the agenda**
- **Presentations and Discussion**
  - Each presentation will be followed by a discussion period that relates to that presentation
  - Please reserve your questions and comments for designated discussion periods
  - Skype attendees may type in questions in the instant message box
- **Discussion time at end of meeting can relate to any presentation**
  - **All public input and requests submitted in writing will be responded to in writing***
- **Keep communications respectful and to the point**

*Joint Stipulation Case No. 15-00241-UT

Updated Schedule – Public Advisory Group Meetings

Meeting	Date	Subject	Location
(1)	5/25/2017 2:00 pm - 4:00 pm	Kick-off and Introduction Explanation of IRP Process and Goals Resource Planning Process and Overview Preliminary Listing of Resource Options to Consider	EPE Office 555 S. Compress Rd. Las Cruces, NM
(2)	6/8/2017 2:00 pm - 3:30 pm	Summary of IRP process and introduction to system	NMPRC Offices 4th Floor Hearing Room P.E.R.A. Building 1120 Paseo de Peralta Santa Fe, NM
(3)	7/6/2017 2:00 pm - 4:30 pm	Operational Considerations/Requirements for Future Resources Assessment of need for additional resources System Operations - Reliability, Import Limits and Balancing Existing Conventional Resources System generation retirement plan and process Transmission & Distribution Systems Overview and Projects	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(4)	8/8/2017 2:00 pm - 4:30 pm	Existing Renewable Resources and Distributed Generation (DG) Demand Response (DR) Programs and Options Energy Efficiency (EE) Rate Considerations and Potential Impacts on Resource Planning Decisions Load Forecast ~~Load Forecast – Impacts from EE/DR and Rate Structure~~	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(5)	9/7/2017 2:00 pm - 4:30 pm	Conventional Capacity and Generation Option Considerations Demand Side Resource Options Renewable Energy Options (Solar, Wind, Geothermal, Storage, DG) Operational Considerations for Intermittent Resources and Balancing Renewable Portfolio Standard Impacts Renewable & Conventional Power Plant Siting and Environmental Considerations	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(6)	10/5/2017 2:00 pm - 4:30 pm	DEADLINE FOR OPTION SUBMITTAL FROM PUBLIC Resource Planning Base Case Assumptions Initial Cost Estimates for Resource Planning Options Modeling and risk assumptions and the cost & general attributes of potential additional resources	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(7)	10/26/2017	Retirements and other topics of interest to PAG	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(8)	11/2/2017	SANTA FE - Resource Planning Overview and Modeling for Cost of Potential Additional Resources	Santa Fe
(9)	11/16/2017	Preliminary Results with 2017 Load Forecast Presentation of Resulting 20-year Expansion Plan Development of the most cost-effective portfolio of resources for utility's IRP	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(10)-(11)	Jan 19, Feb 16	Informational Meetings or Discussions as Requested	LC/Santa Fe
(12)	4/30/2018	IRP Draft Presentation	Las Cruces
(13)	5/16/2018	Follow-up meeting to receive and respond to public feedback	Las Cruces
(14)	6/8/2018	Final IRP presentation showing new load forecast	Las Cruces
(15)	6/29/2018	Follow-up meeting to receive and respond to public feedback	Las Cruces
	7/15/2018	IRP Filing Date	

New meeting

Date change

Integrated Resource Plan

Public Advisory Process

- **The purpose of the public advisory process is to receive public input and solicit public commentary concerning resource planning and related resource acquisition issues**
  - - NM Rule 17.7.3.9 (H)
- **Meeting Schedules and Agendas**
  - Participants may add their own presentations to the agendas for the **January and February** meetings

PAG Written Input and Requests

Follow up Discussion

Integrated Resource Plan

Existing Renewable Resources and Distributed Generation (DG)/Demand Response (DR) Programs and Options

Paul Garcia

Manager of Renewables & Emergent Technologies

17.7.3.9

INTEGRATED RESOURCE PLANS FOR ELECTRIC UTILITIES:

G. Determination of the most cost effective resource portfolio and alternative portfolios.

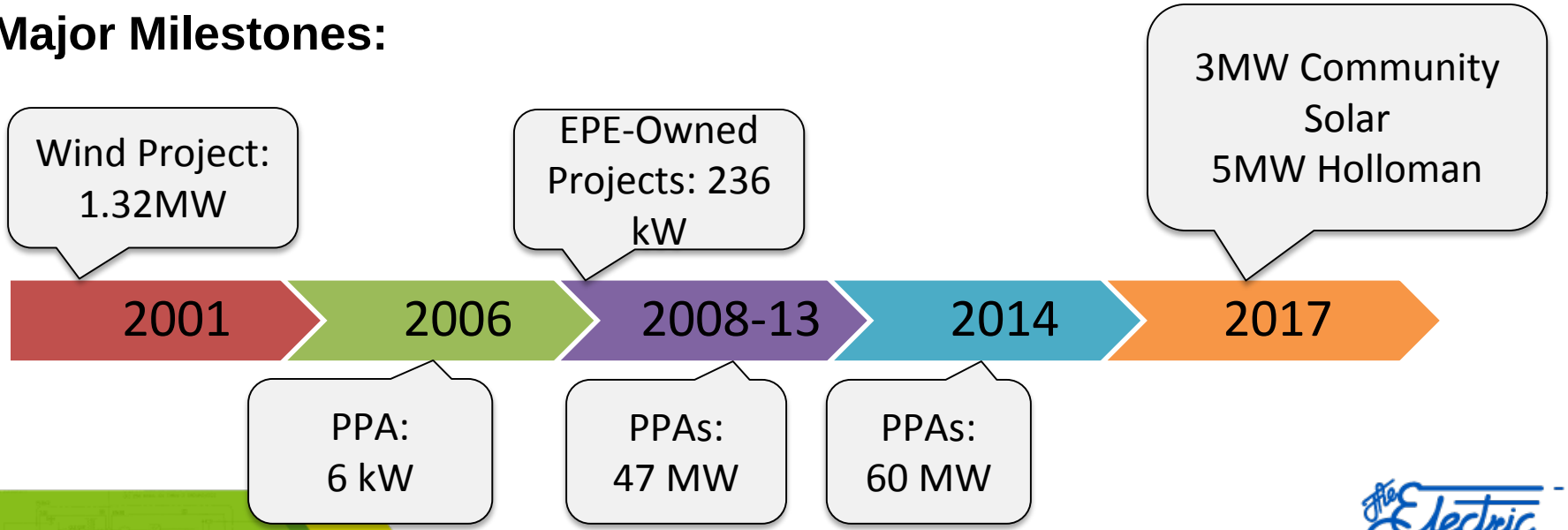
(2) Each electric utility shall provide a summary of how the following factors were considered in, or affected, the development of resource portfolios:

(b) renewable energy portfolio requirements

Renewable Energy Projects

EPE is committed to supporting the development of renewable energy projects.

Major Milestones:



EPE's QF Renewable Facility

Camino Real Landfill:

- **Project:** Biogas
- **Location:** Sunland Park, NM
- **Technology:** Methane Gas Combustion
- **COD:** March 2008
- **Capacity:** 1.6 MW
- **Owner:** Four Peaks Energy, Inc.

EPE's PPA Renewable Facilities-107 MW

Las Cruces Centennial

Chaparral

SWEC

Roadrunner

Hatch

Macho Springs

PSEG(Newman)

EPE's PPA Renewable Facilities

Southwest Environmental Center:

- **Project:** Solar PV
- **Location:** Las Cruces, NM
- **Technology**: PV Panels
- **COD:** 2006
- **Capacity:** 6 kW
- **Rooftop**
- **Owner:** SWEC
- **PPA term:** 20-yr

EPE's PPA Renewable Facilities

Hatch:

- **Project:** Solar PV
- **Location:** Hatch, NM
- **Technology**: Sunpower Monocrystalline, Dual Axis Tracking
- **COD:** July 2011
- **Capacity:** 5 MW
- **Acreage:** 39
- **Owner:** NextEra Energy
- **PPA term:** 25-yr

EPE's PPA Renewable Facilities

Roadrunner:

- **Project:** Solar PV
- **Location:** Santa Teresa, NM
- **Technology:** Thin Film modules, Single Axis Tracking
- **COD:** August 2011
- **Capacity:** 20 MW
- **Acreage:** 210
- **Owner:** NRG Energy
- **PPA term:** 20-yr

EPE's PPA Renewable Facilities

Las Cruces Centennial:

- **Project:** Solar PV
- **Location:** Las Cruces, NM
- **Technology:** Polycrystalline modules, Azimuth Tracking
- **COD:** May 2012
- **Capacity:** 12 MW
- **Acreage:** 140
- **Owner:** SunEdison
- **PPA term:** 25-yr

