2021 Integrated Resource Plan

August 14, 2020

Welcome

2021 El Paso Electric Company Integrated Resource Plan Public Participation Meeting 2

Agenda:

- **Resource Options**
  - Resource Operational Characteristics & Reliability
  - Solutions for Renewable Operational Challenges
  - Process Map for IRP Analysis
  - Schedule and Future Meetings
- **Load Management/Demand Response (LM/DR) by Uplight**
- **Request for Public Input**

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Safe Harbor

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.

Forward-looking statements often include words like we “believe”, “anticipate”, “target”, “project”, “expect”, “predict”, “pro forma”, “estimate”, “intend”, “will”, “is designed to”, “plan” and words of similar meaning, or are indicated by the Company’s discussion of strategies or trends. Forward-looking statements describe the Company’s future plans, objectives, expectations or goals and include, but are not limited to, statements regarding [anticipated future generation costs, resource need, customer growth rates, rate structure, fuel costs, purchased power pricing]. 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 Form 10-K for the fiscal year ended December 31, 2019 and Quarterly Reports filed in 2020. Any such forward-looking statement is qualified by reference to these risks and factors. EPE cautions that these risks and factors are not exclusive.

Although the Company believes that the expectations reflected in such forward-looking statements are reasonable, no assurances can be given that these expectations will prove to be correct. Forward-looking statements by their nature that could substantial risks and uncertainties that could significantly impact expected results, and actual future results could differ materially from those described in such statements. 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.

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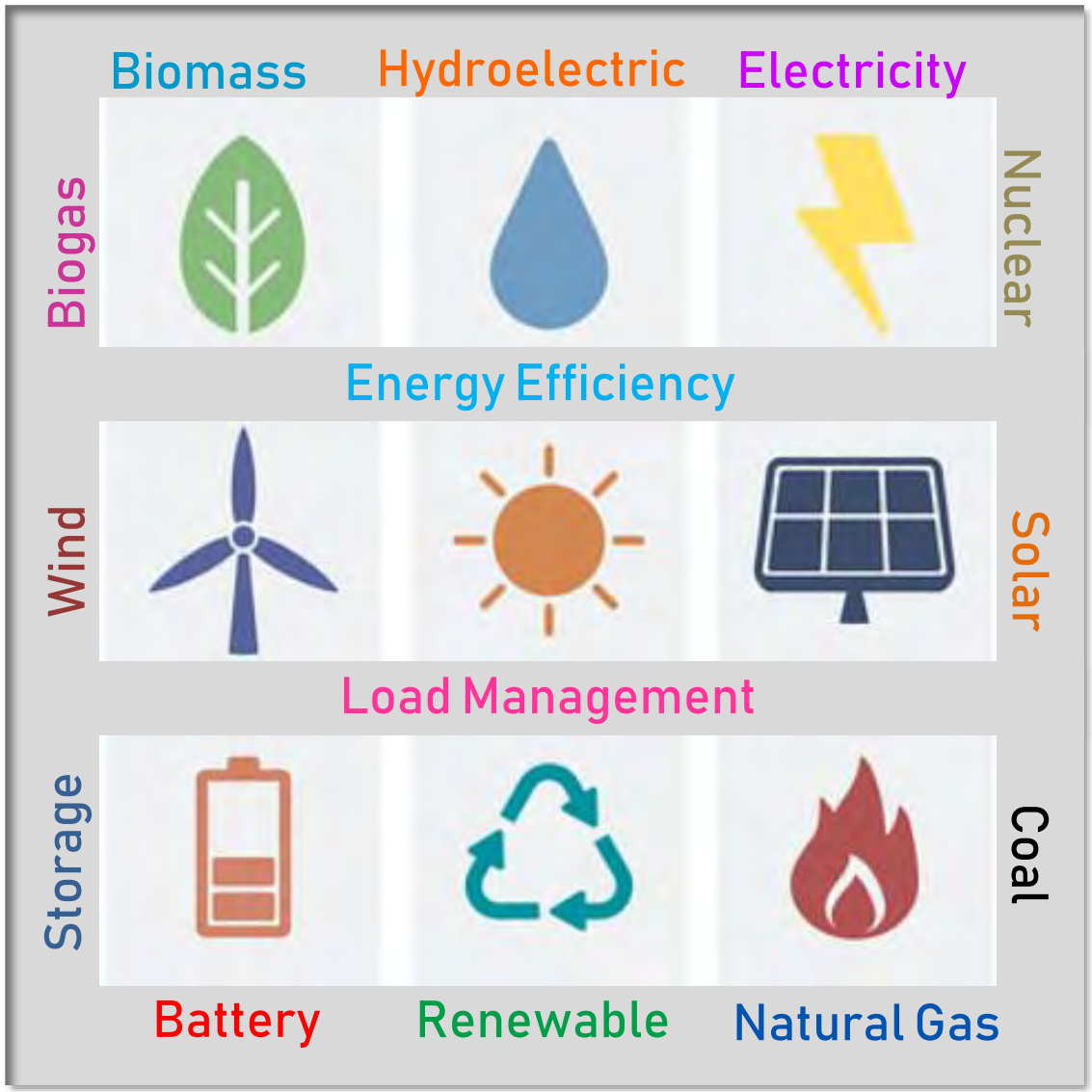
Meeting Format and Guidelines

- **Presentations will be by El Paso Electric staff**
  - EPE will complete presentation prior to answering questions
- **Participants may submit questions through the WebEx chat box**
- **Communications should be respectful, to the point and on topic**
- **Written questions submitted after the meeting will be responded to in writing within 10 days.**

Resource Options



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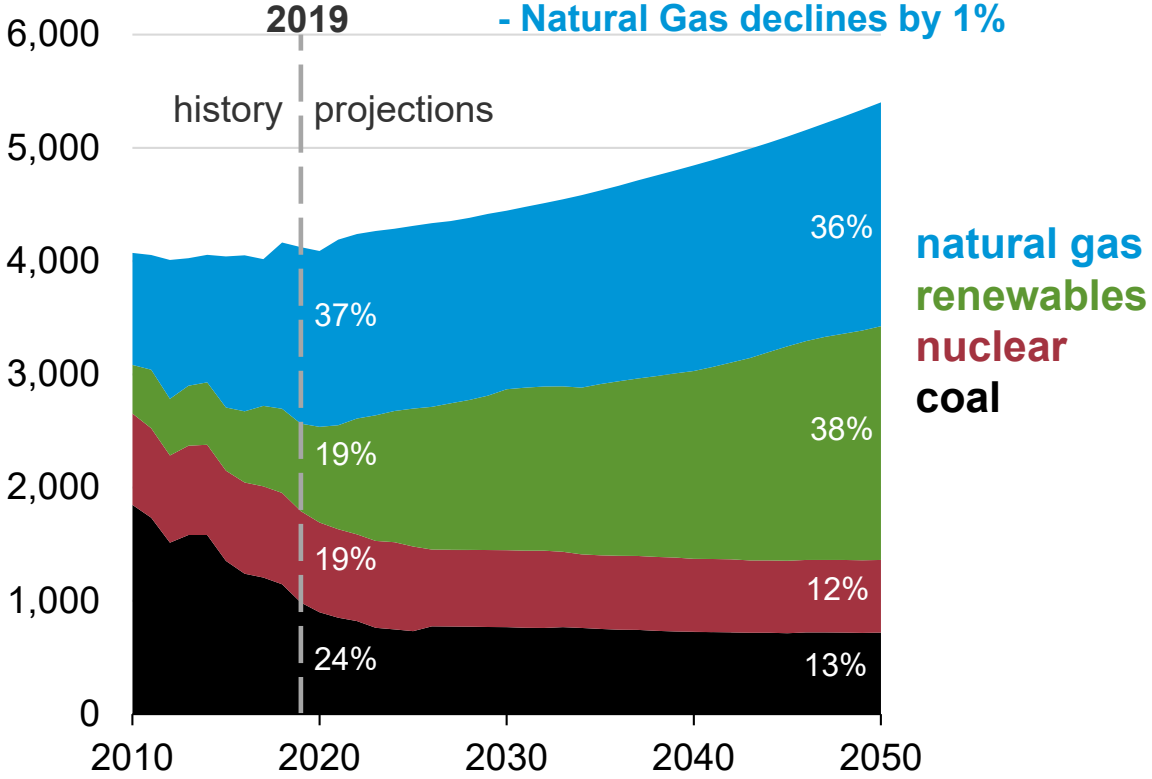
U.S. Annual Energy Outlook 2020 (EIA)

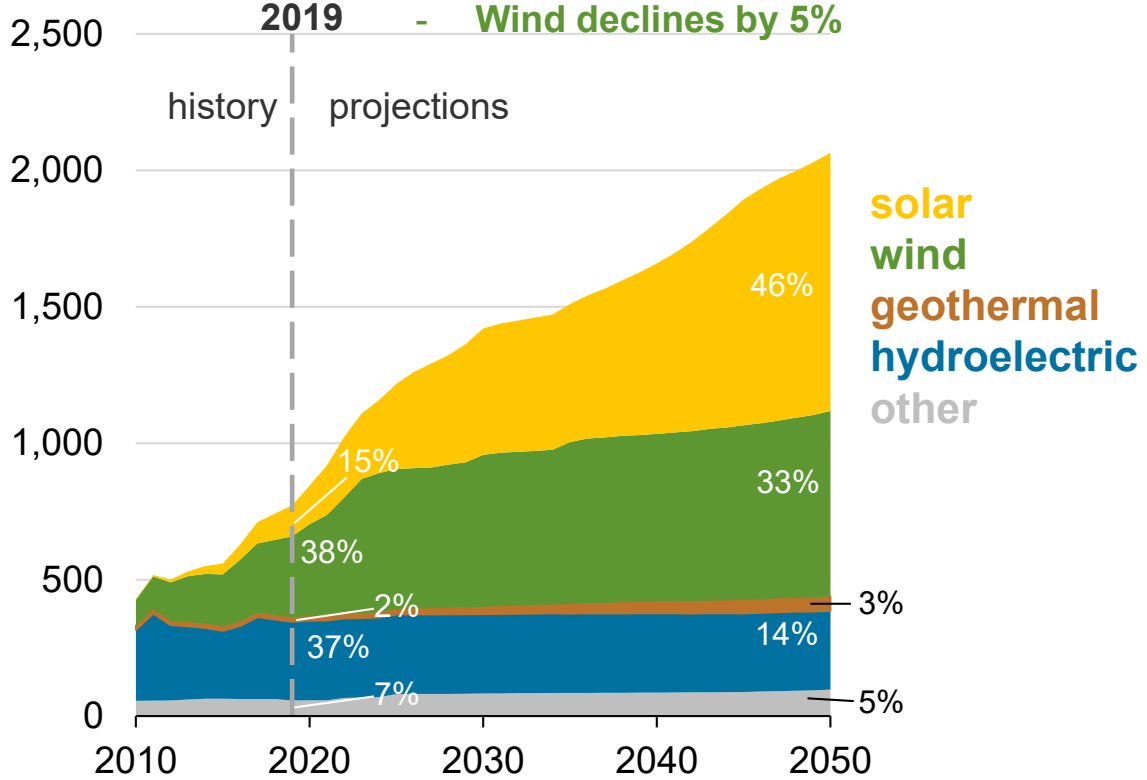
Electricity generation from selected fuels (AEO2020 Reference case)
billion kilowatthours

