# Integrated Resource Plan (IRP) Implementation Update

October 2, 2024

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# LAPP Goals

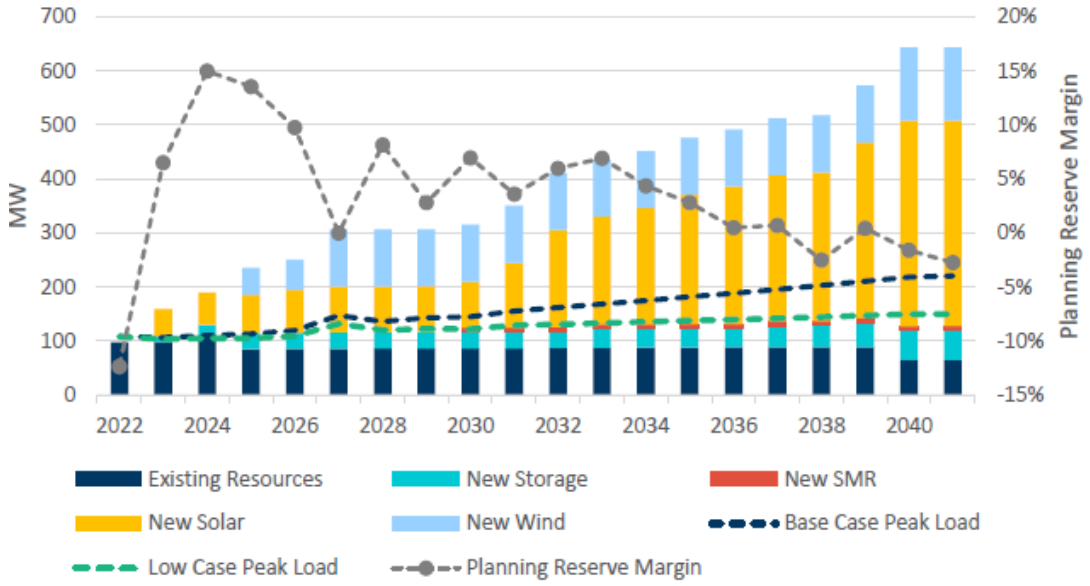
- Provide reliable & cost-effective power
- Achieve carbon free goals
  - LAC carbon neutral by 2040 goal
  - Executive Order 14057: 100% carbon pollution-free electricity (net annual) by 2030, including 50% ATC carbon pollution-free electricity
- Build a diverse generation and storage portfolio
- Transition to a 15% positive reserve margin

# Load Forecast & Preferred Portfolio

*Exhibit 3: LAC and LANL IRP Preferred Resource Plan Cumulative New Builds Summary*

| Year | Storage | Solar | Wind | SMR | Total |
|---|---|---|---|---|---|
| | MW | MW | MW | MW | MW |
| 2025 | 30 | 70 | 50 | 0 | 150 |
| 2027 | 30 | 85 | 105 | 0 | 220 |
| 2030 | 30 | 85 | 105 | 8 | 228 |
| 2035 | 35 | 240 | 105 | 8 | 388 |
| 2040 | 55 | 380 | 135 | 8 | 578 |
| 2041 | 55 | 380 | 135 | 8 | 578 |

*Exhibit 4:Preferred Resource Plan Resources, LAPP Peak Load, and PRM*



# Generation Planning Summary

Ended  Contracted  Investigating

| Types | | Resources | Considerations |
|---|---|---|---|
| Baseload | Thermal | Combined Cycle (CC) | Inconsistent with carbon neutral goal |
| | | Laramie River Station (LRS) | Exit when economical, no later than 2042[1] |
| | Nuclear | Carbon Free Power Project (CFPP) | Subscription levels: 0, 8, 36 MW |
| | Hybrid | ATC PPA with 28% Renewable[2] | Near term bridge PPA to replace San Juan Unit 4 |
| | Firm Renewables | Solar + Wind | Uniper contract + more |
| | | Solar + Battery | Solar weather dependent |
| | | Geothermal | High cost, opportunistic and geography dependent |
| | | Fuel Cells | < 5 MW size, implemented in other national labs |
| Peaking | Thermal | Reciprocating Internal Combustion Engine (RICE) | Explore in IRP for dispatchability and balancing |
| | | Simple Cycle Gas Turbine (SCGT) | Explore in IRP for dispatchability and balancing |
| | Storage | Pumped Hydro | Cost and ownership of water rights; Opportunistic and geography dependent |
| | | Lithium-ion Battery | Duration considerations |
| | | Vanadium Redox Flow Battery | High-cost; lack of actual projects development |
| Intermittent | Renewables | Solar (onsite or offsite) | Weather dependent |
| | | Onshore Wind | Weather dependent; transmission constraints |

Source: Los Alamos County 2022 Integrated Resource Plan, p. 45, exhibit 32.