EPE's PPA Renewable Facilities

El Chaparral:

- **Project:** Solar PV
- **Location:** Chaparral, NM
- **Technology:** Polycrystalline modules, Azimuth Tracking
- **COD:** June 2012
- **Capacity:** 10 MW
- **Acreage:** 140
- **Owner:** SunEdison
- **PPA term:** 25-yr

EPE's PPA Renewable Facilities

Macho Springs:

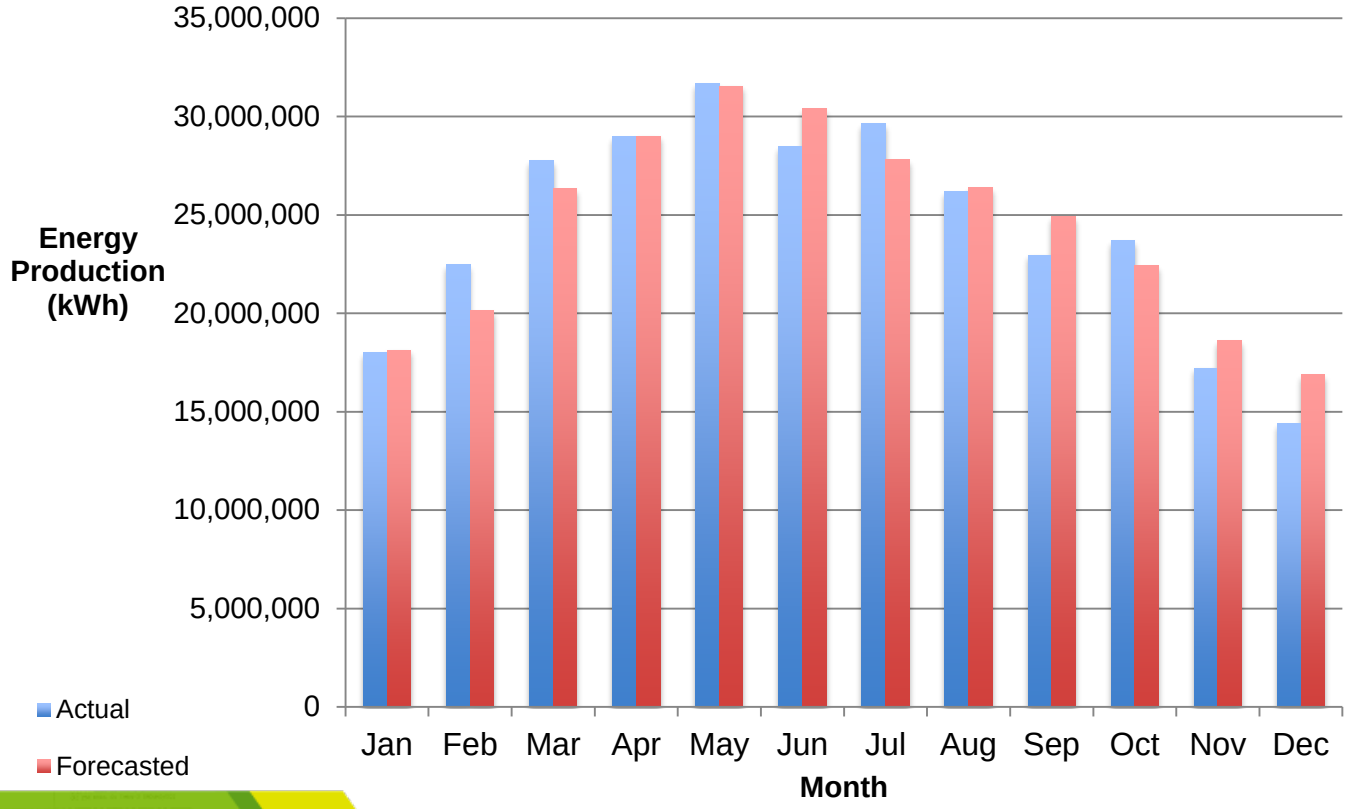
- **Project:** Solar PV
- **Location:** Deming, NM
- **Technology:** Thin Film modules, ground-mounted single axis tracking
- **COD:** May 2014
- **Capacity:** 50 MW
- **Acreage**: 411
- **Owner:** Southern and Turner
- **PPA term:** 20-yr

EPE's PPA Renewable Facilities

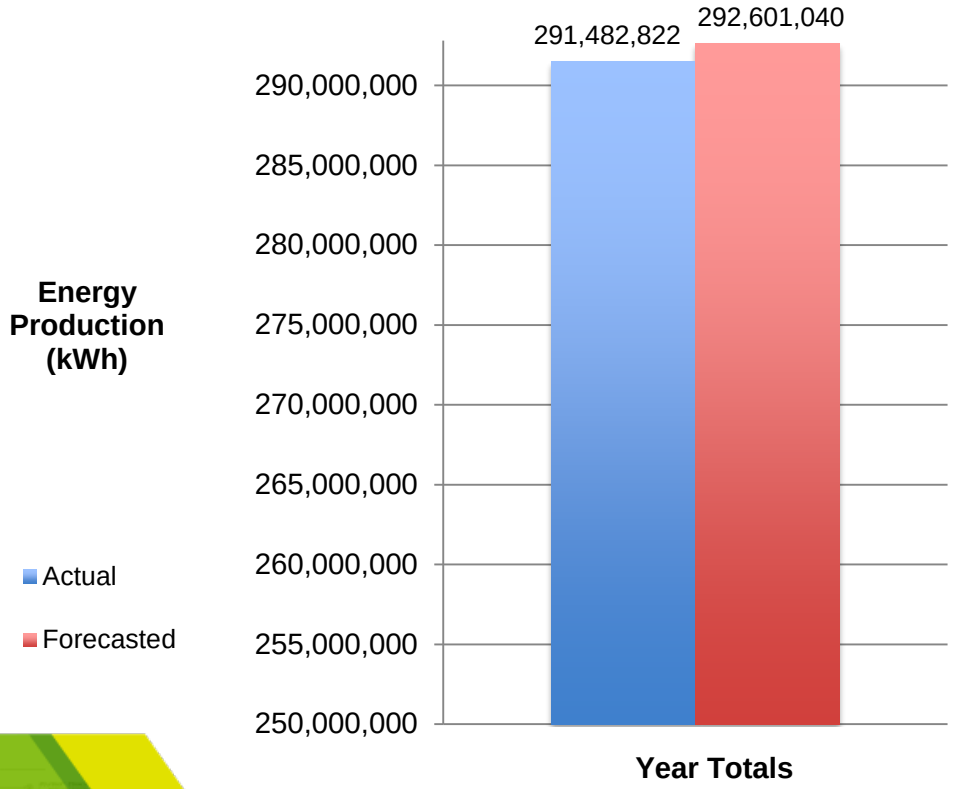
PSEG (Newman) El Paso Energy Center:

- **Project:** Solar PV
- **Location:** Northeast El Paso, TX
- **Technology**: Polycrystalline modules, single axis tracking
- **COD:** December 2014
- **Capacity:** 10 MW
- **Acreage**: 100
- **Owner**: PSEG
- **PPA term:** 30-yr

2016 PPA Actual vs Forecasted Output



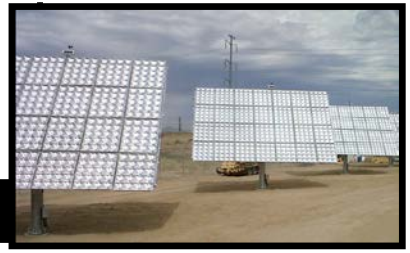
2016 PPA Actual vs Forecasted Output



EPE-Owned Renewable Facilities-236 kW

Rio Grande and Newman Carports

Wrangler



Stanton Tower

El Paso Community College

Van Horn

The Electric Company
El Paso Electric

EPE-Owned Renewable Facilities

Newman and Rio Grande Power Plants:

- **Project:** Solar PV
- **Technology:** Fixed tilt, Monocrystalline modules
- **COD:** December 2009
- **Capacity:** 128 kW (64 kW each)
- **Carport**
- **Owner**: El Paso Electric

EPE-Owned Renewable Facilities

Stanton:

- **Project:** Solar PV
- **Technology:** Fixed tilt, Monocrystalline modules
- **COD:** January 2012
- **Capacity:** 31 kW
- **Rooftop**
- **Owner**: El Paso Electric

EPE-Owned Renewable Facilities

El Paso Community College:

- **Project:** Solar PV
- **Technology:** Fixed tilt, Polycrystalline modules
- **COD:** January 2012
- **Capacity:** 14 kW
- **Rooftop**
- **Owner**: El Paso Electric

EPE-Owned Renewable Facilities

Wrangler Substation:

- **Project:** Solar CPV
- **Technology:** Concentrated Photovoltaic (CPV) dual axis tracking
- **COD:** October 2011
- **Capacity:** 48 kW
- **Acreage:** 0.75
- **Owner**: El Paso Electric

EPE-Owned Renewable Facilities

Van Horn:

- **Project:** Solar PV
- **Technology:** Fixed tilt, Polycrystalline modules
- **COD:** August 2013
- **Capacity:** 15 kW
- **Carport**
- **Owner**: El Paso Electric

Texas Community Solar Site

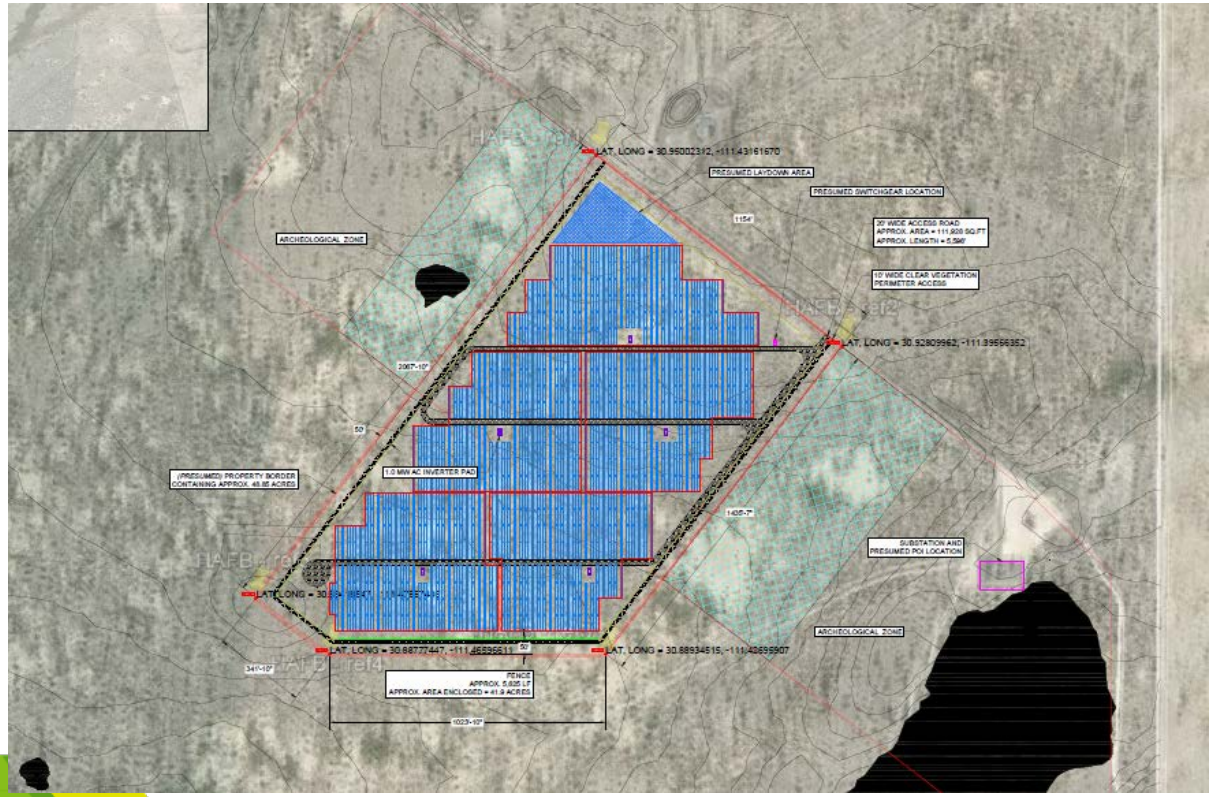
Texas Community Solar Project

- 3 MW PV System that is owned, operated and maintained by EPE;
- Located on 21 acres at EPE's Eastside Operations Center, far east El Paso;
- Approximately 33,000 solar panels;
- Project technology: Thin film modules, single axis tracking;
- COD: May 2017

Community Solar Program

- A voluntary subscription program;
- Open to all customers in EPE's Texas service territory;
- Available on a first-come first-serve basis;
- Customers required to subscribe for minimum 12 consecutive month period and may terminate at any time upon giving notice after one year;
- Subscriptions opened in March 2017
- Program fully subscribed within 30 days

Holloman AFB – 5MW PV Facility



Holloman AFB – 5MW Solar Project

- 5 MW PV system that is owned, operated and maintained by EPE;
- Located on 43 acres at Holloman AFB;
- Approximately 56,000 solar panels;
- Project technology: Ground mounted single axis tracking;
- Commercial Operation- early 2018

Distributed Generation

Cumulative Number of Interconnected DG Systems										
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017(through June)
TX	1	7	36	102	226	324	492	1,210	2,271	2,886
NM	18	93	260	486	917	1,495	1,800	2,102	2,453	2,623
Total Number	19	100	296	588	1,143	1,819	2,292	3,312	4,724	**5,509**

Cumulative Interconnected Capacity (kW ac)										
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017(through June)
TX	2	18	156	682	2,032	2,759	3,662	8,062	12,845	15,570
NM	55	390	996	2,204	4,959	8,122	10,160	11,862	14,743	16,207
									Total kW	**31,777**

eSmart Thermostat Pilot Program

- **Term:** 3 year pilot program (2017-2019)
- **Objective:** to reduce electrical load from central refrigerated air during peak hours or under other system operating conditions;
- **Eligibility:** Residential and small commercial customers with an eligible internet-connected smart thermostat connected to central refrigerated A/C;
- **Availability:** Initially opened up to 3,000 thermostat devices on a voluntary basis;
- **Customer incentives:** $125 upfront incentive, plus $25 per thermostat for each year customer remains enrolled in the program.

eSmart Thermostat Pilot Program

- **Program Season:** June 1 - September 30;
- **Event Timing:** each event can be up to 4 hrs. between 2pm - 8pm MST, non-holiday weekdays;
- **Number of events:** up to 12 events per season;
- **Event strategies:** target high peak system load periods and test the program effectiveness under various conditions;
- **Evaluation of Results:** EPE will install interval meters for a statistically significant sample size of customers and collect energy and demand data to verify program event results;
- **Regulatory approvals:** Program approved by NMPRC.

Discussion

Integrated Resource Plan

Energy Efficiency

Susanne Stone

Director of Energy Efficiency
and Commercial Services

17.7.3.9

INTEGRATED RESOURCE PLANS FOR ELECTRIC UTILITIES:

G. Determination of the most cost effective resource portfolio and alternative portfolios.

(2) Each electric utility shall provide a summary of how the following factors were considered in, or affected, the development of resource portfolios:

(a) load management and energy efficiency requirements;

New Mexico

New Mexico Energy Efficiency Goals

- **NM Energy Efficiency goals are in energy (kWh) savings set for EPE by the New Mexico State legislature in House Bill 267**
- **Based on cumulative energy savings from 2008:**
  - By the end of 2014, the cumulative energy savings was a minimum of 5% of the 2005 retail kWh sales
  - By the end of 2020, the cumulative energy savings will be a minimum of 8% of the 2005 retail kWh sales

New Mexico Energy Efficiency Goals

- **EPE's New Mexico eligible 2005 kWh sales:**

  1,316,311,916 kWh

- **EPE NM Energy Efficiency Cumulative Goals from 2008:**
  - 2014 kWh Goal 5% 65,815,596 kWh
  - 2020 kWh Goal 8% 105,304,953 kWh

NM Energy Efficiency Achievements

Year	Annual Energy Savings (kWh)	Annual Expired Portfolio kWh	Cumulative Energy Savings (kWh)	NM Statutory Energy Goal (kWh)
2008	855,912		855,912	
2009	4,667,928		5,523,840	
2010	5,169,908		10,693,748	
2011	14,728,590		25,422,338	
2012	13,537,655		38,959,993	
2013	12,832,995		51,792,988	
2014	20,692,228		72,485,216	65,815,596
2015	15,729,342		88,214,558	
2008 Exp.		(855,912)	87,358,646	
2016	18,213,422		105,572,068	Exceeds 2020 Goal of 105,304,953

New Mexico 2017 Energy Efficiency Programs

Residential

- Residential Comprehensive Program
- Residential Lighting Program
- LivingWise® Program
- ENERGY STAR® New Homes
- NM EnergySaver (Low Income) Program

Commercial

- Schools and Business Assistance Program – SCORE Plus Program
- Small Business Comprehensive Program

NM Energy Efficiency Program Budget

- **According to the New Mexico Efficient Use of Energy Act NMSA 1978 Section 62-17-6, funding for investor-owned electric utilities shall be 3% of customer's bills, excluding gross receipts sales tax and franchise fees.**
- **NM Budget:**
  - 2017 – $5,191,262
  - 2018 – $5,191,262