- Renewables double by 2050
- Natural Gas declines by 1%



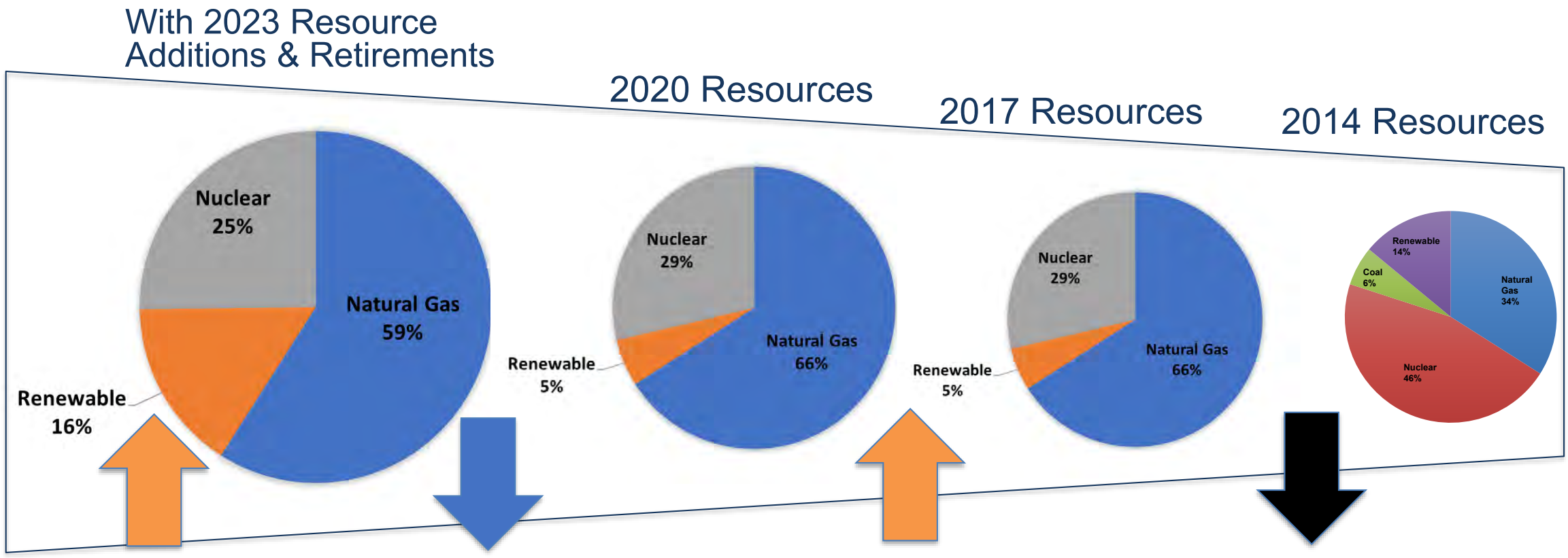
Renewable electricity generation, including end use (AEO2020 Reference case)
billion kilowatthours

- Solar growing faster than wind
- Wind declines by 5%



https://www.eia.gov/outlooks/aeo/

EPE Portfolio Resource Mix 2014-2023 (Capacity)



*Supply-side resources (customer-owned, behind the meter distributed generation not included)

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Future Resource Portfolio

A future resource portfolio will include….

- Greater integration of renewable resources
- Renewable resources such as solar and wind will operate similar to conventional gas-fired generation with dispatch control for curtailment of generation, similar to how gas-fired generation is not utilized 100% of the time
- Greater use of battery storage to shift renewable output from low load periods to higher load periods
- Leverage synergies of solar, wind, and dispatchable renewables such as geothermal and biogas
- Utilize LM/DR and energy efficiency to balance resource to load profiles
- Selective use of firm conventional gas or other evolving technologies to provide firm capacity to ensure reliability

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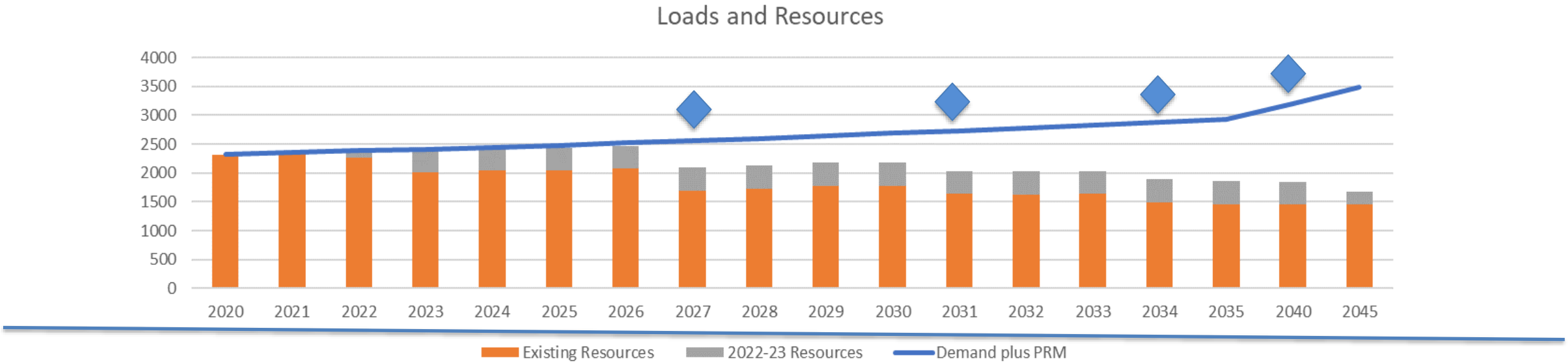
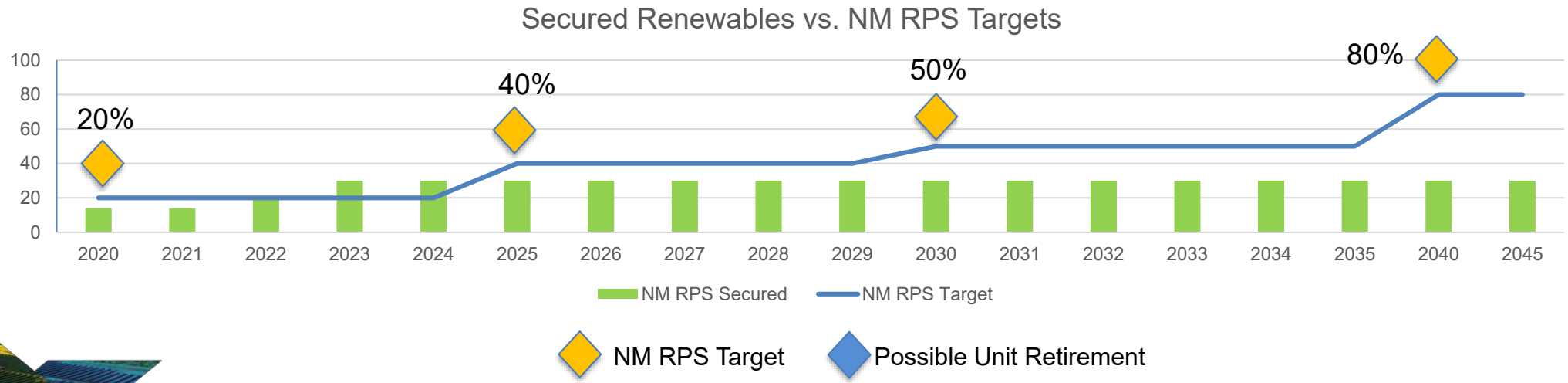
Renewable Integration to Meet RPS Target





NM RPS Target Possible Unit Retirement

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EPE Renewable Resource Additions in 2022-2023 (RPS)

Resource	Jurisdiction	Allocation	Fuel	Ownership	Nameplate	COD Year	Planned Retirement Year	Age at Retirement
Hecate Santa Teresa[1]	system	system	solar	PPA	100	2022	2042	20
Buena Vista (Solar/Storage)[1]	system	system	solar/battery	PPA	100/50	2022	2042	20
Hecate Santa Teresa 2[2]	NM	NM	solar	PPA	50	2022	2042	20
Buena Vista 2[2]	NM	NM	solar	PPA	20	2022	2042	20

Total of 270 MW planned solar addition in 2022-2023

- 200 MW system resources (approximately 20% allocation to NM RPS*)
  - 100 MW solar
  - 100 MW solar/50 MW battery
- 70 MW NM RPS resources (100% allocation to NM RPS**)
  - 50 MW solar
  - 20 MW solar

1. 2017 all source (system) RFP resources (first two resources have been approved, Newman 6 is pending NMPRC approval in case 19-00348-UT)
2. 2019 NM (RPS) RFP resources (filed for approval Case 19-00099-UT)
   Note: Canutillo 50 MW stand-alone battery project was recently denied by NMPRC Case No. 19-00348-UT

