PNM 2023-2042 IRP: Load Forecasting SOW Candidate
Resource Pricing Methodology

TECHNICAL SESSION #3

JULY 6, 2022

DISCLOSURE REGARDING FORWARD LOOKING STATEMENTS

The information provided in this presentation contains scenario planning assumptions to assist in the Integrated Resource Plan public process and should not be considered statements of the company's actual plans. Any assumptions and projections contained in the presentation are subject to a variety of risks, uncertainties and other factors, most of which are beyond the company's control, and many of which could have a significant impact on the company's ultimate conclusions and plans. For further discussion of these and other important factors, please refer to reports filed with the Securities and Exchange Commission. The reports are available online at www.pnmresources.com.

The information in this presentation is based on the best available information at the time of preparation. The company undertakes no obligation to update any forward-looking statement or statements to reflect events or circumstances that occur after the date on which such statement is made or to reflect the occurrence of unanticipated events, except to the extent the events or circumstances constitute material changes in the Integrated Resource Plan that are required to be reported to the New Mexico Public Regulation Commission (NMPRC) pursuant to Rule 17.7.4 New Mexico Administrative Code (NMAC).

MEETING GROUND RULES

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP

01

- Questions and comments are welcome – One Person Speaks at a Time

02

- Reminder; today's presentation is not PNM's plan or a financial forecast, it is an illustration of the IRP process

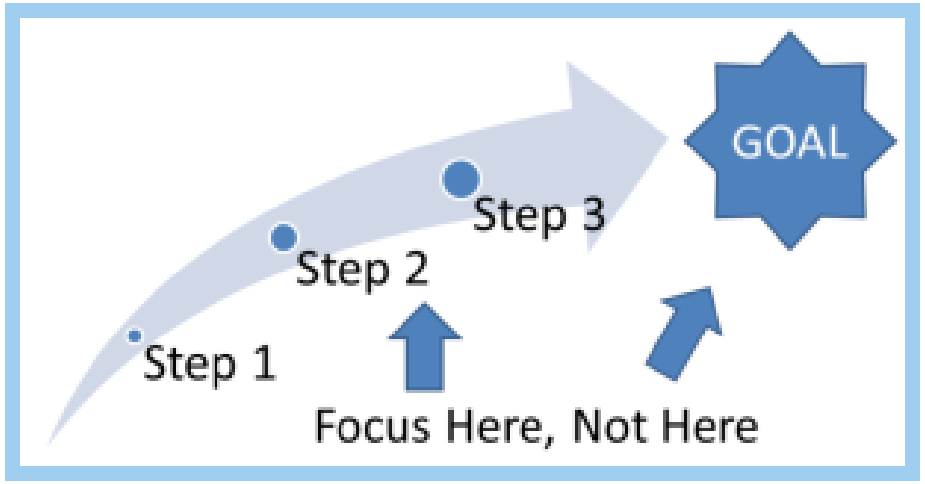
03

- When asking a question, please speak clearly and slowly as all questions will be logged and labeled with the person and organization responsible for asking the question

04

- These meetings are about the 2023 IRP, questions and comments should relate to this IRP. Any questions or comments related to other regulator proceedings should be directed towards the specific filing.

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP



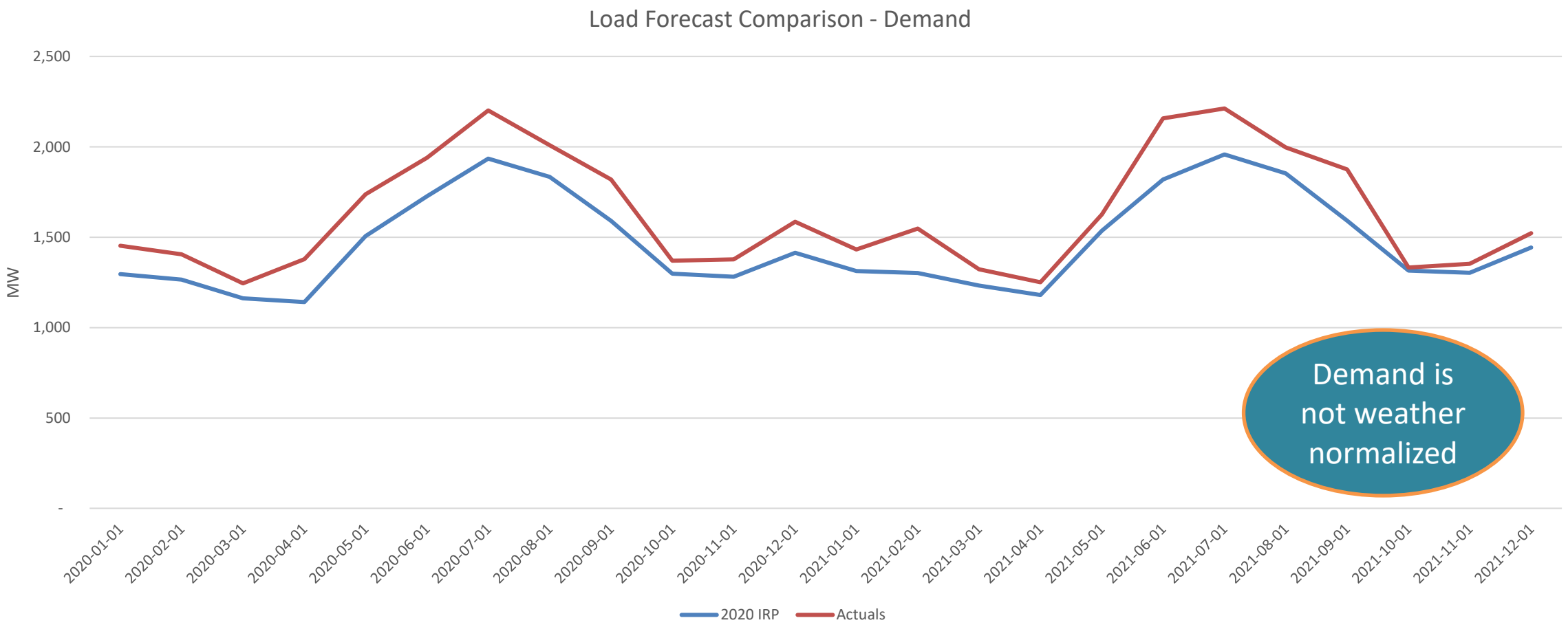
The technical sessions are about discussing the advantages and disadvantages regarding the application of different technical methodologies within the IRP modeling framework.

We are not here to focus on the results or drive towards a specific result. **We all know where we are going: 100% Carbon Free by 2040. The focus in the IRP development is how do we get there in the best way possible for PNM's customers and New Mexico.**