    May be subject to change depending upon the actual 3% Efficient Use of Energy Recovery Factor revenue

New Mexico Residential Rebate Programs

- **Residential Comprehensive Rebate Program**
  - Insulation
  - Solar Screens
  - Duct Sealing
  - Air Infiltration
  - Evaporative Coolers
  - Refrigerated Air Conditioning Units
  - Pool Pumps

New Mexico Residential Programs

- **Residential Lighting Buy-Down Program**
  - Retailer buy-down for ENERGY STAR® rated light bulbs
  - In 2017, EPE anticipates that a minimum of 90% of the lamps will be LEDs

- **LivingWise® Educational Program**
  - Provides Energy Efficiency kits for NM 5th Graders that conserve energy and water
  - Each student receives a Student Guide, a workbook, and a LivingWise® kit to install energy efficient measures at home

New Mexico Residential Programs

- **ENERGY STAR® New Homes Program**
  - Encourages home builders to build homes that are above the minimum energy efficiency codes
  - Incentive paths:
    - Performance path: Tiered incentive levels depending on the level of energy efficiency achieved above a standard code-built home
    - Prescriptive path: Measure-specific incentives for efficient cooling equipment, efficient lighting, radiant barrier, ENERGY STAR® refrigerators and insulation

New Mexico Residential Programs

- **EPE EnergySaver Low Income Program**
  - Program is for income-qualified customers who have a maximum income of 200% of the Federal Poverty Limit
  - NM Statutory goal for EPE is to spend a minimum of 5% of it's budget on low income programs
    - For 2017, the EnergySaver Program's budget is approximately 10% of the overall portfolio budget
  - Measures include ceiling insulation, LEDs, duct sealing, air infiltration, power strips, faucet aerators and low-flow showerheads in homes with an electric water heater

New Mexico Commercial Programs

- **Schools and Business Assistance Program – SCORE Plus**
  - Commercial customers with an average demand of greater than 100 kW, City and County governmental accounts, and schools

- **Small Commercial Comprehensive Program**
  - Commercial customers with an average demand of equal to or less than 100 kW
  - All of EPE's commercial rebates
  - Mainly a contractor-driven program

New Mexico Commercial Programs

- **Some of the eligible EE measures for commercial customers:**
  - Energy efficient lighting
  - Refrigerated air conditioning
  - Cool roofs
  - High efficiency HVAC Tune-ups
  - Pool Pumps
  - Solar screens and film

New Mexico Coincidental Peak Savings

- **Coincidental Peak Demand Savings Estimates**:
  - A portion of the Energy Efficiency demand savings, such as outdoor lighting, street lighting and residential lighting, do not coincide with EPE's system peak demand
  - It is anticipated that NM Coincidental Peak Demand Savings from Energy Efficiency will be approximately 1,470 kW per year during EPE's system peak demand

Texas

Texas Energy Efficiency Goals

- **TX Energy Efficiency goal is in demand (kW) savings EPE's goals are based on Public Utility Commission of Texas Substantive Rule 25.181(e):**
  - Once a utility's demand goal is equal to 0.4% of the average for the 5 previous years' residential and commercial peak demand, that goal remains at 0.4% of that peak; HOWEVER, a utility's demand reduction goal can never be lower than its goal for the prior year.
  - For 2017, EPE's demand goal remained at 11,160 kW, which is 0.99% of EPE's average peak demand
  - The associated energy goal is 19,552,320 kWh

Texas Energy Efficiency Achievements

Year	Annual Energy Savings (kWh)	Annual EE Demand Savings (kW)	Annual Load Management Demand Savings (kW)	Total Demand Savings (kW)
2008	12,494,143	2,919	-	2,919
2009	17,906,976	4,464	1,381	5,845
2010	21,404,232	5,303	4,554	9,857
2011	20,878,023	5,434	7,207	12,641
2012	20,167,921	4,851	7,035	11,886
2013	23,394,394	5,160	9,028	14,188
2014	22,117,823	5,108	8,281	13,389
2015	22,282,527	5,594	6,711	12,305
2016	22,912,025	5,191	7,599	12,790

TX Energy Efficiency Program Budget

- **EPE's Texas Energy Efficiency program budget has remained relatively consistent since 2011 when the demand goal of 11,160 kW was established**

- **In the 2017 Energy Efficiency Plan and Report, EPE filed its proposed program budgets for 2017 and 2018**
  - 2017 - $4,394,650
  - 2018 - $4,394,650

Texas 2017 Energy Efficiency Programs

Residential

- Residential Solutions Program
- Hard-to-Reach (Low Income) Solutions Program
- LivingWise® Educational Program

Commercial

- SCORE Program
- Small Commercial Solutions Program
- Large Commercial Solutions Program
- Commercial Standard Offer Program
- Load Management Standard Offer Program

Texas Coincidental Peak Savings

- **Coincidental Peak Demand Savings Estimates**:
  - A portion of the Energy Efficiency demand savings, such as outdoor lighting, street lighting and residential lighting, do not coincide with EPE's system peak demand
  - The Load Management Program, which is a voluntary load curtailment program, is not included in the calculation for Coincidental Peak Demand Savings
  - It is anticipated that Texas Coincidental Peak Demand Savings from Energy Efficiency will be approximately 3,350 kW per year during EPE's system peak demand

Discussion

Integrated Resource Plan

Load Forecast

George Novela

Manager of Economic Research

17.7.3.9

Integrated Resource Plans for Electric Utilities

B. Contents of IRP for electric utilities. The IRP submitted by an electric utility shall contain the utility's New Mexico jurisdictional:

(2) current load forecast as described in this rule;

17.7.3.9

Integrated Resource Plans for Electric Utilities

D. Current load forecast.

(1) The utility shall provide a load forecast for each year of the planning period; the load forecast shall incorporate the following information and projections:

(a) annual sales of energy and coincident peak demand on a system-wide basis, by customer class, and disaggregated among commission jurisdictional sales, FERC jurisdictional sales, and sales subject to the jurisdiction of other states;

(b) annual coincident peak system losses and the allocation of such losses to the transmission and distribution components of the system;

(c) weather normalization adjustments;

(d) assumptions for economic and demographic factors relied on in load forecasting;

(e) expected capacity and energy impacts of existing and proposed demand-side resources; and

(f) typical historic day or week load patterns on a system-wide basis for each major customer class.

(2) The utility shall develop base-case, high-growth and low-growth forecasts, or an alternative forecast that provides an assessment of uncertainty (e.g., probabilistic techniques).

Introduction

- The energy & load forecasts are used to project energy sales and peak load for 20 years.
- The peak load forecast is used to determine how much Generation and Transmission capacity is expected in the future.
- Electric utilities need to have adequate capacity available to meet peak conditions at any point in time.
- The system expansion profile is used to plan for capital expenditures required to meet the future system load.

Introduction (cont.)

- The energy forecast is used to determine the expected energy sales and revenue, usually for two or three years.
- This information is used by the Finance Department to balance cash flow and financial needs, as well as to provide guidance to outside investors and analysts.

Energy Model

Energy Forecast Methodology

- **The 2017 Energy Forecast:**
  - Employs monthly and annual methodologies to develop its models.
  - Models are estimated based on an econometric methodology
    - All econometric models are estimated using Ordinary Least Squares (OLS) as a function of weather, economic, and demographic variables.
    - Residential energy sales are estimated using a use per customer (UPC) methodology.
  - The final models are selected based on various key statistical measures and professional judgment.
  - Load research data, professional judgment and statistical analysis are employed to estimate sales and demand that don't lend themselves to econometric modeling.

Example of Energy Forecast Models

Typical simple regression model: Y = β_0 + β_1 X + ε

New Mexico Residential Use Per Customer Equation

UPC NM = β_0 + β_1 Weather + β_2 LC Non-Farm Employment

New Mexico Residential Customer Equation

CUS NM = β_0 + β_1 LC Population

New Mexico Residential kWh Forecast

Total kWh NM= UPC NM * CUS NM

NM Energy Forecast Model

- **All of the energy models for NM are econometric models with the exception of street lighting.**
  - NM Street Lights are currently converting to LED's .
- **Residential is the only Revenue Class that has a UPC energy model methodology.**
- **All of the energy models for NM use monthly data with the exception of Large C&I which uses annual data.**
- **All of the customer models for NM are econometric models with the exception of Large C&I and Street Lighting.**
  - The non econometric models assume the year ending 2016 customer count to remain constant.