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# Changes since the 2022 IRP

Ended Contracted Investigating

- UAMPS 8 MW CFPP project; ended 11/8/2023
- 15+25 MW Uniper PPAs; ended 3/20/24
- UAMPS CYRQ 4 MW Geothermal project; ended 9/2024

# Changes since the 2022 IRP

Ended Contracted Investigating

- Foxtail Flats 170 MW solar + 80 MW / 320 MWh storage agreements executed March 2024; phase 1 scheduled for 50% capacity delivery on March 1, 2026
- Mercuria 40MW ATC PPA executed March 2024; April 1, 2024, through February 28, 2026, ends when Foxtail Flats delivery begins

# IRP vs. Current Contracted Generation

| IRP Preferred Generation Portfolio | | | | | |
|---|---|---|---|---|---|
| Year | Storage | Solar | Wind | SMR | Total. |
| | MW | MW | MW | MW | MW |
| 2025 | 30 | 70 | 50 | 0 | 150 |
| | | | | | |
| 2027 | 30 | 85 | 105 | 0 | 220 |
| 2030 | 30 | 85 | 105 | 8 | 228 |
| 2035 | 35 | 240 | 105 | 8 | 388 |
| 2040 | 55 | 380 | 135 | 8 | 578 |
| 2041 | 55 | 380 | 135 | 8 | 578 |

| Contracted Additional Generation | | | | | |
|---|---|---|---|---|---|
| Year | Storage | Solar | Wind | SMR | Total. |
| | MW | MW | MW | MW | MW |
| 2025 | 0 | 0 | 0 | 0 | 0 |
| 2026 | 30 | 45 | 0 | 0 | 75 |
| 2027 | 60 | 90 | 0 | 0 | 150 |
| | | | | | |
| 2036 | 80 | 170 | | | 250 |
| | | | | | |
| | | | | | |

Note: Contracted storage and solar capacities under the Foxtail Flats agreements are 80 MW and 170 MW, respectively. Notional plan is for 80 MW solar to be resold (30 MW to Sandia/Kirtland, and 50 MW to a third party for 10 years) and 20 MW storage to be allocated to Sandia/Kirtland. The values above for the contracted additional generation are net of these planned transactions.

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# Changes since the 2022 IRP

Ended Contracted Investigating

- Ongoing: UAMPS gas/hydrogen-capable turbine projects, 10 MW share
- Ongoing: San Ildefonso Pueblo: 40MW solar + long-term storage option
- New: UAMPS Rodatherm Geothermal Study Project, DPU has 64 kW share of 3,600 kW, future option for 894 kW share of 50,000 kW
- New: Kit Carson Electric Cooperative Green Hydrogen Initiative, presented to BPU on Oct. 2, 2024, agenda item 19011-24

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# Changes since the 2022 IRP

Ended Contracted Investigating

- Very early monitoring of future possible Small Modular Reactors
  - Aurora
  - Deep Fission
  - Aalo
- Very early investigation of long-duration CO2 storage: Energy Dome
- Guzman natural gas peaker near Farmington

# Foxtail Flats Status 9/12/2024

- Currently on schedule
- Pedestrian cultural surveys complete on every acre of land
- Biological surveys complete
- Title surveys ongoing
- Initiating conversations with EPC firms
- Challenges with geotechnical boring access – categorical exclusion has taken over 4 months for BIA to process. We continue to push, but this is an important design and EPC item
- All necessary real estate secured
- Completed topographic mapping
- Drafts of NEPA docs complete, continuing to refine design
- Substation Purchase Orders are in place
- Exploring feasibility of wind generation at the site, no details to share right now; still collecting weather data