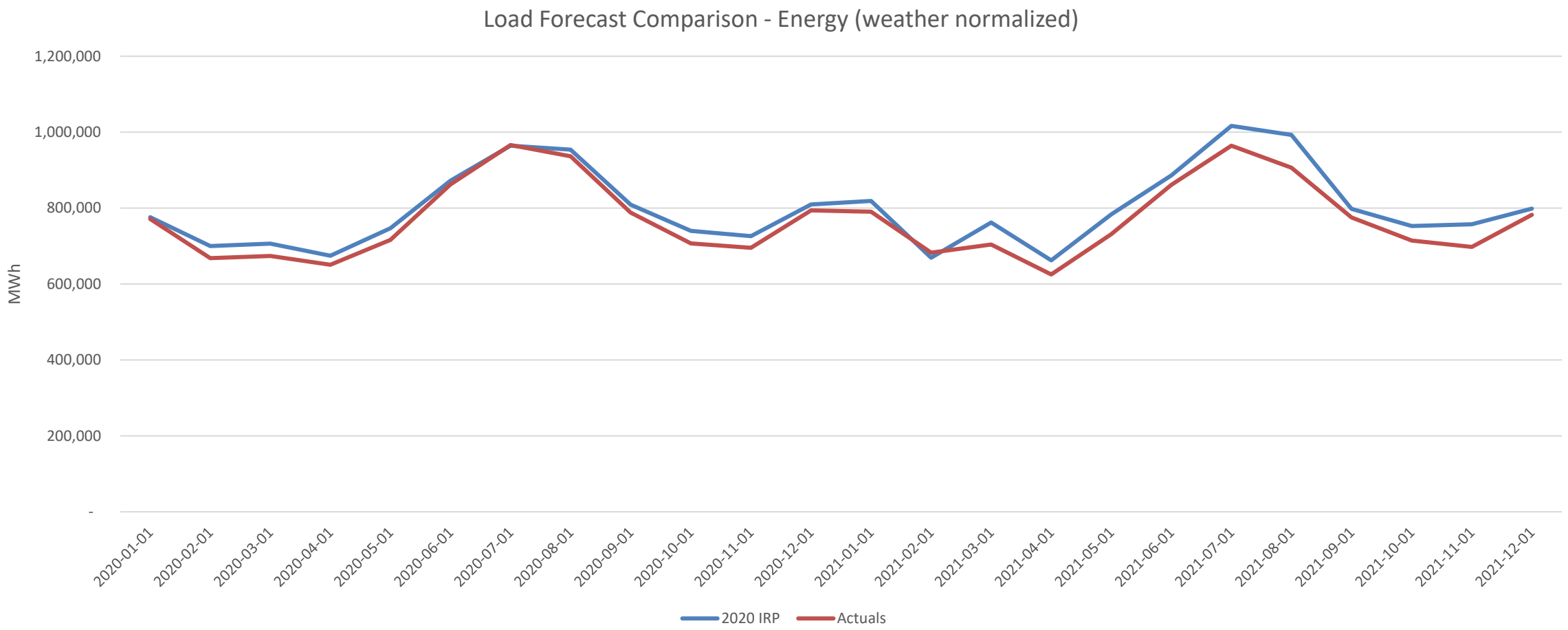
MEETING AGENDA

- Welcome and Introductions
- Load Forecasting:
  - Load Forecasting Statement of Work/Fundamentals
  - Open forum for any stakeholder discussion or any changes on assumptions for the load forecasting fundamentals
- Candidate Resource Pricing Methodology
  - Review
  - Feedback/Questions
- Next steps and Near-Term/Long-Term Schedule

2020 IRP LOAD FORECAST COMPARISON TO ACTUALS



2020 IRP LOAD FORECAST COMPARISON TO ACTUALS



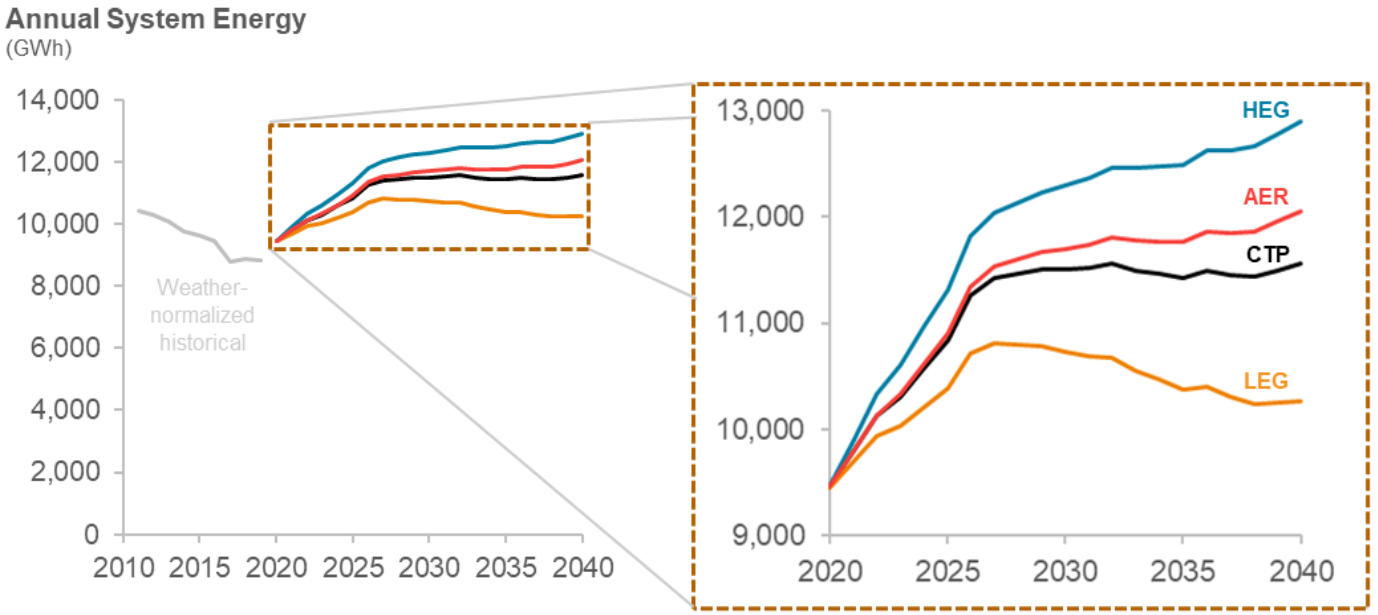
COMMENTS FROM 2020 IRP: QUESTIONED PNM'S LONG TERM LOAD FORECASTING

Comments questioned:

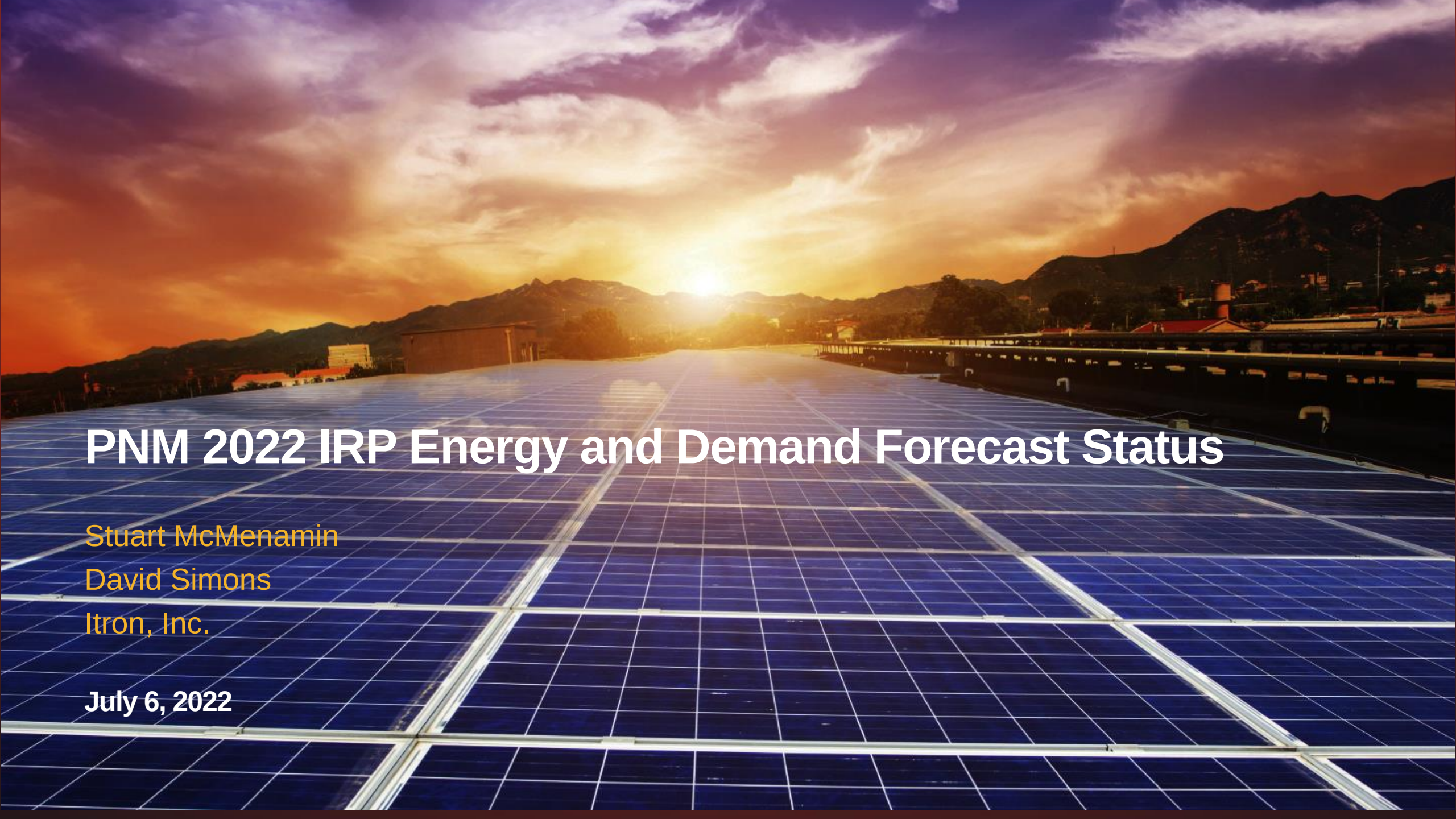
- Historical peak load and energy needs have shown a decline in past decade, but PNM forecast shows incline
- Compounded growth exacerbates and overstates the needs by 2040 timeframe
- PNM not accurately reflecting EE/other factors that show a trending decline

However, the past does not account for economic growth, electrical vehicle adoption rates, etc. and EE was modeled on the supply side.