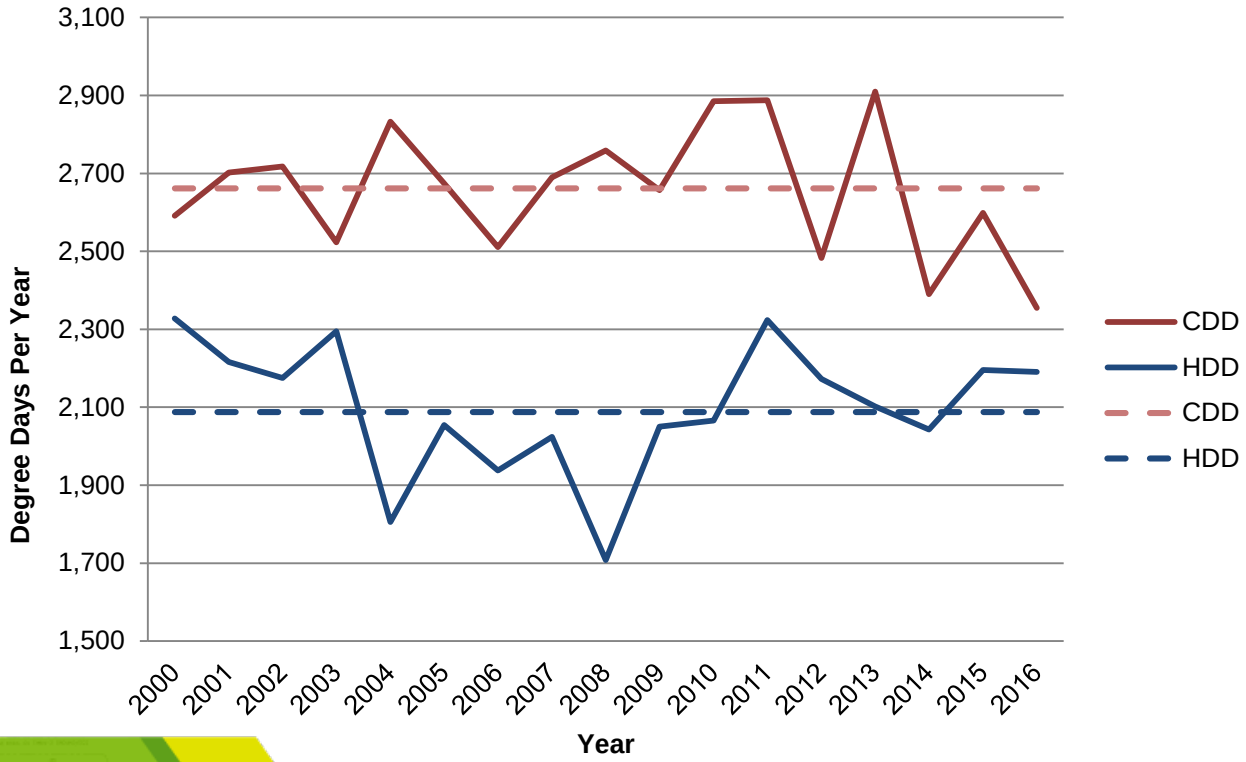
TX Energy Forecast Model

- **All of the energy models for TX are econometric models with the exception of street lighting.**
  - TX Street Lights are currently converting to LED's .
- **Residential is the only Revenue Class that has a UPC energy model methodology.**
- **All of the energy models for TX use monthly data with the exception of Large C&I which uses annual data.**
- **All of the customer models for TX are econometric models with the exception of Large C&I and Street Lighting.**
  - The non econometric models assume the year ending 2016 customer count to remain constant.

Weather

- **Weather in the EPE service territory has been warming over time.**
- **Since weather can sometimes change dramatically from year to year, it is necessary to use the average weather over several years to smooth out the annual variability of weather in the forecasting equation.**
- **For the purpose of generating the energy forecast, ten-year average weather for El Paso and Las Cruces is used.**
- **We use HDD's and CDD's to analyze weather.**
  - HDD-measure the fluctuations in daily average temperature below the designated base temperature (65 degrees Fahrenheit).
  - CDD-measure the fluctuations in daily average temperature above the designated base temperature (65 degrees Fahrenheit).

Las Cruces Annual CDD &HDD



Out of Model Adjustments

- Losses
- Rio Grande Electric Cooperative
- Energy Efficiency
- Military Activity
- Distributed Solar Generation

Distributed Solar Generation

- Customer-owned solar generation has been rising in our service territory
- The table below shows the cumulative new distributed generation demand adjustments used in the 2017 Forecast.

Distributed Generation Adjustment (2017-2026)			
Year	Demand (MW)	Year	Demand (MW)
2017	2.5	2022	14.9
2018	5.0	2023	17.4
2019	7.5	2024	19.8
2020	10.0	2025	22.3
2021	12.5	2026	24.7

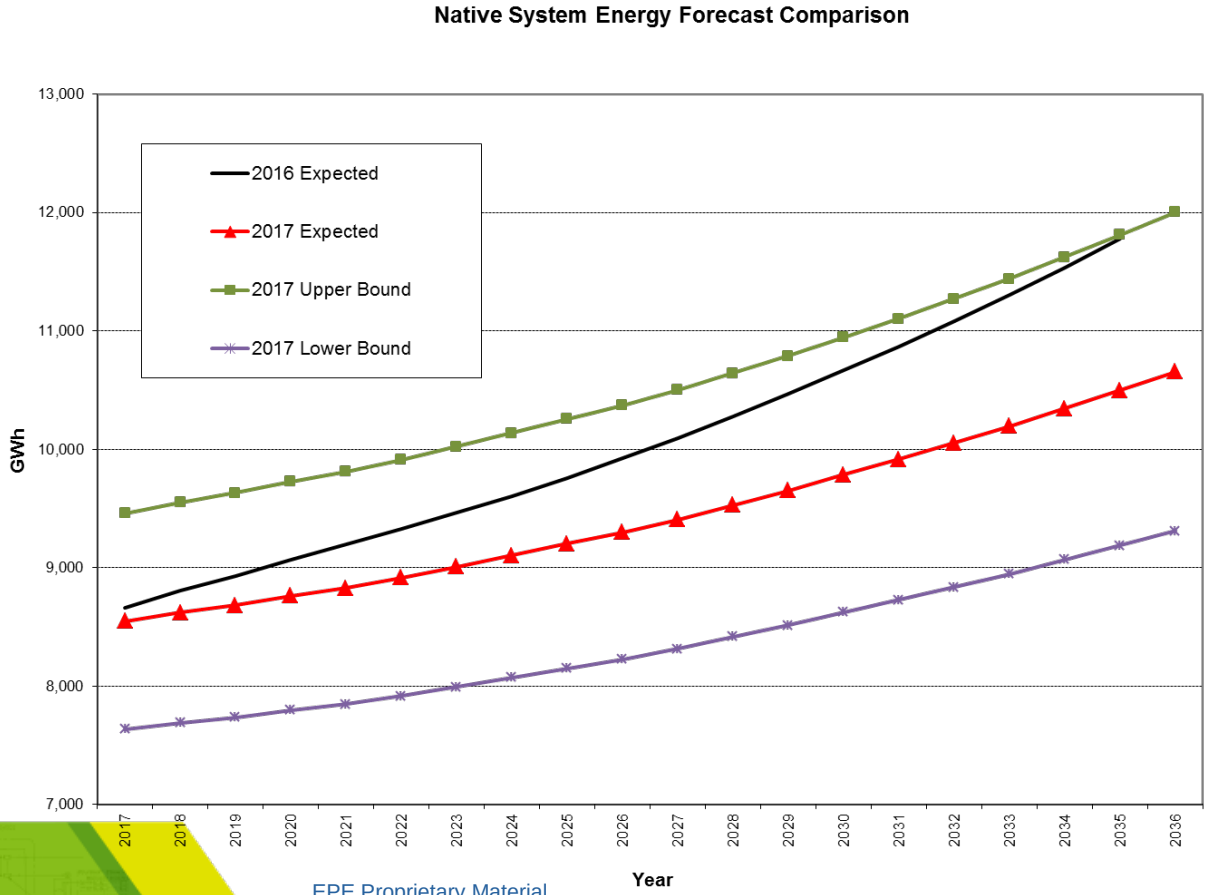
Energy and Customer Forecast Summary

Year	Native System Energy (GWh)	Percent Growth	Customers
2016	8,432		408,505
2017	8,549	1.40%	415,359
2018	8,621	0.84%	422,462
2019	8,684	0.73%	429,748
2020	8,763	0.91%	436,926
2021	8,830	0.76%	444,156
2022	8,915	0.97%	451,720
2023	9,007	1.03%	459,594
2024	9,105	1.09%	467,721
2025	9,203	1.07%	475,942
2026	9,299	1.05%	484,109

What goes into the Native System Energy?