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EPE Unit Retirements

Resource	Fuel Type	Operation Mode	Capacity (MW)	Commission Year	Retirement Year	Age at Retirement
Rio Grande 7 (STM)	gas	baseload/inter	46	1958	2022	64
Newman 1 (STM)	gas	baseload/inter	74	1960	2022	62
Newman 2 (STM)	gas	baseload/inter	76	1963	2022	59
Newman 4 (CC)	gas	intermediate	227	1975	2026	51
Newman 3 (STM)	gas	base load/inter	97	1966	2026	60
Copper (CT)	gas	peaking	63	1980	2030	50
Rio Grande 8 (STM)	gas	base load/inter	144	1972	2033	61

- Gas units being considered for retirement in the near term are candidates for short-term life extension to delay the addition of a new resource, if economically feasible

- For reliability purposes, ancillary services for frequency regulation and contingency reserves are required to comply with WECC[1], NERC[2] and FERC[3] standards

1. WECC: Western Electricity Coordinating Council
2. NERC: North American Electric Reliability Corporation
3. FERC: Federal Energy Regulation Commission

2021 IRP Resource Options

Preliminary listing of resources to be considered in 2021 IRP

- Solar
- Wind
- Biomass
- Geothermal
- LM/DR – EE[1]
- Battery Li-Ion
- Other Energy Storage
- Other Renewables
- Imports
- Gas Fired Reciprocating
- Gas Fired CT[2]
- Gas Fired CC[3]

Other resources & technology to be explored

- Energy Storage– pumped hydro, flow batteries, underground compressed air, hydrogen, flywheels
- Nuclear - modular nuclear possible option upon Palo Verde retirement but not prior to 2045
- Gas Turbine– conversion to hydrogen fuel
- EV and customer sited batteries

1. LM/DR-EE: Load Management/Demand Response- Energy Efficiency
2. Combustion Turbine
3. Combined Cycle

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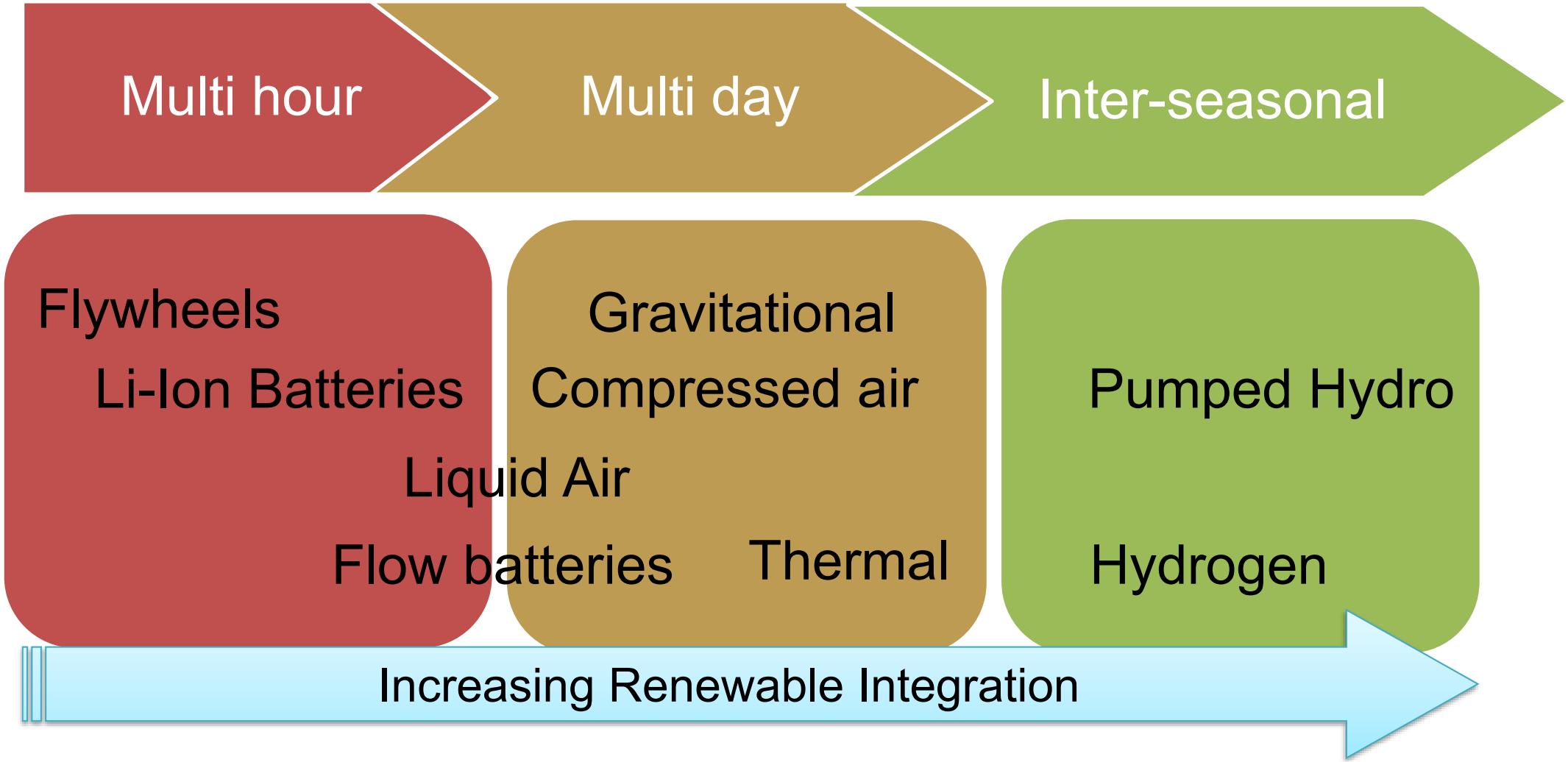
Energy Storage, Short & Long Term



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Load Management/Demand Response

- LM/DR programs can offer benefits to capacity as the number of participants increase.
- LM/DR programs typically include limits to times, duration of events and number of events but with sufficient participation can offer peak demand reductions.
- LM/DR programs require the utility to engage and enroll customers in LM/DR programs.
- Uplight will present further information on the LM/DR program.

Resource Operational Characteristics & Reliability

Operational Characteristics

Technology	Fuel Type	Operation Mode	Dispatch	Ramp Support	Ancillary Services	RPS
Combined Cycle (CC)	gas	baseload/inter	yes	limited	yes	no
Steam Turbine	gas	baseload/inter	yes	limited	yes	no
Combustion Turbine (CT)	gas	peak or inter	yes	yes	yes	no
Reciprocating Engine	gas	peak or inter	yes	yes	yes	no
Nuclear	nuclear	base load	no	no	yes	no
Solar PV	sun	must take	no[4]	no	no[1]	yes
Wind	wind	must take	no[4]	no	no[1]	yes
Geothermal	earth heat	base load	yes	no	yes	yes
Biomass	biogas	base load	no	no	yes	yes
Battery Li-Ion	charge solar/grid	firming/shift-energy	yes[2]	yes[3]	no[1]	no

1 . Inverter Based Resources (IBR) are capable of providing reactive power voltage control through inverter but do not add to system inertia.
2. Battery would be charged during early morning hours (low load) and discharged during peak hours.
3. Can provide ramp support at maximum discharge.
4. Solar and wind are must take but at higher integration levels can be downward dispatched to some degree by curtailing surplus energy.

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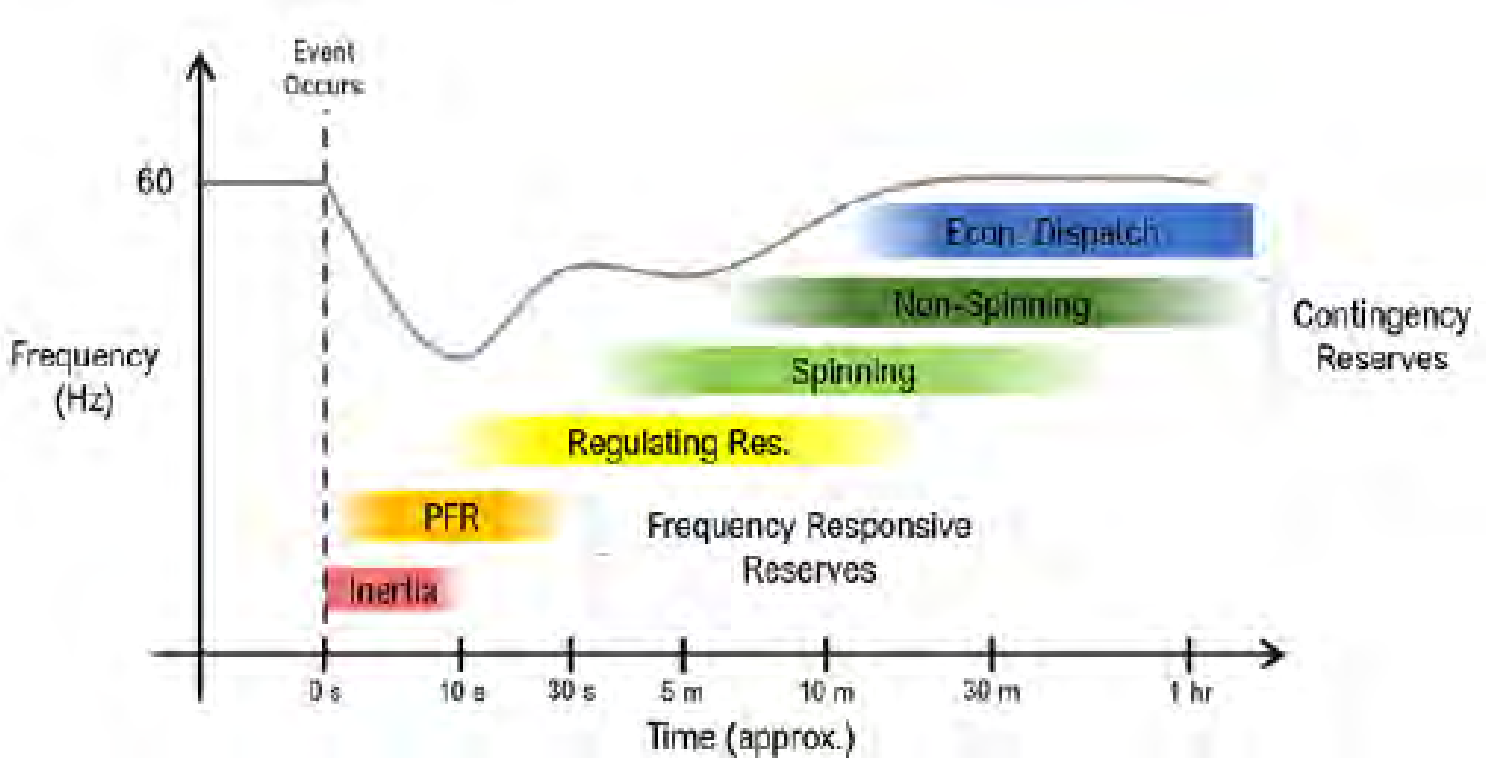
Operational Reliability- Ancillary Services