PNM's 2020 IRP: Figure 40. Forecasts of annual energy demand (before EE reductions) under different futures



CTP = Current Trends & Policy; AER = Aggressive Environmental Regulation; HEG = High Economic Growth; LEG = Low Economic Growth



PNM 2022 IRP Energy and Demand Forecast Status

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Itron, Inc.

July 6, 2022

Agenda

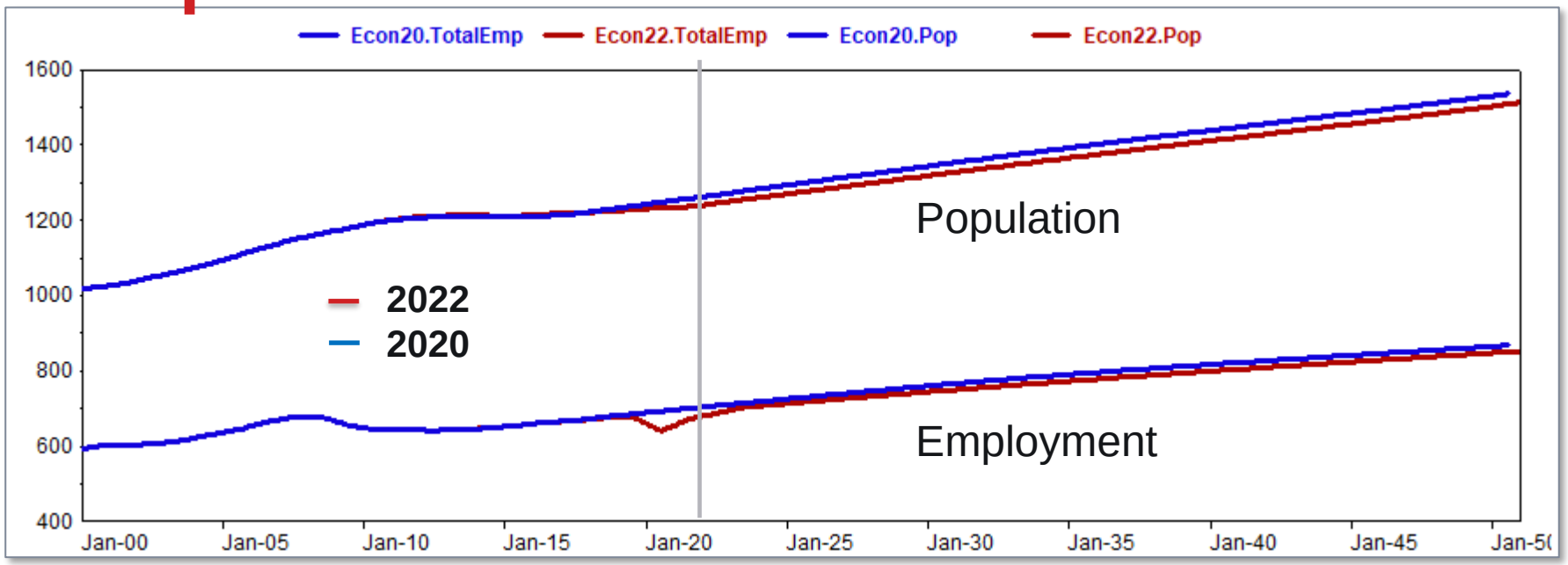
- Economic Data and Forecasts
- Weather Data and Normal Weather
- Behind the Meter PV Data and Forecasts
- Electric Vehicle Forecast
- Other Scenario Inputs
- Energy Modeling and Forecasts
  - Customer growth forecast
  - Statistically Adjusted End Use (SAE) Method
  - Use per customer models (energy use vs utility sales)
  - Energy and peak forecast summary
- To Do -- Hourly System Load and Peak Demand Forecasts
  - Bottom-up load shape and peak demand forecast
- To Do -- Forecast Scenarios

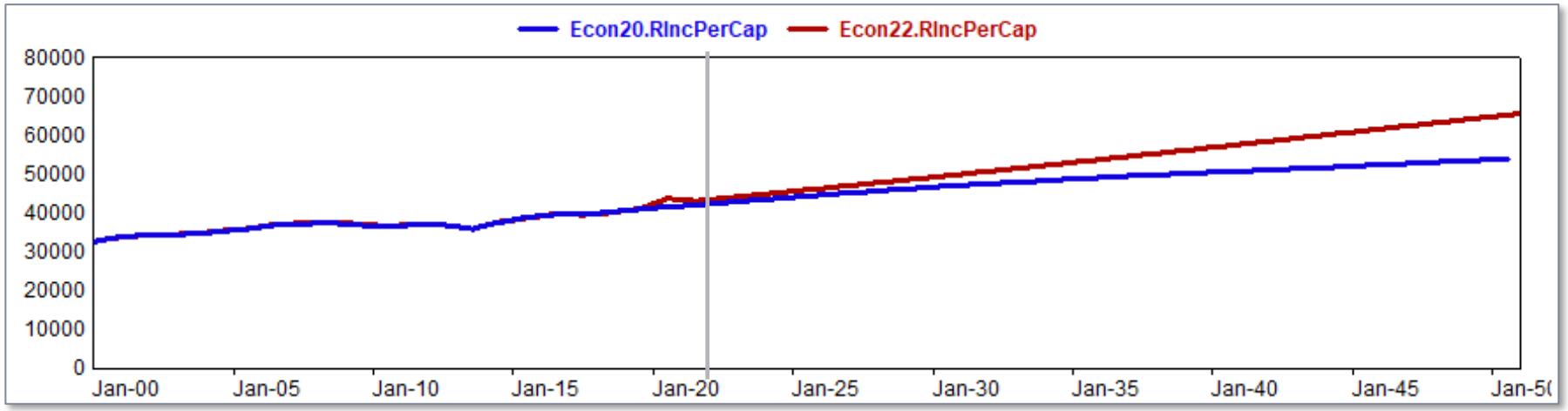
Economic Data and Forecasts

Economic Data and Forecast

- Forecast provided by Woods and Poole
- Annual history from 1950
- Annual forecast to 2060
- State and County level data
- Used data for PNM counties:
  - North: Bernalillo, San Miguel, Sandoval Santa Fe, Union, Valencia
  - South: Grant, Hidalgo, Luna, Otero
- Annual data converted to monthly using centered moving averages
- To Do – Develop High/Low Scenarios