Components of Native System Energy	2017 MWh
Total Retail Sales	7,948,173
RGEC (Wholesale Sales)	62,550
Energy Efficiency	(35,131)
Distributed Generation	(10,813)
Company Use	13,953
Native System Losses	570,554
Native System Energy	8,549,285

Energy Forecast Comparison



Energy Forecast Summary

- The table below, shows 10- and 20-year average annual growth rates for native system energy from the 2016 and 2017 Forecasts

Native System Energy Growth Rates (CAGR)			
	Historical	2016 Forecast	2017 Forecast
10-Year	1.2%	1.4%	1.0%
20-Year	1.6%	1.7%	1.2%

Energy Model Enhancements

- **Changed Small C&I from UPC to total kWh**
- **Making adjustments to Street Lighting in Texas**
- **Improving data that feeds into Distributed Solar forecast**
  - Survey meter data
- **Using NMSU weather station for Las Cruces**
    - Accuweather data purchase in 2017

Demand Model

Demand Model

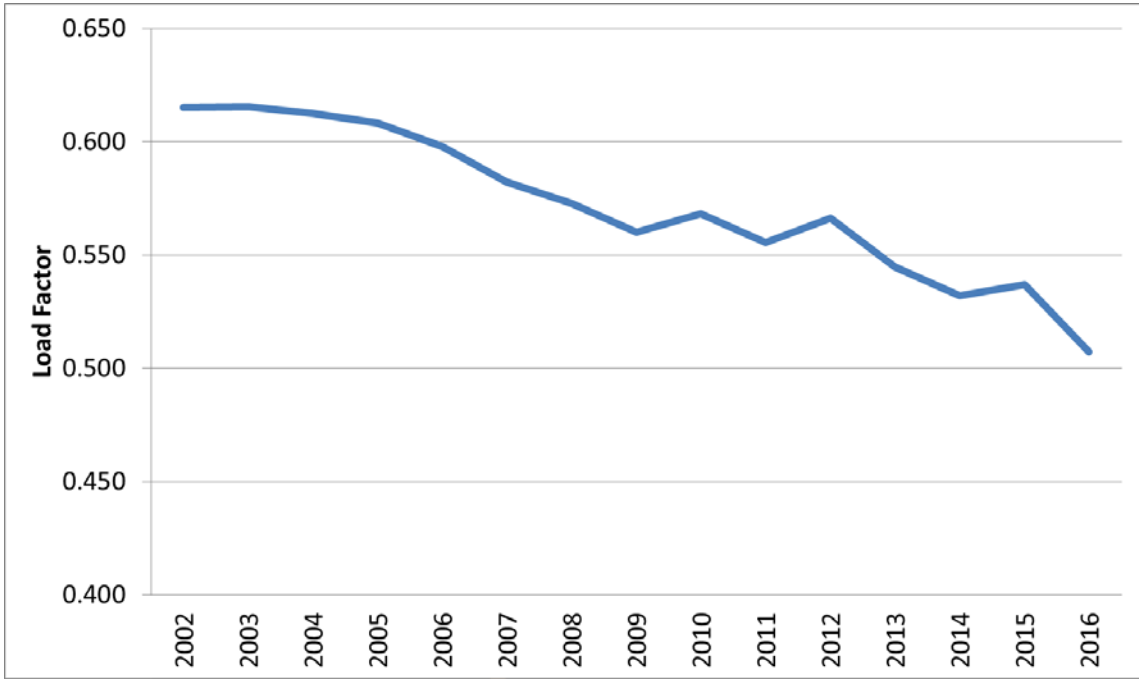
- **Constant System Load Factor (LF) Method**
  - LF = Energy / (Demand x Hours)
  - LF = 8,431,656 / (1,892 x 8784) = 0.507

- **Demand is estimated based on the Constant System Load Factor and the Native System Energy Forecast**
  - Demand = Energy / (LF x Hours)
  - Demand = 8,595,230 / (0.507 x 8760) = 1,934
    - After adjusting for Distributed Generation and Energy Efficiency our Native System Demand is **1,927**

System Load Factor

- With the exception of 2010, 2012 and 2015, the system load factor has been declining since 2000..
- Historically, annual forecasts used a five year average system load factor to project demand, given its year to year fluctuations.
- Subsequently, the forecast moved first to a three year average, then to the previous year load factor, to compensate for under prediction of peak demand due to the declining system load factor.
- In the 2017 Forecast, a one-year load factor of 0.507 is used to forecast peak demand. This load factor is obtained from 2016 historical data.