- Chart shows Sequence of reserve deployments in response to a contingency event
- Ancillary Services for EPE are typically provided by conventional gas-fired resources that provide both inertia and reactive power
- When conventional gas-fired resources are retired, the ancillary serviced they provide must be replaced to comply with reliability standards

https://www.nrel.gov/docs/fy19osti/72355.pdf

Solar and Wind Variability

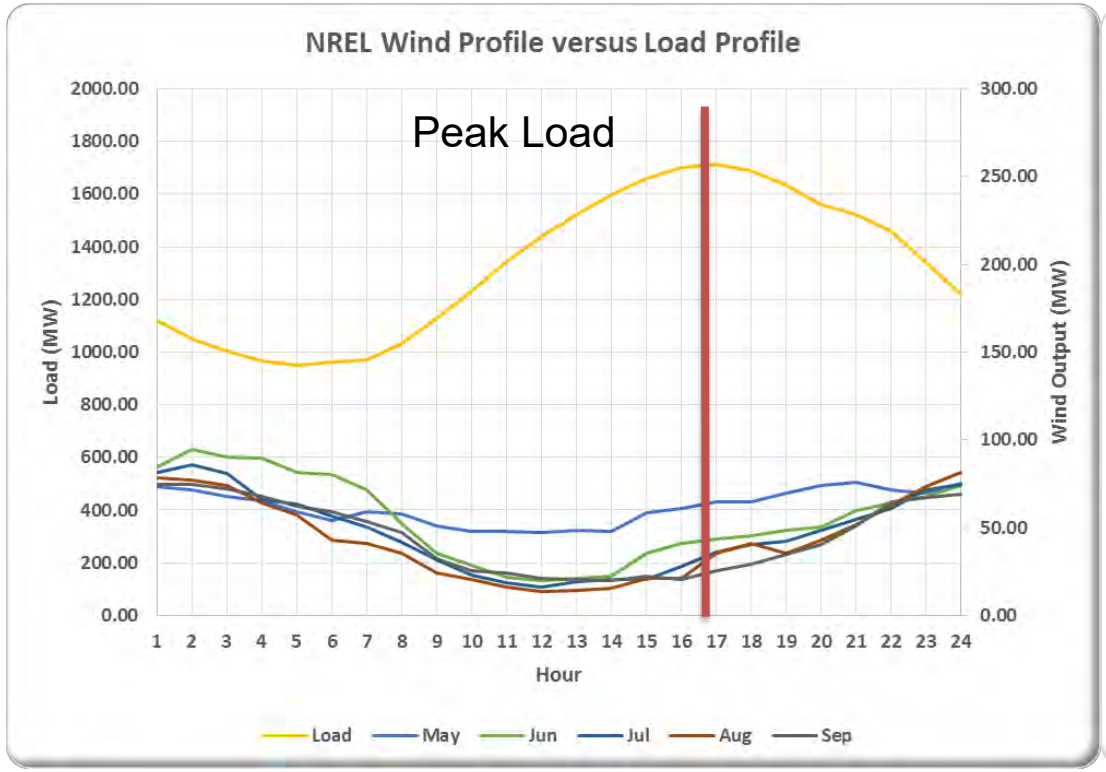
Solar

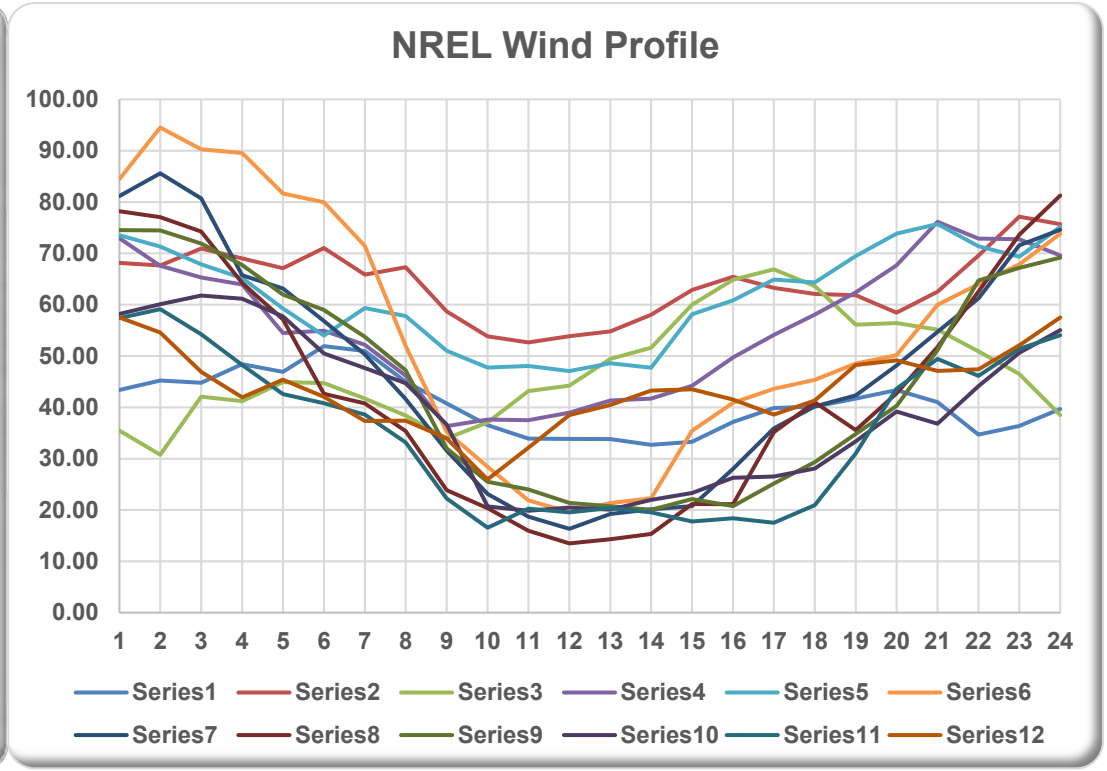
- Variability; diurnal, seasonal, geographical, yearly
- Uncertainty; solar is certain in that the sun rises and sets everyday, but has some level of uncertainty due to the intermittency brought about from weather patterns- cloud cover

Wind

- Variability; hourly, daily, seasonal, geographical, yearly
- Uncertainty; wind has greater uncertainty than solar due to intermittency that can occur at any time

Wind and Load Profile





Observations:
Wind generates more energy during nighttime hours and decreases to a minimum during daytime hours

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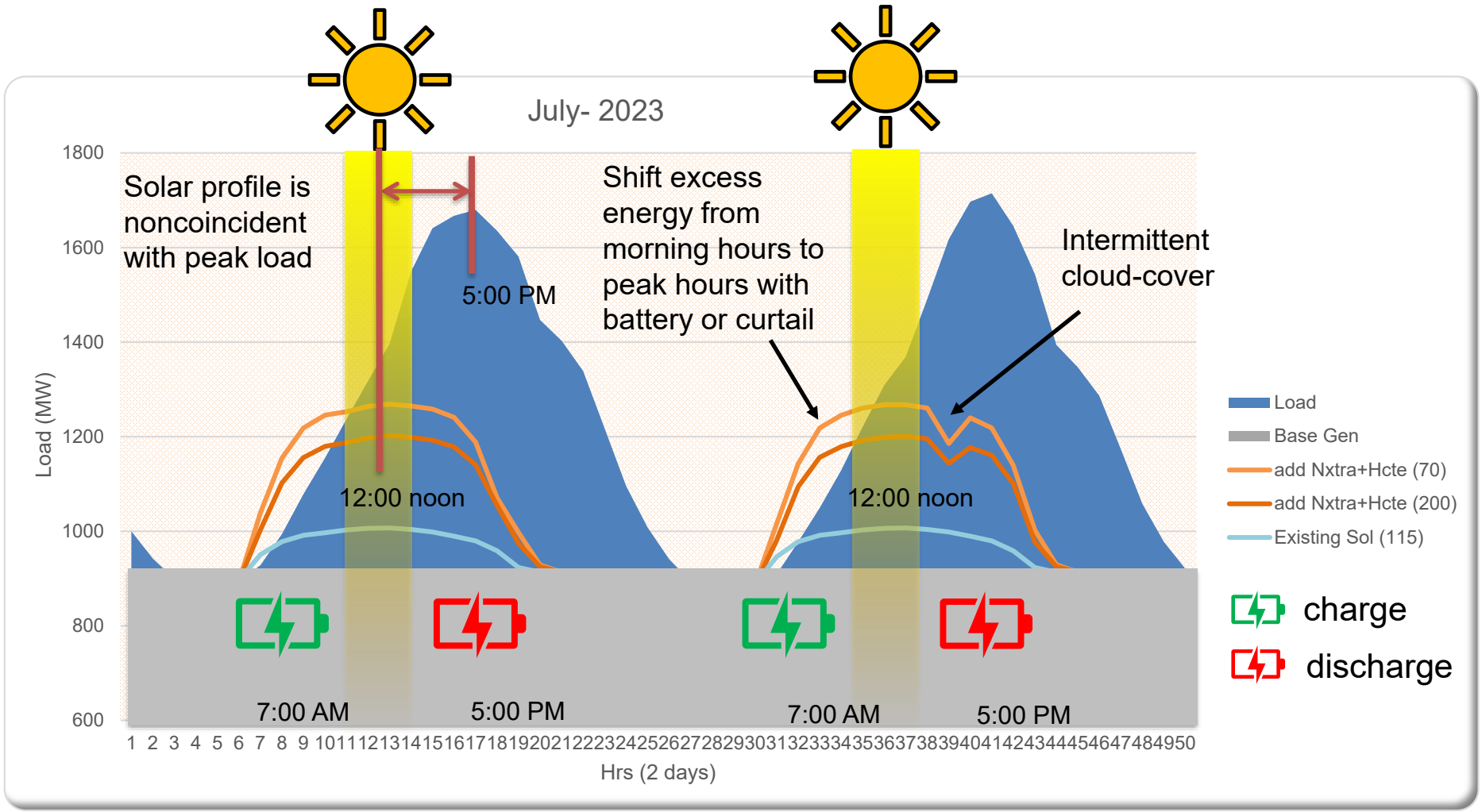
2021 IRP Resource Options- typical summer solar profile