Comparison 2022 vs 2020

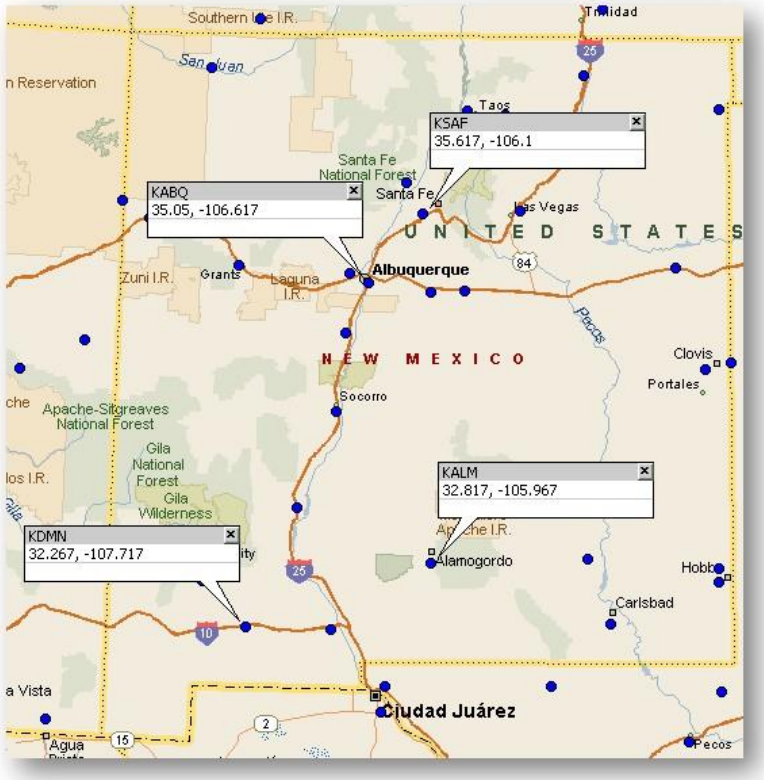




Weather Data and Normal Weather

Weather Data and Normal Scenario

- Hourly weather data from AccuWeather
  - Temperature – Used to compute Degree Days
  - Global horizontal irradiation (GHI) – Used for solar generation
- 4 Stations
  - North: Albuquerque (KABQ), Santa Fe (KSAF)
  - South: Deming (KDMN), Alamogordo (KALM)
- Station weights for weather variables
  - Based on billed sales 2015 to 2018
  - Heating Degree weights based on winter sales
  - Cooling Degree weights based on summer sales
  - Solar GHI weights based on annual sales
- Normal Weather – 2002 to 2021 (20 years)

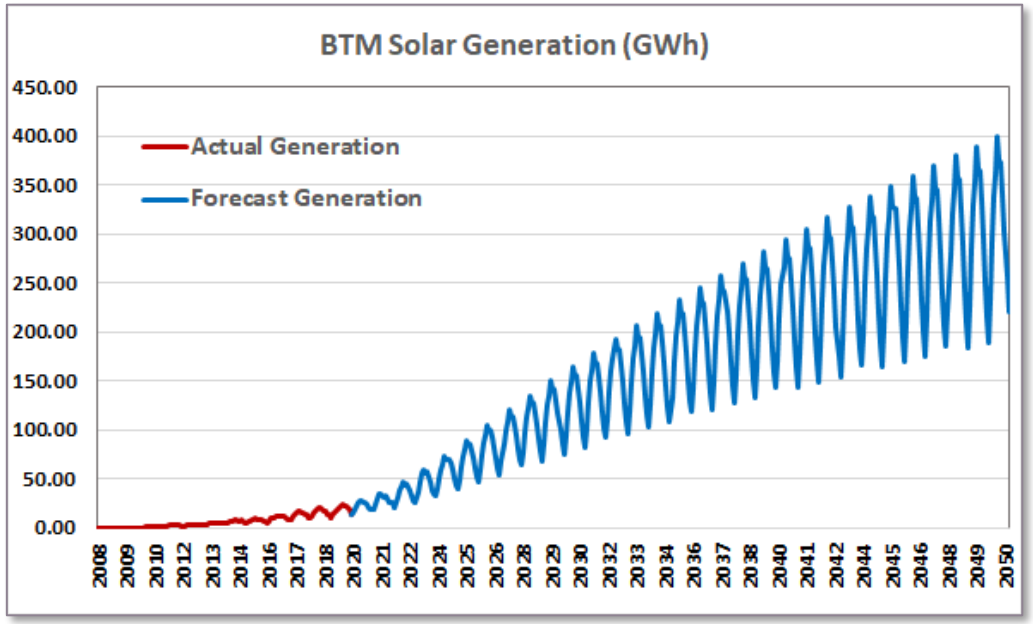


Station	Heating Degrees	Cooling Degrees	Solar GHI
KABQ	75.0%	77.8%	76.3%
KALM	3.0%	3.2%	3.1%
KDMN	9.0%	8.4%	8.9%
KSAF	13.0%	10.5%	11.7%

Behind the Meter PV Data and Forecasts

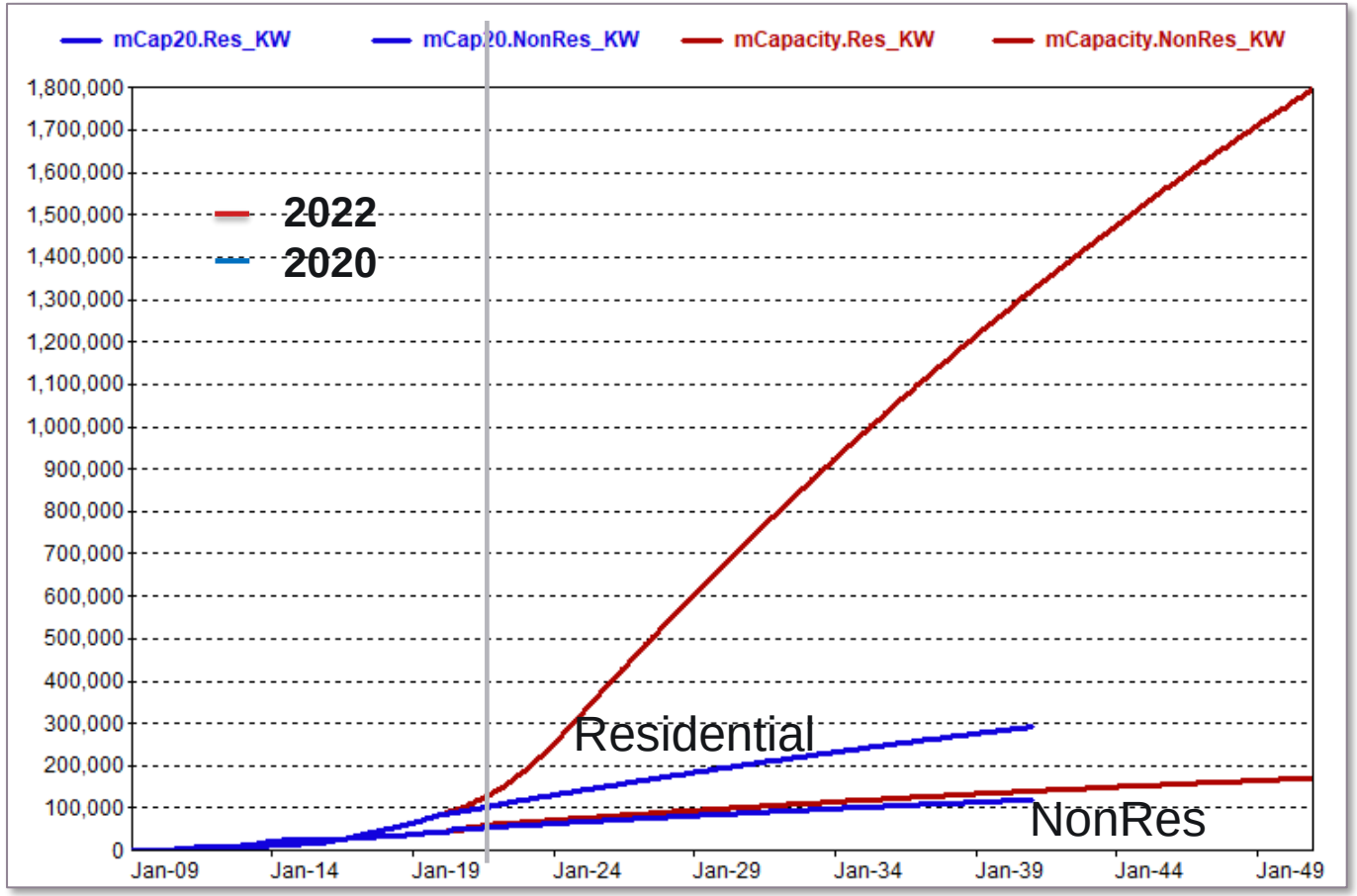
BTM Solar Capacity and Generation Data

- Solar Capacity Data
  - Generation capacity data for new systems
  - Aggregated to monthly (Res & NonRes)
  - Forecasted through 2040, extended to 2050
- Solar Generation Data
  - All solar customers have generation output meters
  - Data are gathered monthly on a billing-cycle basis
- Solar Model
  - Y = Daily average KWh output per KW capacity
  - X = Monthly binary vars, Daily average GHI Sum
  - Daily forecast allocated to hours based on hourly GHI
  - Forecasts of MWh generated monthly, daily, hourly
    - MWh = Capacity (MW) * KWhPerKW / 1000
- To Do: Develop PV capacity scenarios