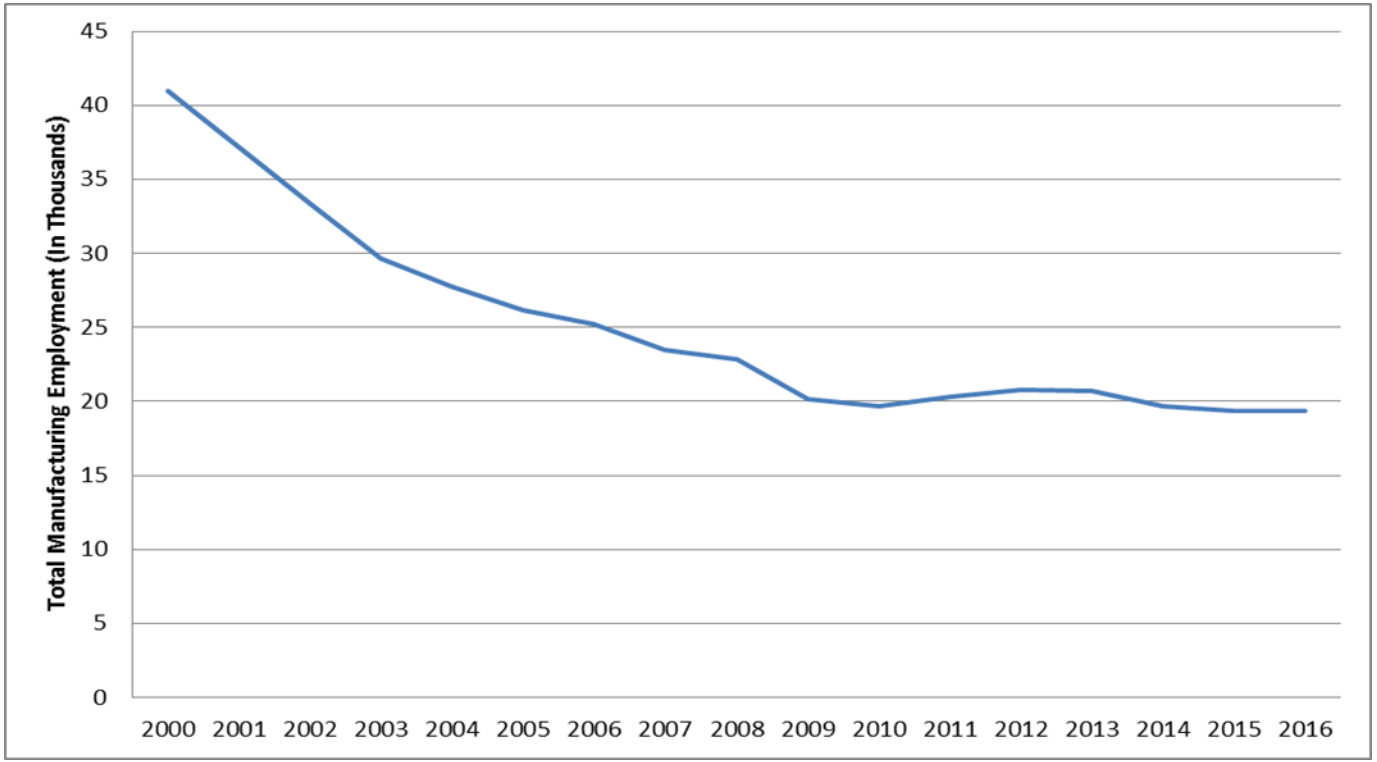
System Load Factor



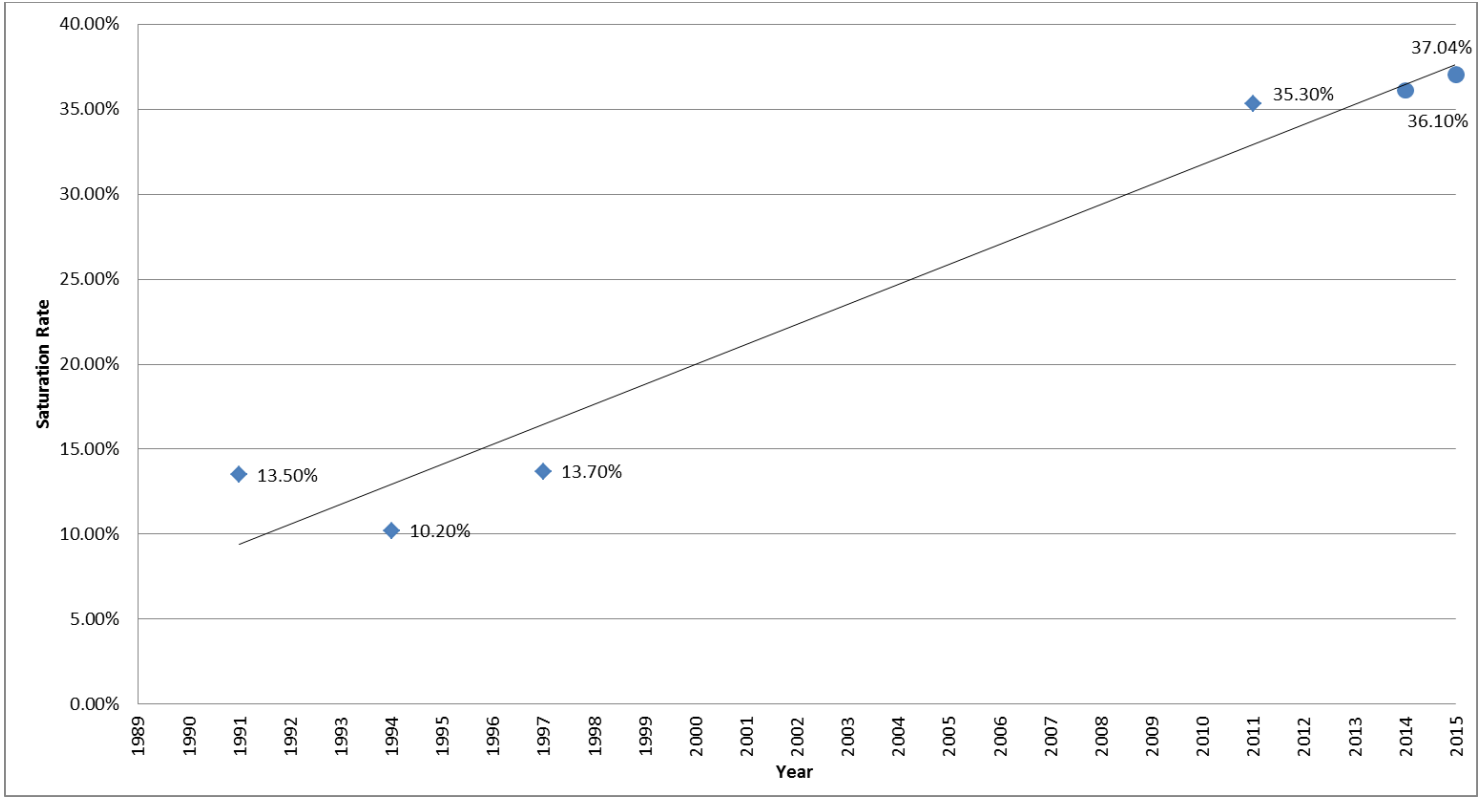
Factors in System Load Factor Decline

- **Increasing share of residential sales**
  - Loss of manufacturing employment
- **Increasing saturation rate for refrigerated air conditioning**
  - 37%

Total Manufacturing Employment for both El Paso and Las Cruces

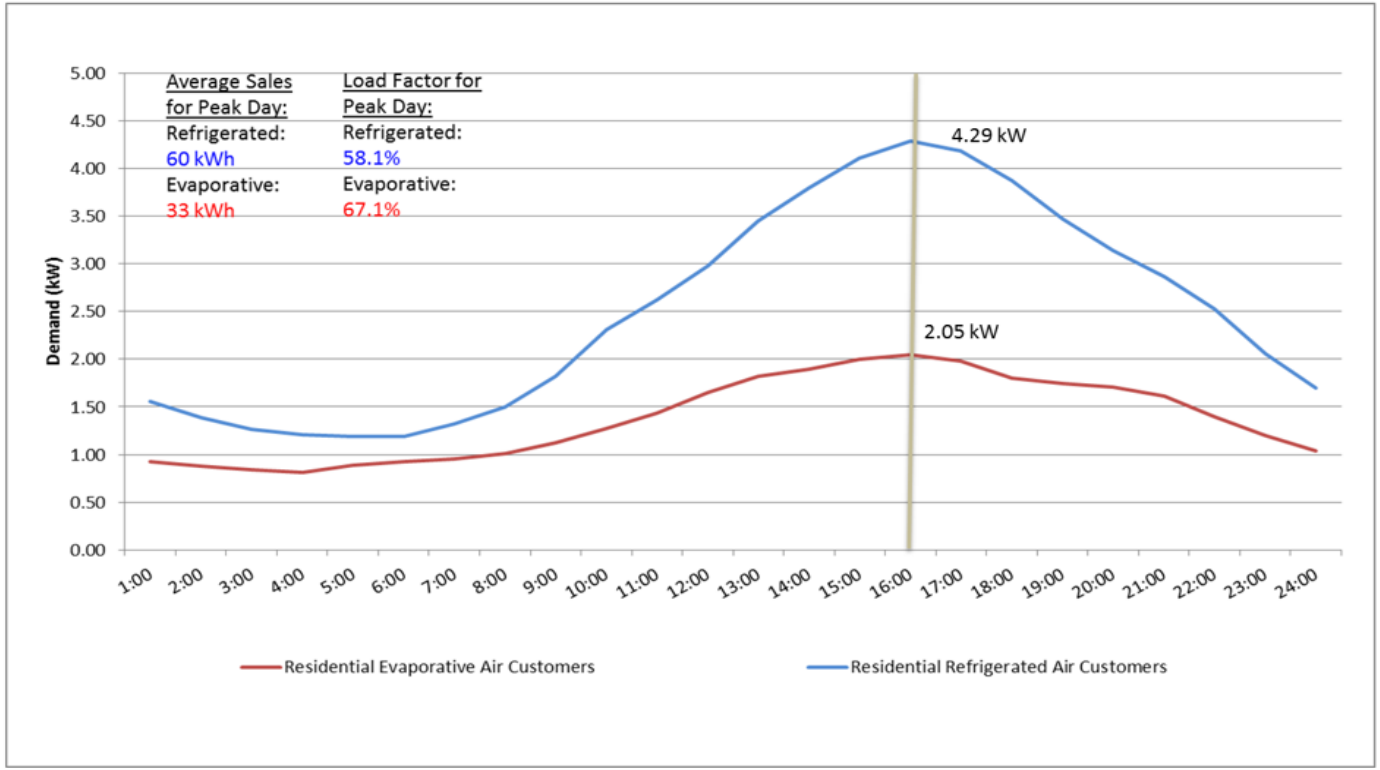


Refrigerated Air Conditioning Saturation Rate



Average Daily Load Profile – 4CP 2016:

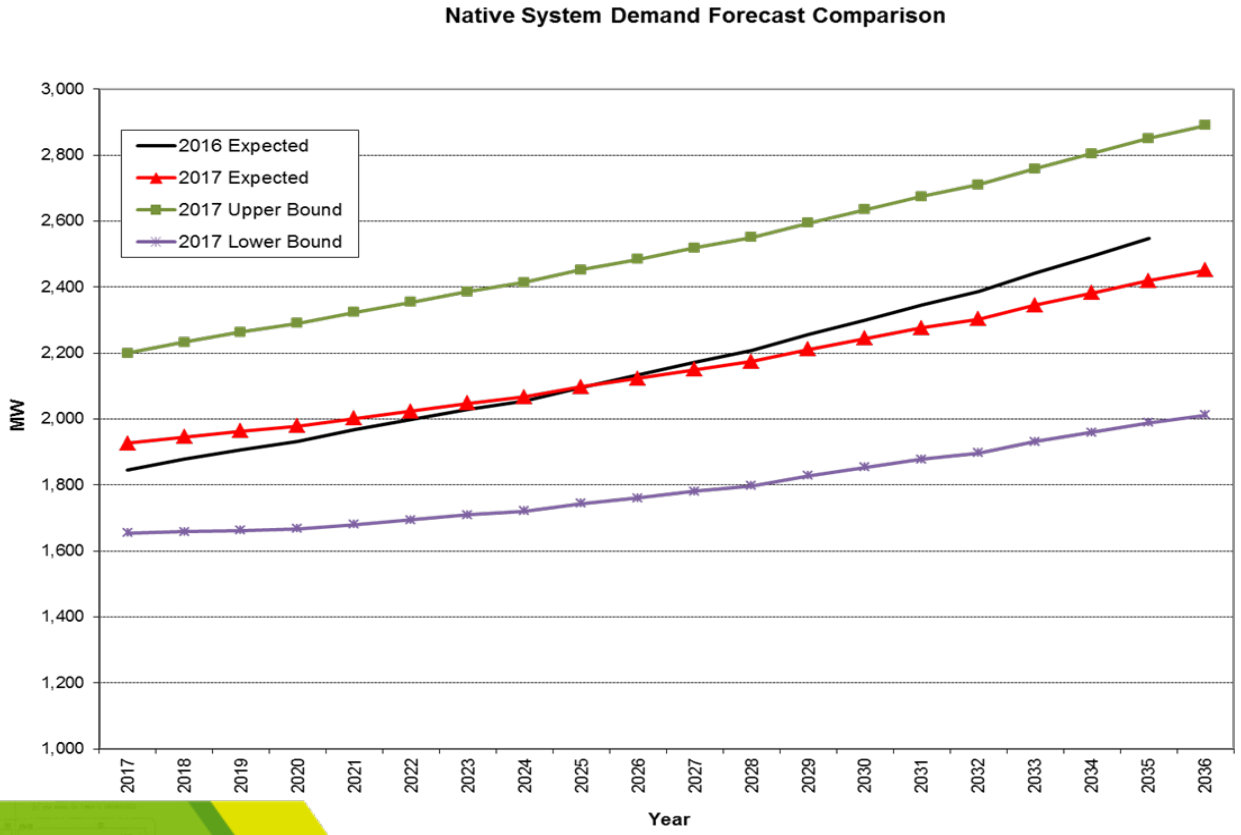
Refrigerated Air vs. Evaporative Air



Demand Forecast Summary

Year	Native System Peak Demand (MW)	Percent Growth
2016	1,892	
2017	1,927	1.83%
2018	1,946	0.99%
2019	1,963	0.88%
2020	1,978	0.78%
2021	2,002	1.18%
2022	2,024	1.11%
2023	2,048	1.17%
2024	2,067	0.94%
2025	2,098	1.49%
2026	2,122	1.17%

Demand Forecast Comparison



Demand Forecast Summary

- **The table below compares 10- and 20-year annual average growth rates for native system demand from the 2016 Forecast and 2017 Forecast.**

Native System Peak Demand Growth Rates (CAGR)			
	Historical	**2016 Forecast**	**2017 Forecast**
10-Year	2.9%	1.6%	1.2%
20-Year	2.7%	1.8%	1.3%

Key Drivers to future load

- **Growth in:**
  - Distributed Generation
  - Battery technology
  - Electric vehicles
  - Energy Efficiency (UPC reductions)
- **Changes to rate design/offerings**
  - Three-part rates
    - fixed charges
    - demand charges
    - time-varying energy charges
  - Critical Peak Pricing
  - Demand Response

Future Model Refinements

- **Continue to observe monthly model accuracy and correct problem areas.**
- **Continue studying the use of Cooling Degree Hours/Heating Degree Hours.**
  - Accuweather data
- **Keep improving Distributed Generation Model**
  - Sampling points
  - System sizes

Discussion

Integrated Resource Plan

Rate Considerations and Potential Impacts on Resource Planning Decisions

Jim Schichtl

Vice President of Regulatory Affairs

IRP Rule 17.7.3.9(F)(3)

Integrated Resource Plans – Identification of Resource Options

- **“The utility shall describe its existing rates and tariffs that incorporate load management or load shifting concepts. The utility shall also describe how changes in rate design might assist in meeting, delaying or avoiding the need for new capacity.”**

Attributes of a Sound Rate Structure

James Bonbright – The Principles of Public Utility Rates

- **Capital attraction / revenue requirement - sound rates are those which are effective in "yielding total revenue requirements under the fair return standard" while avoiding socially undesirable levels of rate base, product quality, and safety.**
- **Consumer rationing objective - rates and structures designed to "discourage the wasteful use of public utility services while promoting all use that is economically justified in view of the relationships between the private and social costs incurred and benefits received."**
- **Fairness to ratepayers - the principle "that the burden of meeting total revenue requirements must be distributed fairly and without arbitrariness, capriciousness, and inequities" in order to avoid "undue discrimination." Characterized by rates which are subsidy free and with "equals treated equally."**

Ratemaking Process – Simplified

Generally In the Context of Rate Case

- **Establish total Company test year revenue requirement**
- **Allocate to Jurisdictions based on cost drivers and direct assignment**
- **Allocate to Rate Classes based on cost drivers and direct assignment**
- **Design rates to recover class revenues based on test year billing determinants**

Ratemaking Terminology

- Rate Structure – various monetary charges used to recover authorized revenues based on metered billing determinants
- Marginal Cost – incremental cost of next unit of service provided
- Energy Charge – charge applicable to volumetric quantity of power consumed over a designated period (seasonal, Time of Use, etc.)
- Demand Charge – charge applicable to instantaneous measure of power required during a designated period
- Decoupling – revenue adjustment mechanism which accounts for revenue loss due to exogenous variable (weather, energy efficiency, conservation, bypass)

Current Mandatory Rate Structures

- **General Rate Classes and Rate Structures**
  - Residential – Volumetric rate, seasonal variations
  - Small Commercial – Volumetric and demand charges
  - Medium Commercial - Volumetric and demand charges
  - Industrial - Volumetric TOU and demand charges
  - Irrigation/ Water Pumping - Volumetric TOU and demand charges
  - Lighting – Volumetric rate
- **Most tariffs include optional (voluntary) rates**

Load Management and Load Shifting

- Load management refers to changes in customer usage that impacts the magnitude and timing of instantaneous demand they place on the system
- Load shifting refers to changes in customer usage which move the time of consumption while not necessarily changing in total consumption
- Load management and load shifting can be affected by providing price differentials which reflect utility costs, in addition to other factors
- Changes in the system load shape, which drives cost of service, result from combined changes in customer consumption over time

Mandatory Rate Structure Transitions

	Current	3-Year	5-Year	10-Year	20-Year
Res	Volumetric	Volumetric	Volumetric / CPP & PTR	Volumetric / CPP & PTR	TOU Energy CPP & PTR
Small Commercial	Demand / Energy	Demand / Energy	Demand / Energy CPP & PTR	Demand / TOU Energy CPP & PTR	Demand / TOU Energy CPP & PTR
Medium Commercial	Demand / Energy	Demand / TOU Energy	Demand / TOU Energy CPP & PTR	Demand / TOU Energy CPP & PTR	Demand / TOU Energy CPP & PTR
Industrial	Demand / TOU Energy	Demand / TOU Energy	TOU Demand / TOU Energy	TOU Demand / TOU Energy Cap Bidding	TOU Demand / TOU Energy Cap Bidding
Irrigation / Pumping	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy

AMI

Load Management and Load Shifting

- Continue to provide optional TOU pricing and price response programs for all customers
- Critical Peak Pricing and Peak Time Rebate can be combined as options with standard tariffs
- Expand mandatory TOU pricing across rate classes
- Estimate customer participation and price response to determine impact on load curve over time
- Assumptions include participation rates and price elasticity of demand
- Develop model adjustments for long-term load and sales forecast for IRP Report

Discussion

For More Information

- EPE's IRP website https://www.epelectric.com/community/2017-18-public-advisory-group-meetings
- E-mail NMIRP@epelectric.com to be added to the Public Advisory Group e-mail distribution list. You will receive updates on available presentation material and future meetings. Questions can also be submitted to this e-mail.

Acronyms

4CP	-	4 coincident peaks	kWh	-	kilowatt hour
AC	-	Alternating Current	LED	-	light-emitting diode
A/C	-	Air Conditioning	LF	-	Load Factor
AFB	-	Air Force Base	MW	-	MegaWatts (1,000 kW)
AMI	-	Advanced Metering Infrastructure	NMAC	-	New Mexico Administrative Code
CAGR	-	Compound annual growth rate	NMPRC	-	New Mexico Public Regulation Commission
CDD	-	Cooling degree day	OLS	-	Ordinary Least Squares
C&I	-	Commercial and Industrial	PAG	-	Public Advisory Group
COD	-	Commercial Operation Date	PDES	-	Phelps Dodge Energy Services
CPP	-	Critical Peak Pricing	PPA	-	Power Purchase Agreement
CVT	-	Concentrated Photovoltaic	PSEG	-	Public Service Electric and Gas Company
EPE	-	El paso Electric Company, or "EPEC"	PTR	-	Peak Time Rebate
FERC	-	Federal Energy Regulation Commission	PV	-	Photovoltaic
GWh	-	Gigawatt hour	QF	-	Qualified Facility
HDD	-	Heating Degree Day	RGEC	-	Rio Grande Electric Co-op
IRP	-	Integrated Resource Plan	SWEC	-	Southwest Environmental Center
KV	-	Kilovolt (1,000 volts)	TOU	-	Time of Use
kW	-	kilowatt (1,000 watts)	UPC	-	Use per customer methodology