Observations:

- Solar profile is non-coincident with load profile
- Surplus energy is observed during early morning hours
- Battery is a key operational tool to shift energy from early morning hours to peak hours for mitigating curtailment and contributing to capacity
- LM/DR- EE can also contribute towards balancing resource & load profiles

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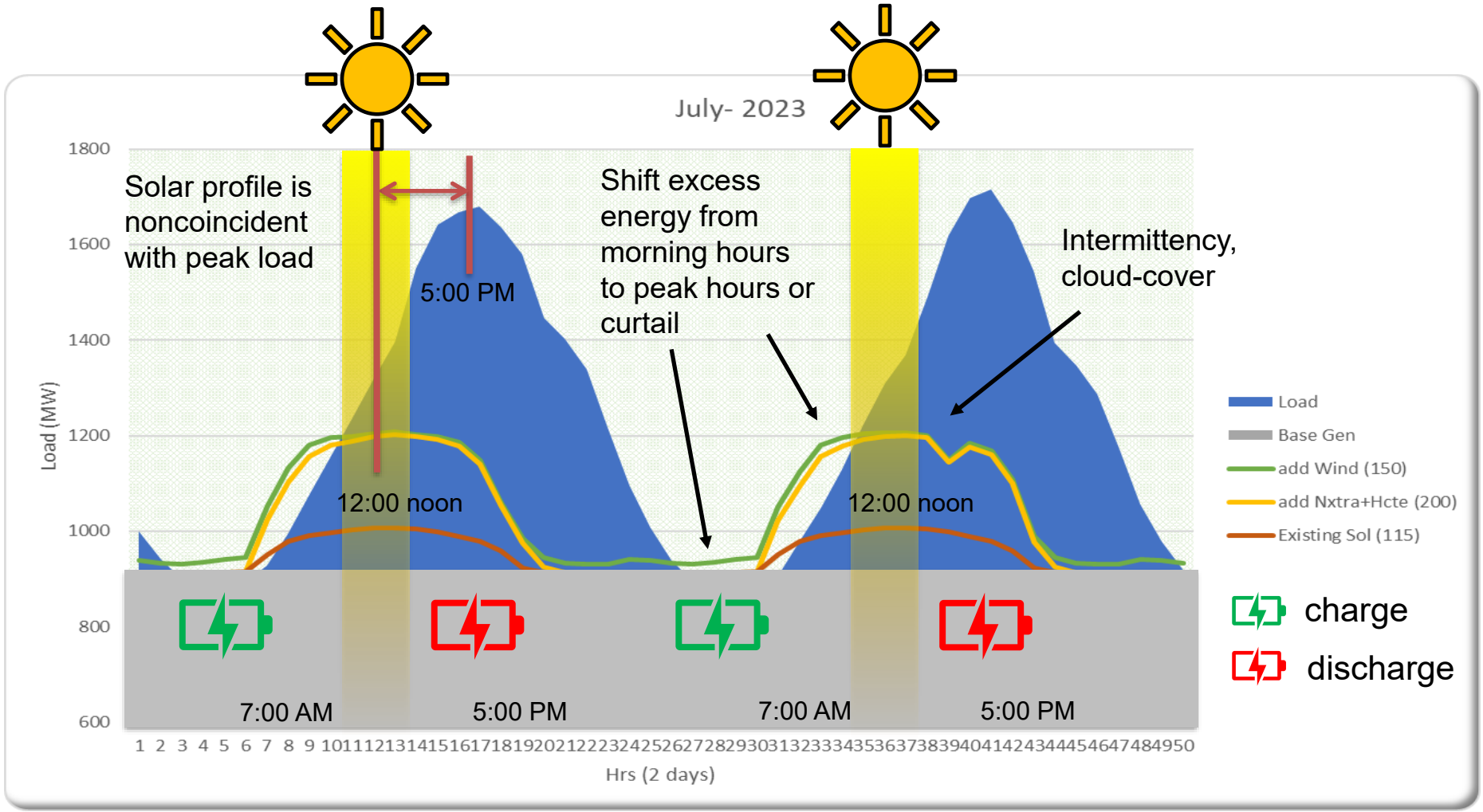
2021 IRP Resource- typical solar/wind summer profile



Observations:

- The 70MW solar resource was removed and 150MW of wind was added
- Wind contributes more energy during nighttime hours and less during daytime hours
- Wind increases surplus energy during low load hours requiring energy storage to mitigate curtailment during these hours

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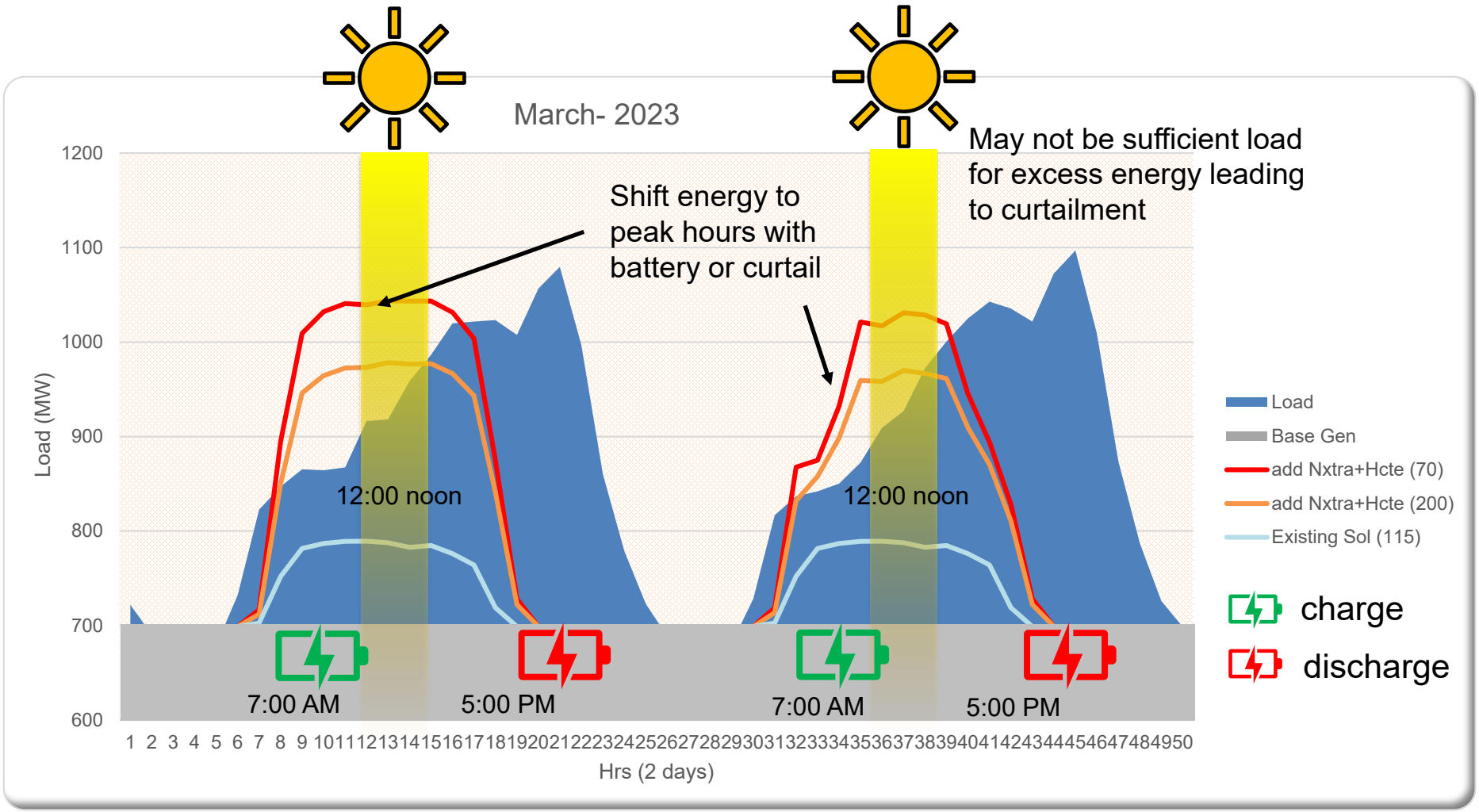
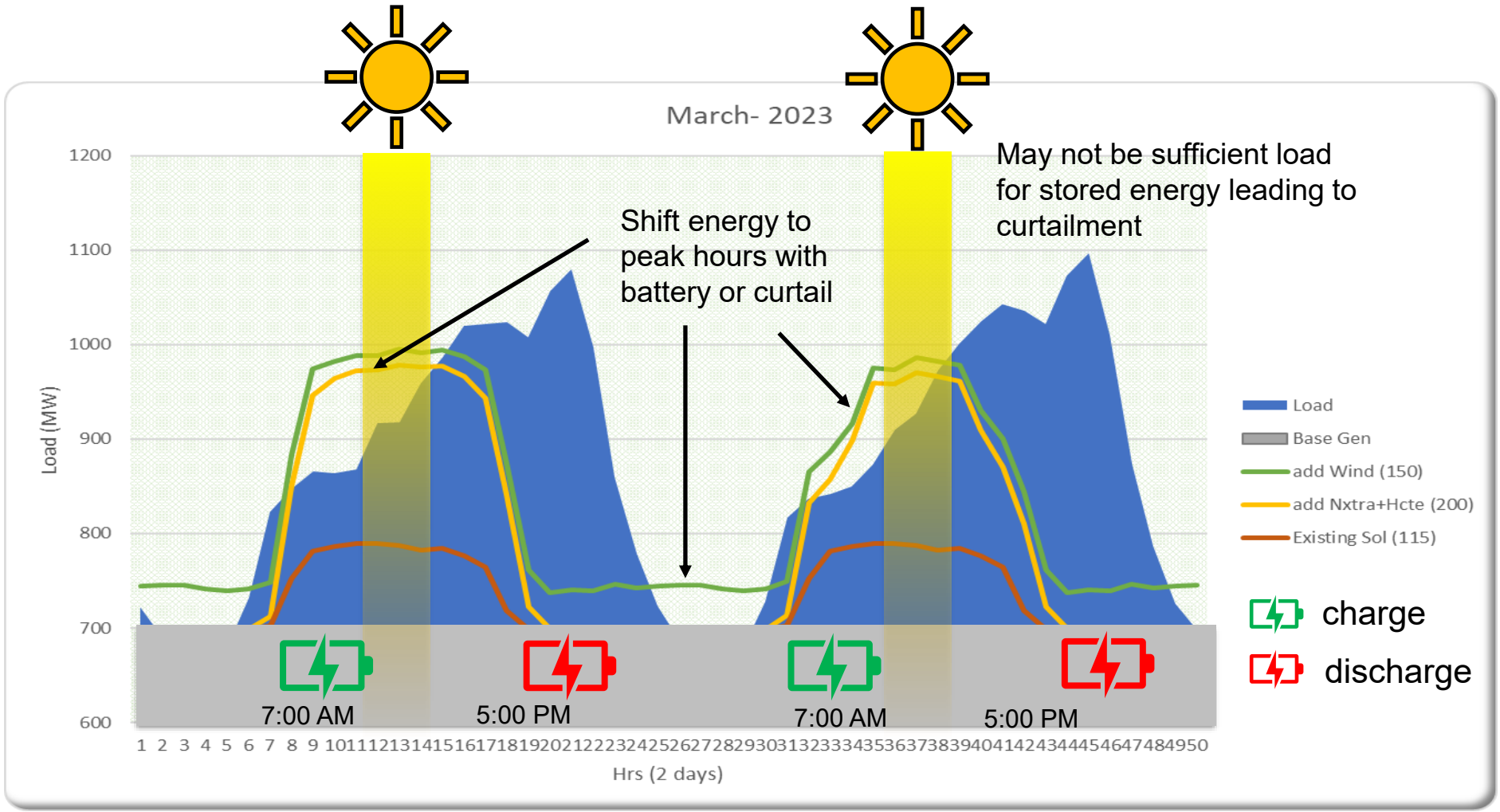
2021 IRP Resource- typical spring solar profile