Comparison 2022 vs 2020

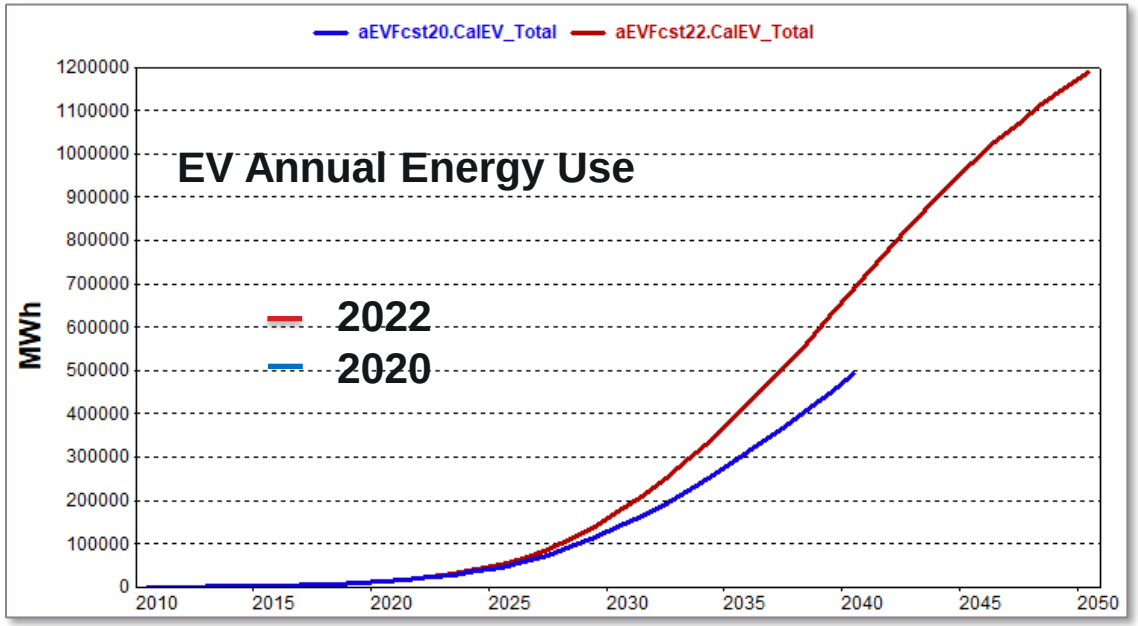
- Non Res capacity forecast is about the same
- Res capacity forecast in 2040 is over 1250 MW, which is about 1000 mW higher than the 2020 forecast
- Annual solar generation forecast in 2040 is about 1,900 GWh higher than the 2020 forecast.



Electric Vehicle Forecast

ELECTRIC VEHICLE FORECAST

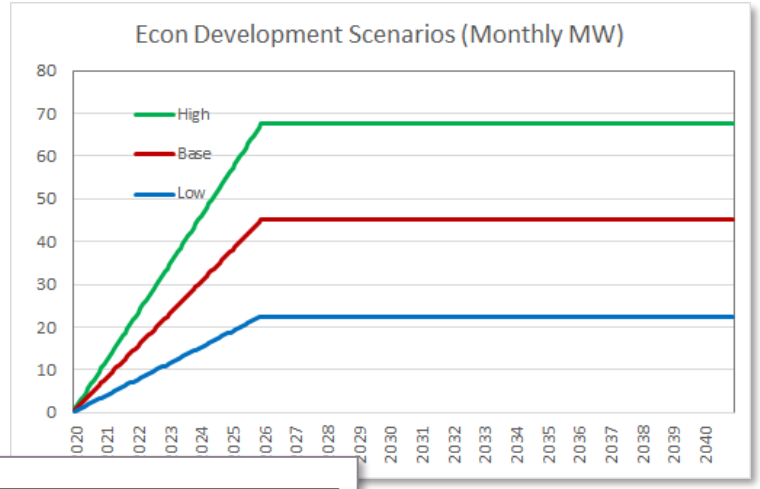
- Forecasts based on new car sales
  - Total New Mexico annual car sales are about 87,000
  - US EV adoption ramps up from 2.3% to 20% by 2030, 35% by 2040
  - NM adoption is about 41% of US adoption
  - 75% of NM adoptions are in PNM territory
  - EV annual energy use is about 4 MWh
  - About 80% of charging is residential
- Changes for 2022
  - Forecasts extended to 2050
  - Car life set to 18 years
- New forecast is stronger by 200 GWH in 2040
- To Do – Develop EV scenarios

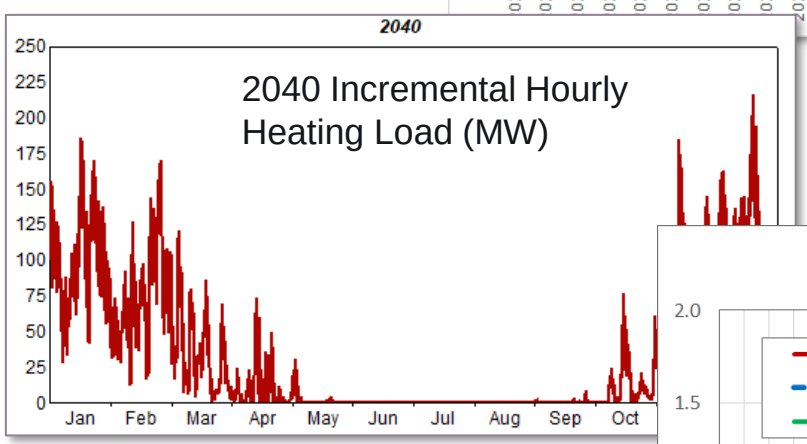


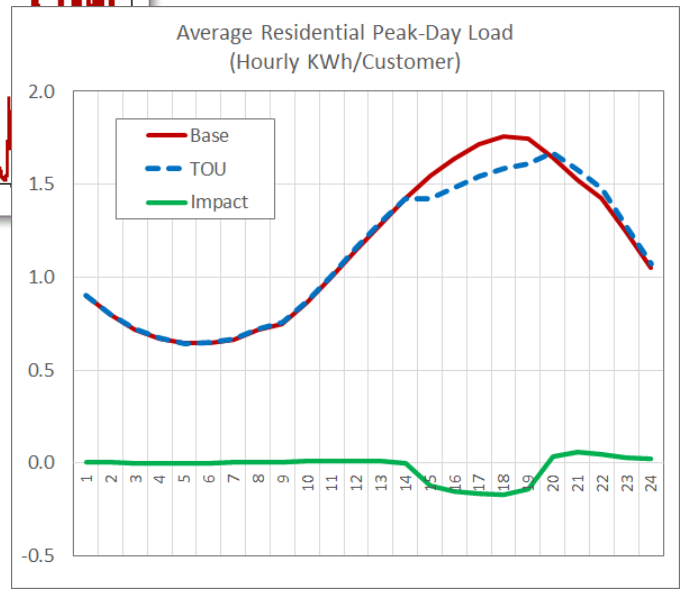
Other Scenario Inputs

Other Factors

- Provided by PNM Economic Development Group
  - Represents new industrial customers
  - Added about 360 GWh to 2020 forecast by 2026
  - To Do – Get inputs for 2022 forecast
- Electrification
  - To Do – Update scenario inputs
- Time of Use Rates
  - To Do – Update scenario inputs