Observations:

- Again solar profile is non-coincident with load profile
- During the shoulder months we get high solar production with lower demand increasing the amount of surplus energy during the early morning hours

2021 IRP Resource- typical spring solar/wind profile



Observations:

- The 70MW solar resource was removed and 150MW of wind was added
- At higher solar and/or wind integration levels, Inter-seasonal energy storage may be necessary to fully utilize the solar/wind energy
- Also, at higher solar/wind integration levels, generation from these resources may be down dispatched by curtailing energy output

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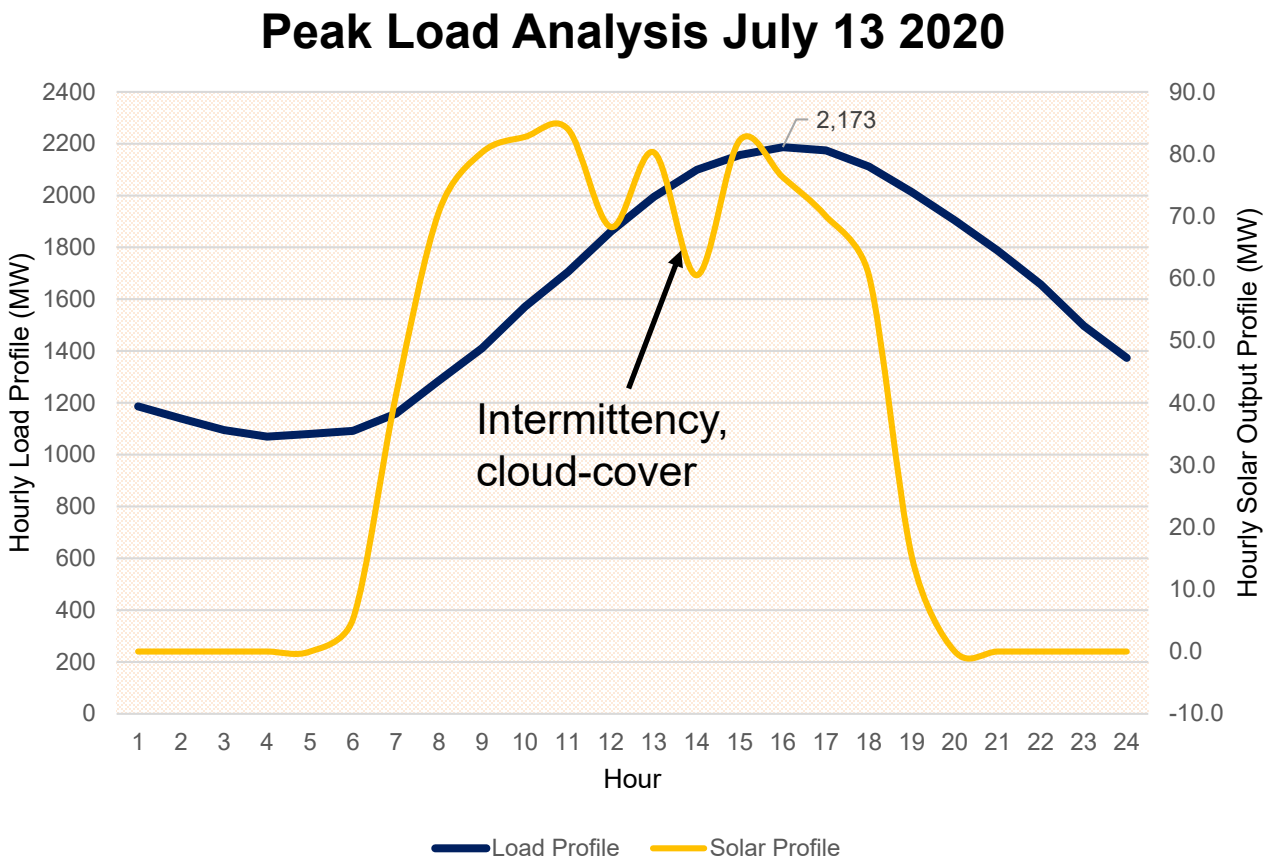
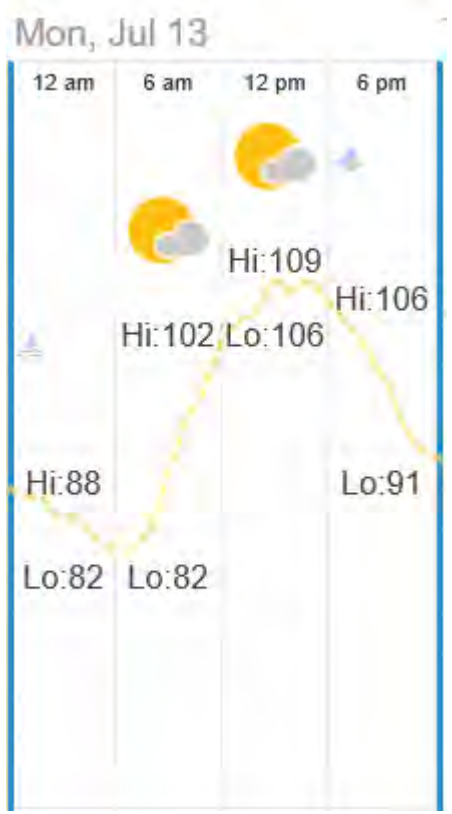
Solar Resource vs. Load Profile for July 13, 2020





Actual Weather July 13, 2020*

- **Solar output tapers off in early afternoon during peak months**
  - -Taper off begins in ~1 pm
- **EPE region experiences seasonal monsoon clouds**
  - -Utility solar output reduced during peak hours
  - -DG solar output reduced resulting in load increase
- **Depending on cloud density or absence of rain, load decline may lag solar output reduction**
- **In this case, even though solar generation declined due to cloud-cover, we do not see a reduction in load during these hours.**

* https://www.timeanddate.com/weather/usa/el-paso/historic?month=7&year=2020

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Solutions for Renewable Operational Challenges

System Operation with Solar & Wind

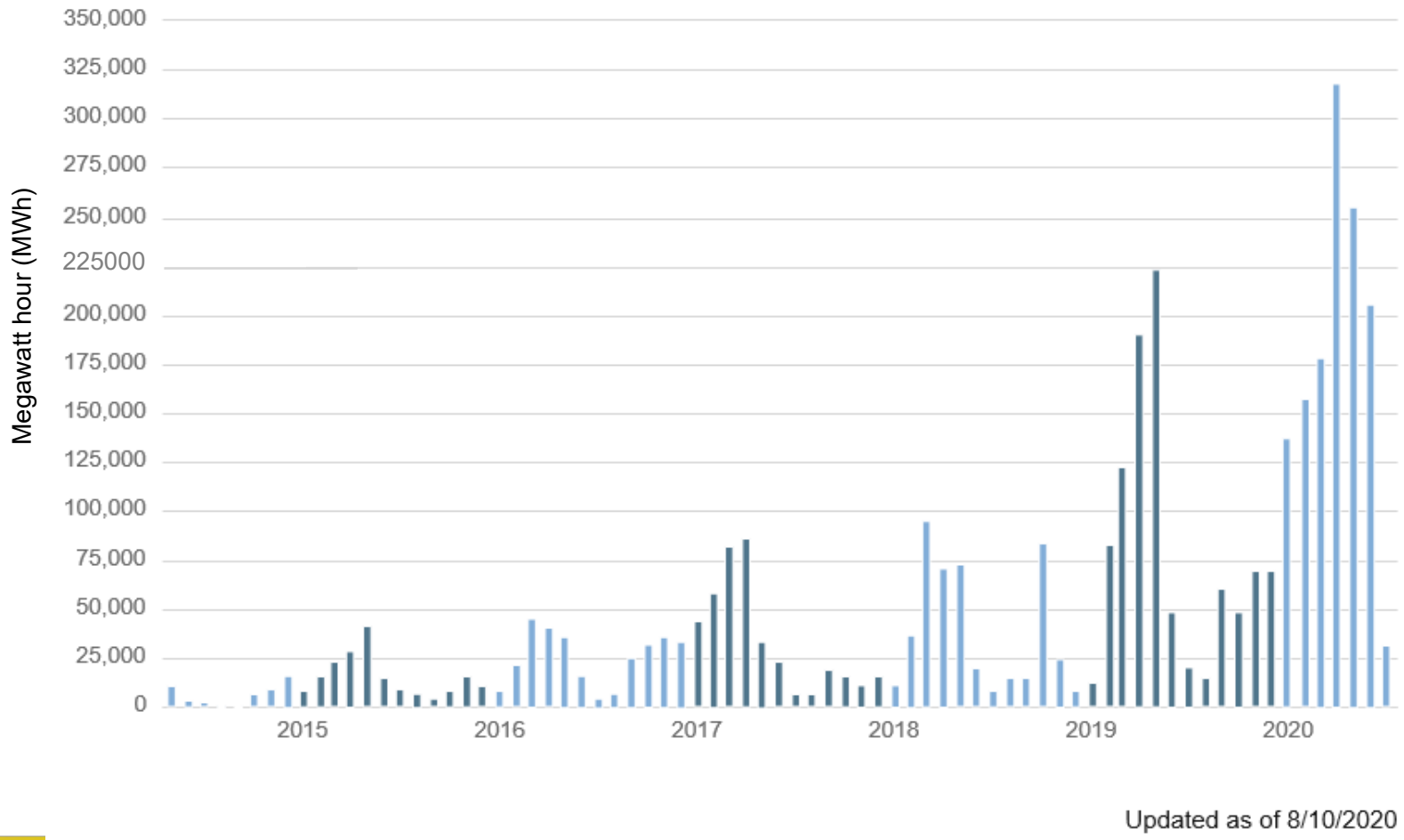
The increasing integration of solar & wind to the resource portfolio adds new operational challenges and opportunities to the electrical system including variation and oversupply of energy during low load periods. Operational strategies & solutions to address these challenges includes:

1. Selection of new resource portfolio that includes a mix of renewable and nonrenewable resources that compliment each other.
2. As part of the resource mix, sufficient LM/DR-EE capacity to contribute towards balancing resource and load profiles.
3. Implementation and utilization of energy storage technologies for firming and/or shifting surplus energy from low load periods to high load hours to mitigate curtailment.
4. At higher solar and wind integration levels, intermediate and/or longer term energy storage will be needed to store energy for days, weeks and even months from low load winter & spring months and discharge during peak summer months.
5. Consider participation in the Energy Imbalance Market (EIM).
6. For reliability purposes, ancillary services for frequency regulation and contingency reserves are required to comply with WECC, NERC and FERC standards.
7. To manage ramps resulting from sun-up/sun-down and/or intermittency events, conventional fast start gas units and/or inverter based resources including battery can be implemented.
8. To a certain extent, similar to dispatch of conventional units, use dispatch control for curtailment of solar and/or wind generation to manage oversupply of energy during low load periods.
9. If economically and operationally feasible, consider the retirement of older conventional gas-fired units to provide more room and flexibility for renewables.
10. Greater use of probabilistic methods, statistics, and data-analytics to analyze renewable data that are subject to random variation for probabilistic resource adequacy assessment and reliability. EPE is currently a member of the NERC- PAWG.*

* NERC- PAWG: North American Electric Reliability Corporation- Probabilistic Assessment Working Group

Managing Renewable Oversupply- CAISO

Wind and Solar Curtailment totals for CAISO



* http://www.caiso.com/Documents/CurtailmentFastFacts.pdf

- The rapid rise in solar and wind resources coming onto the system has created a new operating paradigm, in which the system frequently has too much renewable energy without adequate demand to use it. This is called “oversupply” * .
- Currently, the ISO’s most effective tool for managing oversupply is to “curtail” renewable resources*.
- While CAISO strives to meet their renewables target, they are also exploring other concepts and technologies to minimize oversupply and curtailment such as: Storage, Demand Response, Western EIM Expansion, Flexible Resources, and others.

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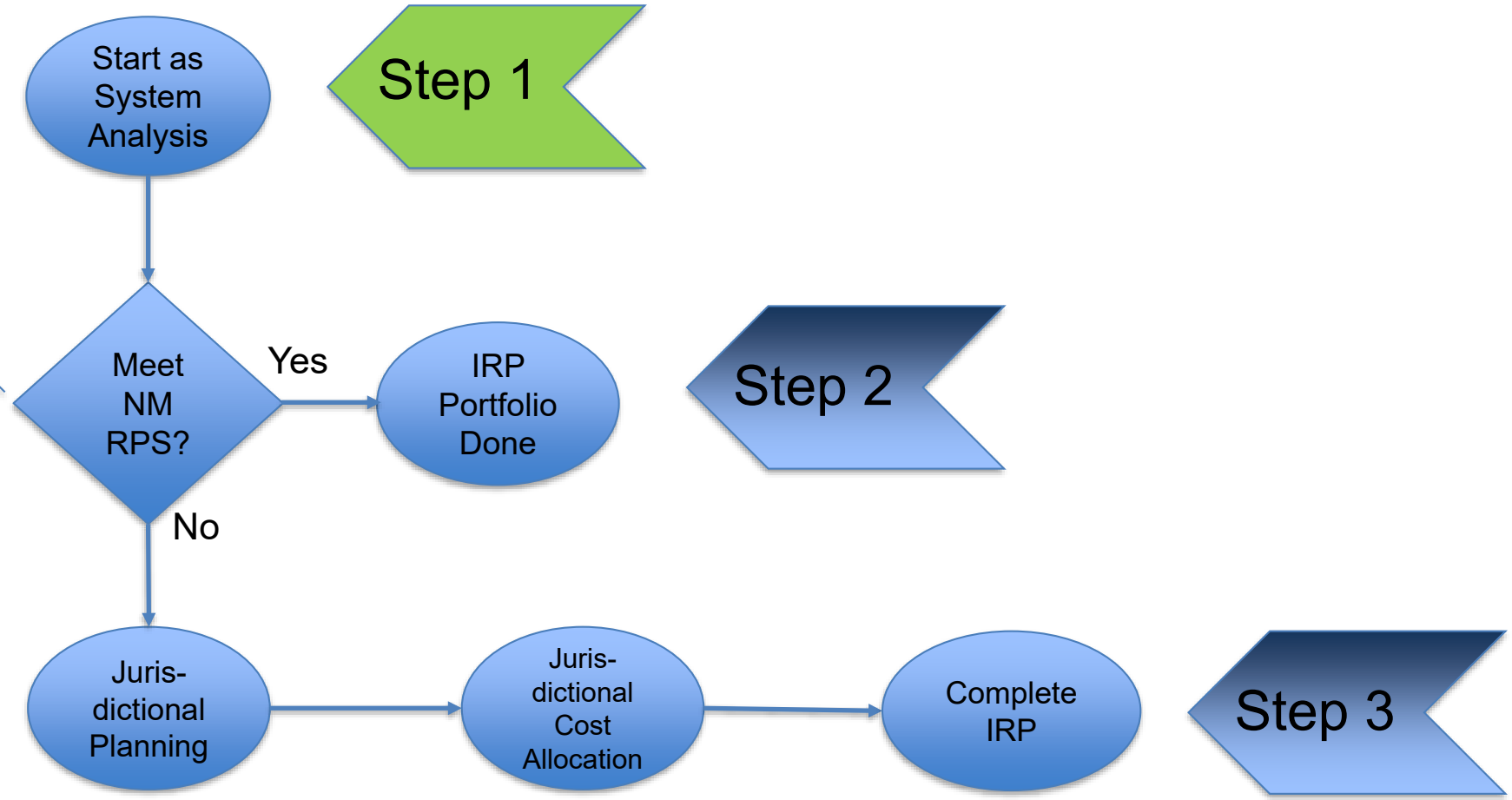
Process Map for IRP Analysis

If System optimal resource portfolio from Step 1 doesn't satisfy the NM RPS target in Step 2, then IRP Analysis will move forward with Step 3 for Jurisdictional Planning and Cost Allocation. If Step 1 satisfies NM RPS target in Step 2, then Step 3 is not necessary.



Questions?

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El Paso Electric Company Energy Wise Program

Program Overview for New Mexico PRC

14 August 2020

OUR PURPOSE

To Create a More Sustainable Future

OUR MISSION

We Motivate and Enable Energy Users and Providers to Accelerate the Clean Energy Ecosystem

Certified B Corporation

Uplight—Already Delivering to the Market at Scale

- 85+ global utility partners
- 24 billion+ data points from 100s of customer attributes

Over 300 people exclusively focused on enabling utilities to accelerate the clean energy ecosystem.