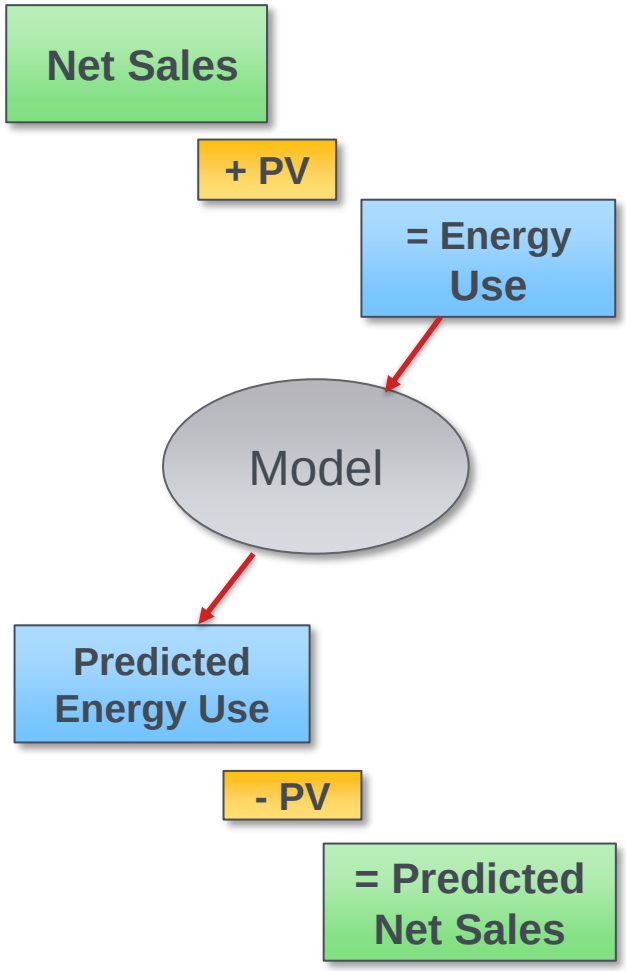




Energy Modeling and Forecasts

Energy Use and Energy Sales

- Monthly sales and monthly energy use:
  - Sales = net delivery of energy through the customer meter
  - Energy use = consumption of appliances and equipment
  - Energy use is bigger than net sales because of PV generation
  - Models explain energy use
- Monthly Use Models
  - Regression models
  - Y is energy use per customer (UPC)
  - X variables are end-use drivers and weighted CD and HD variables
- PNM Sales and Load
  - Sales computed as Energy Use Forecast – PV Generation Forecast
  - Same approach as used in 2020 IRP Forecast

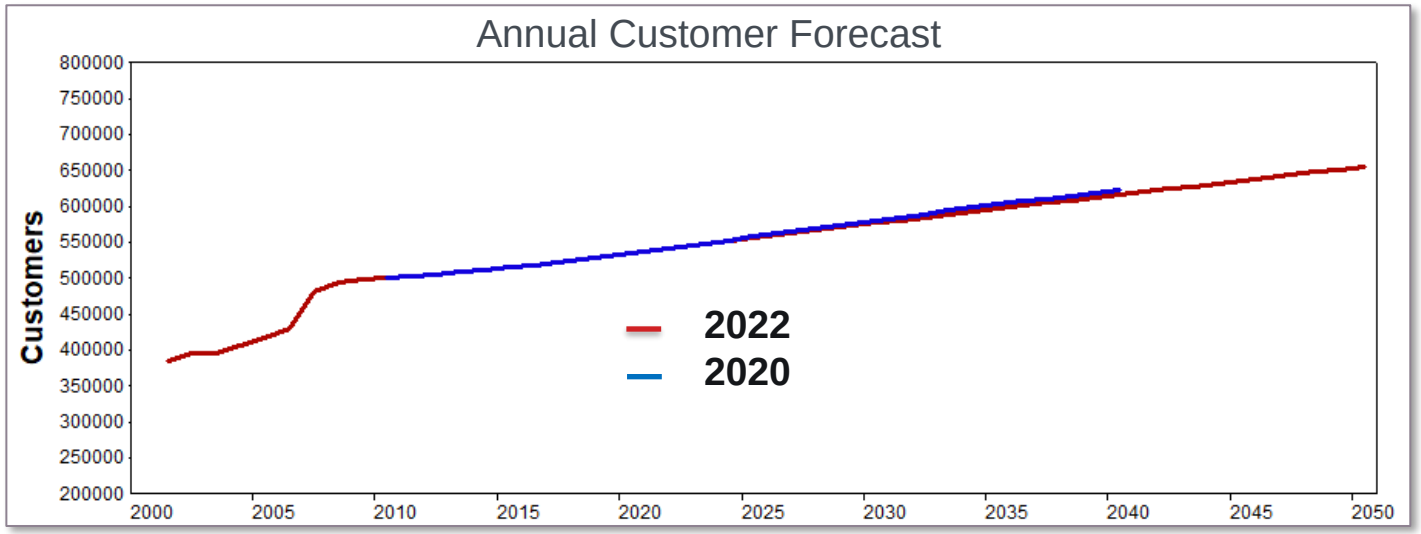


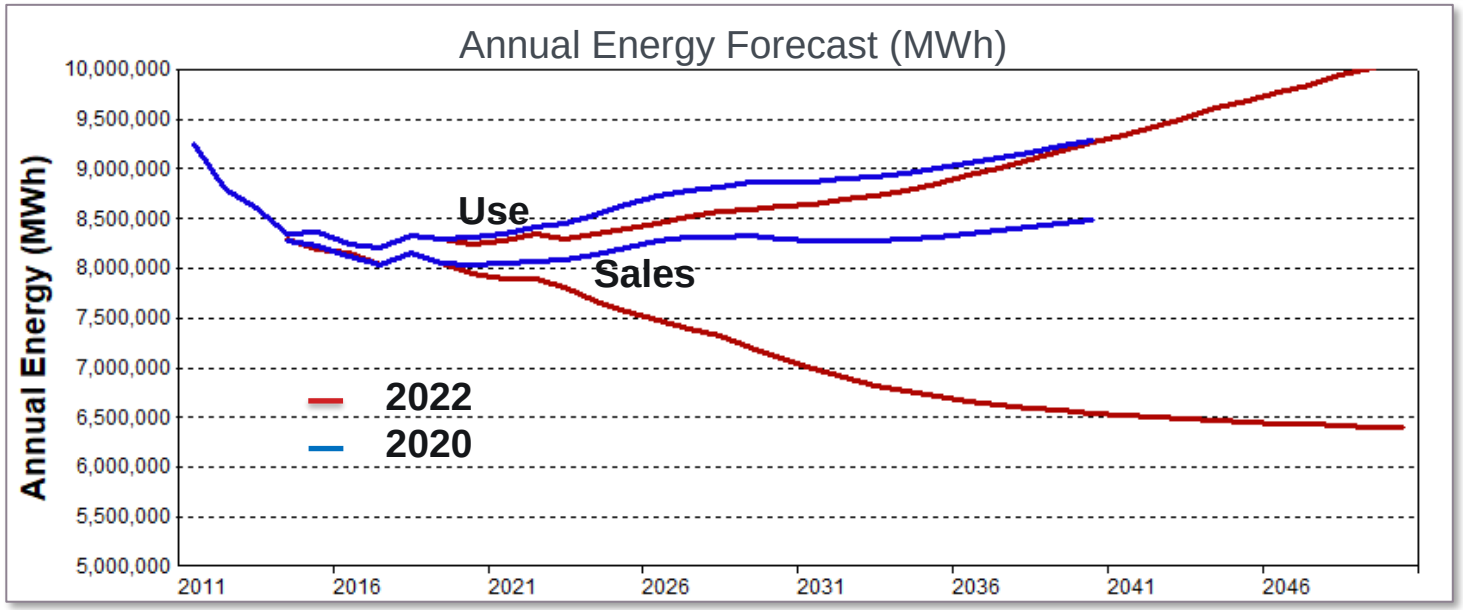
Statistically Adjusted End-Use Framework

- Residential and commercial models use Statistically Adjusted End-Use (SAE) Model
- SAE models account for:
  - Appliance and equipment efficiency
  - Thermal efficiency of buildings
  - Appliance saturation and equipment density
- Efficiency and saturation data initialized using 2021 EIA data for Mountain region
- Saturation and intensity values are modified to agree with PNM data
  - 2016 base-year intensities and saturations from PNM Efficiency Potential Study
  - Efficiency gains are accelerated in 2021 to 2025 to be consistent with PNM efficiency goals and potential study estimates
  - To Do – Update if new market studies are available

COMPARE 2022 DRAFT AND 2020 FORECASTS

- Customer forecast is about the same
- 2022 Use forecast is lower to 2040
  - No Econ Dev in 2022 forecast versus 350 GWh in 2020 forecast through 2026
- Use forecast gap closes by 2040
  - Stronger EV forecast adds 200 GWh by 2040
- Sales forecast is driven downward significantly because of stronger PV adoption in the 2022 forecast