- 39 data scientists and UX leaders
- 130 energy software engineers
- 59 dedicated client service, success, and deployment specialists

Uplight Comprehensive Demand Response

New Mexico Energy Wise Program Design

Participants

- Annual household target
  - 2020 – 4,500
  - 2021 – 5,000
- Smart thermostat brands
  - Nest
  - ecobee
  - Emerson
  - Honeywell TCC (Q4)
- Channels
  - Bring your own device (BYOD)
  - Microsite marketplace

DR Events

- June 1 – September 30
- 2– 8 pm, M-F, non-holidays
- Event duration up to four hours
- 3 – 12 events per season
- Post-event load shift and participation reporting
  - Uplight provides preliminary results within 48 hours
  - Evergreen validates program at season end

Incentives

- Year 1:
  - $50 one-time EE instant rebate for new tstat purchase through EPE microsite marketplace
  - $25 enrollment incentive
- Out-years
  - $25 annual participation incentive

Program Goals & Performance

Program Launch & Enrollments

- Texas
  - BYOD launch 6/30
  - Marketplace launch 7/29
  - Enrollments as of 8/11:
    - 2019 Migration: 537
    - BYOD: 1776
    - Marketplace: 17
- New Mexico
  - BYOD and microsite marketplace launch 7/29
  - Enrollments as of 8/11:
    - 2019 Migration: 206
    - BYOD: 24
    - Marketplace: 0

Performance Projections

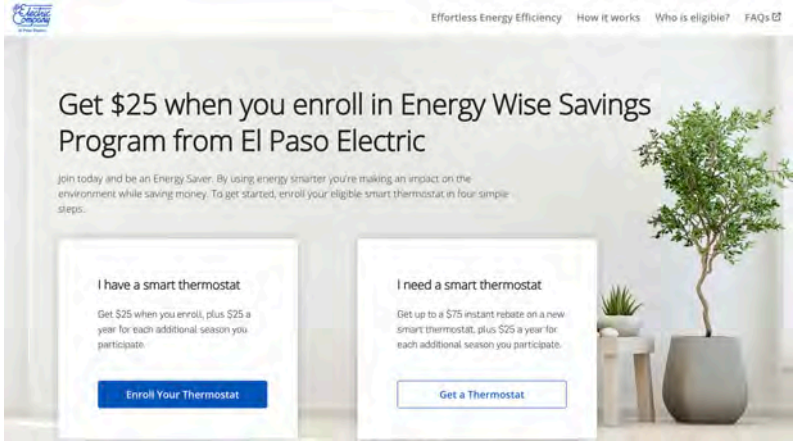
EPE Projected Program Participation & Savings
NM Energy Wise Savings Program

Program Year	Participants	Annual kW	Annual kW · h
2020	4,500	4,262	826,143
2021	5,000	4,736	654,572

Customer Experience *Enrollment*

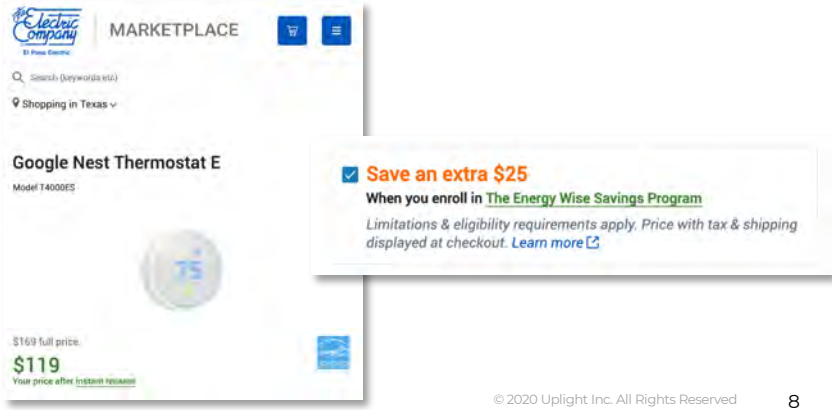
Bring-Your-Own-Device Enrollment for existing smart tstat owners

- Enrollment push by thermostat OEMs
  - In-app
  - E-mail
  - Via Energy Wise landing page



Microsite Marketplace – purchase and enroll a new smart tstat

- Thermostat-only microsite marketplace allows purchase of new device
- Stackable EE & LM rebates
- Smart tstats automatically pre-enrolled in LM program
- Line-of-sight from purchase to installation
- Post-purchase installation reinforcement



Customer Experience - *Event Day CX*

Event Notifications

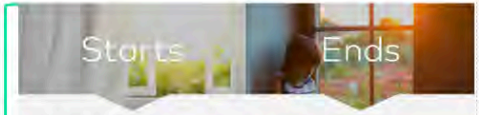
Event timing

[Demand Response] Event
There is is a [Demand Response] event scheduled for [weekday, date] from [time] – [time]

Hi [First Name],

Your home is scheduled to participate in a [Demand Response] event on [insert date] from [insert start time] to [insert end time]. No need to panic! We'll handle everything to make sure you and your family stay comfortable.

Event description – what to expect during the event and when



[DR Start Time]
The [Demand Response] event is starting! Since we've pre-cooled your home, you'll be able to float through the event without feeling too warm.

[DR End Time]
Congrats! By not touching your thermostat today, you've successfully completed the event and made a positive impact on our community. Your pre-set cooling schedule will now resume. Thanks for your help!

Explanation of pre-cooling before the event

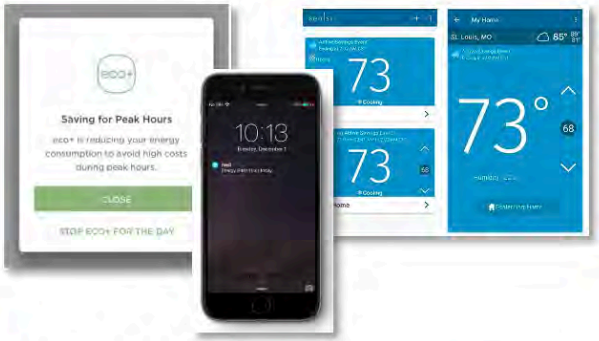
Here's what to expect

We'll send a personalized schedule to your thermostat with setpoints to keep you and your family comfortable for the day. Sit back and relax while we do all the work.

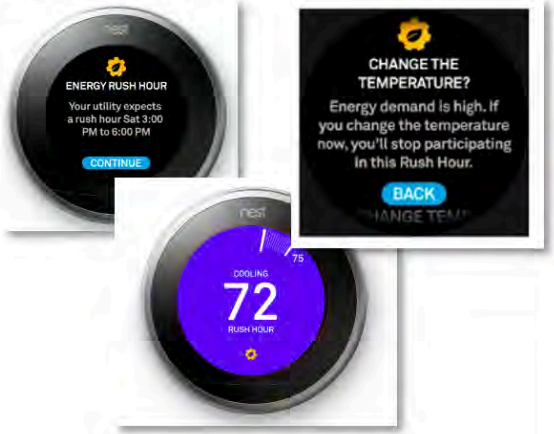
Before the Event: We'll cool your home by just a few degrees when demand for energy is low. We call this pre-cooling. Try not to adjust the temperature on event days. This will help us

Experience During the Event

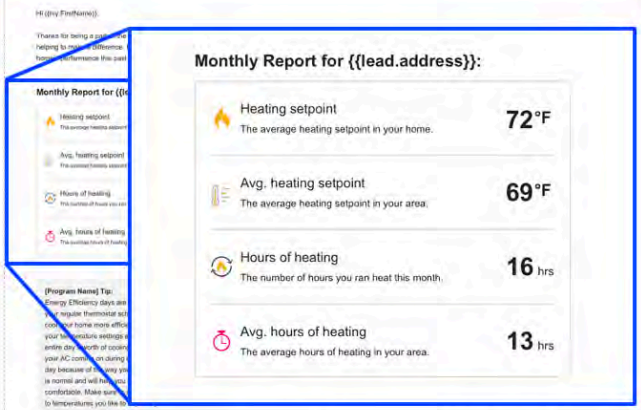
In-app Notifications



On-Device Notifications



Post-Event Performance Email



Aggregated community performance

Opportunity for Feedback

CASE STUDY

Consumers Energy

"As we execute our latest Integrated Resource Plan it's more important than ever to work with partners that deliver flexibility and innovation at scale.

Uplight, with its focus on the customer and comprehensive solution set provides the full package required to help achieve our IRP goals."

Patti Poppe
President & CEO
Consumers Energy

Program Details

- 2019 pilot with 2,050 customers
- 1.4 kW sustained over 4 hours
- 2020 program expansion now has over 18,000 customers

MISO* Participation

- Goal of 14,750 households by 15 May
- 1 kW per household with assumed 5% opt-out
- 14 MW of capacity (based on resi)
- Internal results: 14.3 MW per event

*MISO is "Midcontinent Independent System Operator", which is a multi-state wholesale energy market in the Midwest.

Future Vision: Fleet Optimization

- Uplight builds on co-optimization
- Awareness of resource availability, customer preferences across a population

Utility Value

- Operate on per-circuit/per-substation basis with predictable dispatch.
- Combine resources beyond storage

Customer Value

- Gentler treatment of customer while still meeting utility load shift/shed goals.
- Access to smart home tech

Comments/Questions

Public Advisory Group Request for Resource Options

The Electric Company
El Paso Electric

Request Public Input for Resources

The Public Advisory Group may propose alternative resource options to consider and EPE will investigate the resource characteristics or alternatively the Public Advisory Group may provide:

- Operational profile
- Technology state of development
- Sufficient cost information to model the resource
- References for all resource information must be provided
- References for all resource information must be publicly available

EPE will review the Public Advisory Group proposed resource options and pricing to determine if viable:

- Based on the information provided by the Public Advisory Group, EPE will determine if options and/or pricing can be modeled as recommended
- When modeled, EPE will determine if to model in the base case or if to model as a sensitivity analysis

To have sufficient time for review and modeling, please submit your proposed resource option(s) and supporting information/data before the next scheduled meeting, October 7th, 2020.

Schedule and Future Meetings

Meeting Schedule

Date	Meeting	Day	Time
7/10/2020	**First Meeting - Present 2018 IRP, Load Forecast, and L&R**	**Fri**	**2:00 PM**
	Overview of EPE's 2018 IRP, 2020 L&R, Discuss 2025 ETA		
	Economic Research Analysis		
8/14/2020	**Second Meeting - Discuss Resource Options**	**Fri**	**2:00 PM**
	EPE Resource Options		
	Load Management/Demand Response Programs		
	Request for Public Input of Resources		
10/7/2020	**Third Meeting - Present Expansion Modeling**	**Wed**	**2:00 PM**
	Introduce Transportation Electrification		
	Energy Imbalance Markets		
	Reserve Margin Requirements		
	Expansion Modeling		
5/14/2021	**Fourth Meeting - Present Preliminary Resource Portfolio (Draft I**	**Fri**	**2:00 PM**
	EPE Resource Planning and E3 - Draft IRP		
6/15/2021	**Fifth Meeting - Present Final Resource Portfolio (Final IRP)**	**Tue**	**2:00 PM**
	EPE Resource Planning and E3 - Final IRP		
7/1/2021	**Final Meeting - Receive feedback on Final IRP**	**Thu**	**2:00 PM**
	EPE Resource Planning - Feedback		
7/15/2021	**File at NMPRC**	**Thu**	**2:00 PM**

Next Meeting 10/07/2020

- Introduce Transportation and Electrification
- Energy Imbalance Market (EIM)
- Reserve Margin Requirements (SPP)
- Expansion Modeling

Thank you!