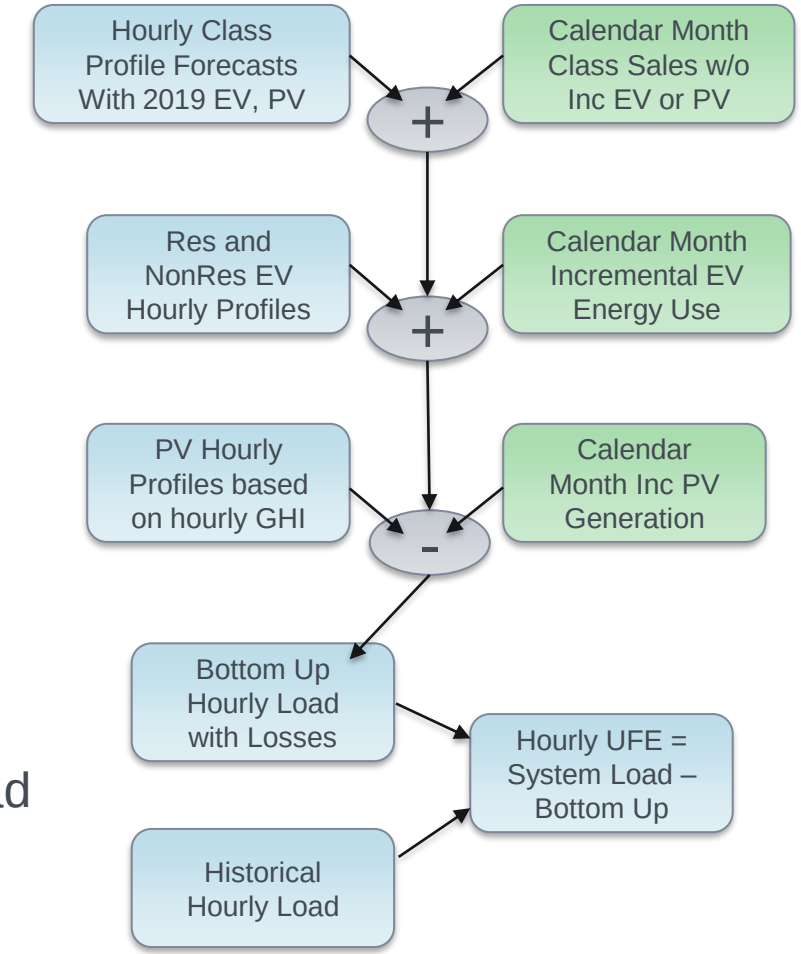




Hourly Load and Peak Demand Forecast

Hourly Load and Peak Load Forecasts

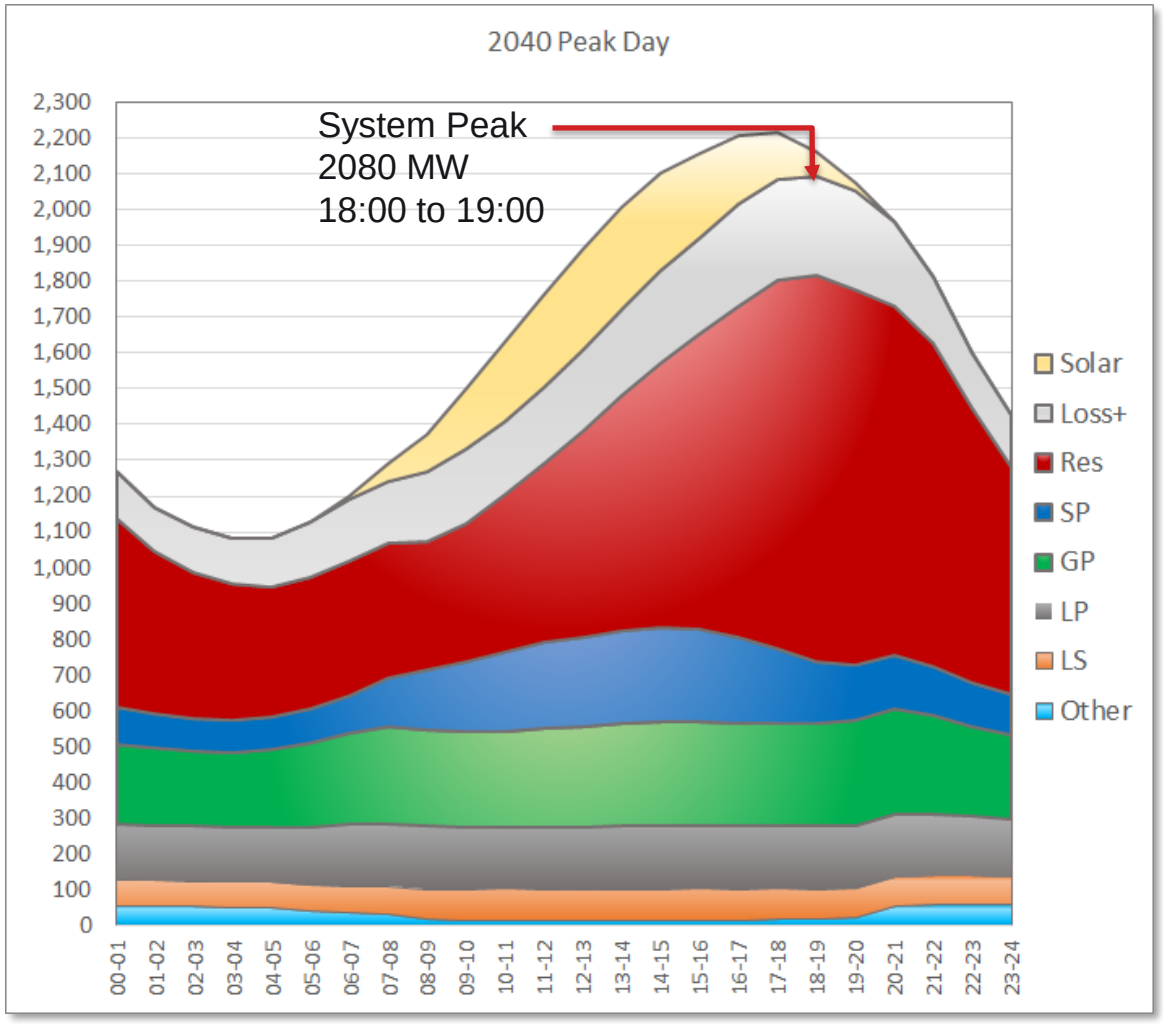
- Hourly load models for each class
  - Estimated with hourly load research data for 2015 to 2019
  - Forecasted using normal daily weather pattern
- Hourly shapes for EV and PV
  - EV shapes: Idaho National Labs, EV Charging Reports
  - PV shapes based on hourly GHI data (rotated from 2018)
- Bottom up logic
  - Calendar month sales forecast without incremental EV or PV
  - Calibrate class hourly profile to calendar month energy value
  - Scale EV profile to incremental EV energy, add to class load
  - Scale PV profile to incremental PV energy, subtract from class load
  - Multiply by annual loss factor based on voltage level
  - Add across classes
- Compute and apply UFE adjustment factors by month and hour



Hourly Load on Peak Day

- Bottom-up process depiction
  - Class loads are at the meter
  - Loss estimate includes
    - Loss factors by delivery voltage
    - Company use
    - 3rd party transmission
    - FERC Wholesale deliveries
    - Unaccounted for energy
- Solar is total BTM generation at the customer meter and does not include avoided T&D losses
- To Do – Extend bottom up logic to 2050

This Picture will change a lot because of new PV forecast



Forecast Scenarios

2020 Scenario Definitions

	Scenario	Economic Forecast	BTM PV	EV Adoption	Building Electrification	TOU	Description
A	Reference Forecast	Mid	Mid	Mid	No	No	Base Forecast without EE Programs
B	High Economics	High	Mid	Mid	No	No	Strong Econ, Misc. End Use, & Econ Dev
C	Low Economics	Low	Mid	Mid	No	No	Weak Econ, Misc. End Use, & Econ Dev
D	Strong Energy Growth	High	High	High	Yes	No	Strong Econ, Misc. End Use, & Econ Dev Strong PV, Strong EV, Add Res Electrification
E	Weak Energy Growth	Low	Low	Low	No	No	Weak Econ, Misc. End Use, & Econ Dev Weak PV, Weak EV
F	High BTM PV	Mid	High	Mid	No	No	Strong PV
G	Low BTM PV	Mid	Low	Mid	No	No	Weak PV
H	Zero Incremental PV	Mid	Zero Inc	Mid	No	No	Zero Incremental PV
I	Zero PV	Mid	Zero	Mid	No	No	No PV Ever
J	High EV Adoption	Mid	Mid	High	No	No	Strong EV
K	Low EV Adoption	Mid	Mid	Low	No	No	Weak EV
L	Aggressive Environmental Regulation	Mid	High	High	Yes	No	Strong PV, Strong EV, Add Res Electrification
M	High Building Electrification	Mid	Mid	Mid	Yes	No	Add Res Electrification
N	TOU Pricing	Mid	Mid	Mid	No	Yes	Add TOU Impacts

THANK YOU

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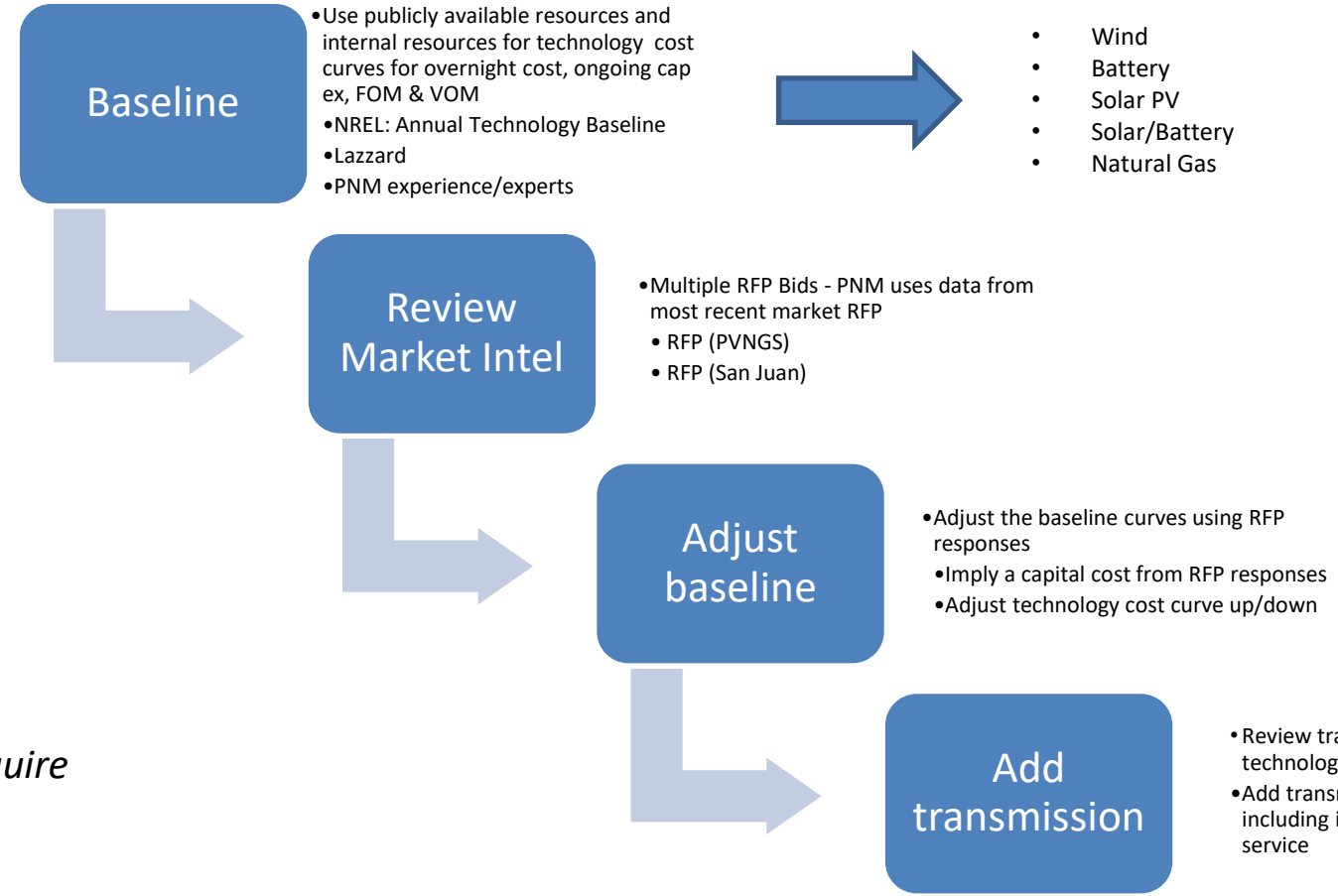
COMMENTS FROM 2020 IRP: CANDIDATE RESOURCE PRICING

Cost assumptions for renewables are too high

- Assumed costs for new wind, solar & battery resources are high above NREL's costs
- PNM lacks transparency in how it uses RFP bid costs to imply a capital cost
- PNM lacks transparency in transmission cost adjustments

CANDIDATE RESOURCE PRICING METHODOLOGY



Not all technologies require adjustments

2023 IRP PUBLIC ADVISORY PROCESS

WE WOULD LIKE TO HEAR FROM YOU

We did not receive any feedback to these questions posted during the last public meeting:

1. What did we do well in the last (2020) IRP and where can we improve?
2. Any additional ideas for technical discussions?
3. What is the proper way to balance reliability, customer cost and accelerating the transition to clean energy?
4. How can we be more collaborative throughout the process with our public stakeholders?

We would also like to hear your ideas on the Load Forecasting Scope of Work or the Candidate Resource Pricing Methodology or if you have any questions.

NEAR TERM SCHEDULE

FUTURE MEETING TIME & LOCATION

When: July 27, 2022

Topic: Public Advisory Technical Session #4: IRP Modeling Updates/Techniques & *Preliminary RFI Responses**

Start Time: 9:00 AM

Location: Virtual

Subject to change, pending time constraints

Due to many participants for the first two meetings attending virtually, we have decided to make the next meeting a virtual meeting. If there is strong interest to resume in person meetings for future sessions, please email us at IRP@pnm.com. We will continue to notify everyone through the email service list regarding upcoming meeting dates, topics and locations (virtual or in person).

NEAR TERM SCHEDULE

FUTURE MEETING TIME & LOCATION

When: August 3, 2022

Topic: Public Advisory Technical Session #5 (Modeling Assumptions: Transmission*)

Start Time: 9:00 AM

Location: Virtual

subject to change, may be switched with Public Advisory Group Day on Aug 17

Due to the vast majority of participants for the first two meetings attending virtually, we have decided to make technical session a virtual meeting. If there is strong interest to resume in person meetings for future sessions, please email us at IRP@pnm.com. We will continue to notify everyone through the email service list regarding upcoming meeting dates, topics and locations (virtual or in person).

LONG TERM SCHEDULE (THROUGH 2021)

Date	Meeting		Title
4/28/2022	Steering Meeting #1	Modeling Assumptions/ Drivers	IRP Kick Off Meeting
5/25/2022	Steering Meeting #2		Reliability & Resiliency
6/8/2022	Technical Session # 1		*Resource Adequacy Modeling*
6/22/2022	Mini Steering/Technical #2		*Energy Efficiency/Resiliency/Market Depth*
7/6/2022	Technical Session #3		***Load Forecast/Candidate Resource Pricing Methodology***
7/27/2022	Technical Session #4		***IRP Modeling Updates/Techniques & RFI Responses****
8/3/2022	Technical Session #5		***Other Modeling Assumptions****
8/17/2022	Steering Meeting #4		***Public Advisory Group Day****
8/30/2022	Steering Meeting #5		***Emerging/Evolving Grid Solutions***
9/21/2022	Steering Meeting #6	Modeling Inputs/Set Up	***Modeling Input #1 - Existing System/Inputs***
10/11/2022	Steering Meeting #7		***Modeling Input #2 Scenario Building/The Future***
11/15/2022	Steering Meeting #8		***Modeling Input #3***
12/13/2022	Steering Meeting #9		***Modeling Input #4 Transmission***

**subject to change*

NEXT MEETING

We encourage you to send in your thoughts ahead of time to IRP@pnm.com so that we can summarize them and distribute them for the next meeting. Please have your submissions in by July 20, 2022.

MAKE SURE WE HAVE UP TO DATE CONTACT INFORMATION FOR YOU

www.pnm.com/irp for documents

IRP@pnm.com for e-mails

Register your email on sign-in sheets to receive alerts of upcoming meetings and notices that we have posted to the website.

Thank you