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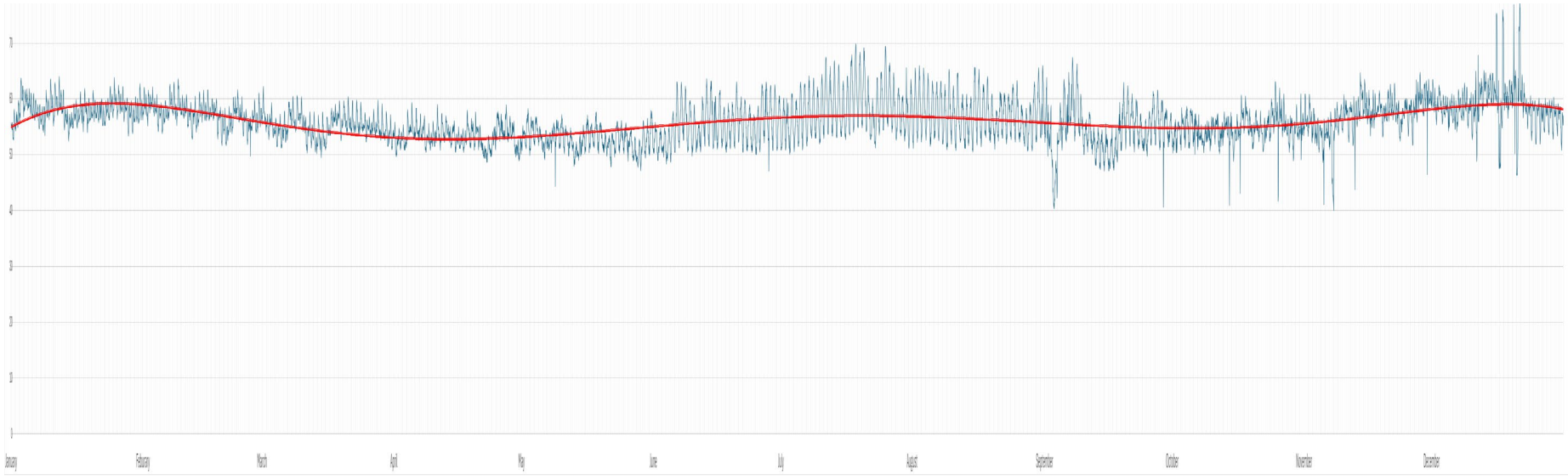
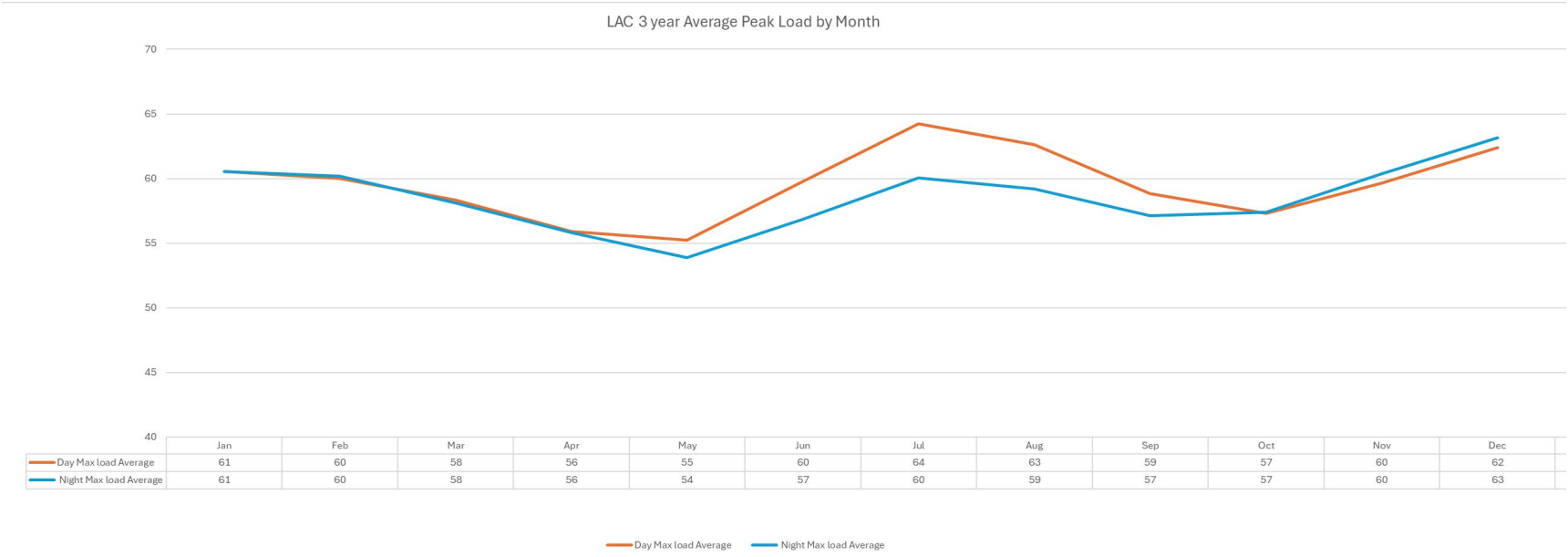
# Load & Generation Planning

- Refining Power Pool historical load and planned generation data to identify how much additional generation is needed
- Averaged 3 years of hourly Power Pool load from Jan 2022 through Aug 2024



# Monthly Day/Night Average Load

- To simplify the load visually and make determining generation needs simpler, used a pivot table to get the average monthly **day and night peaks** for each month




| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day Max load Average | 61 | 60 | 58 | 56 | 55 | 60 | 64 | 63 | 59 | 57 | 60 | 62 |
| Night Max load Average | 61 | 60 | 58 | 56 | 54 | 57 | 60 | 59 | 57 | 57 | 60 | 63 |

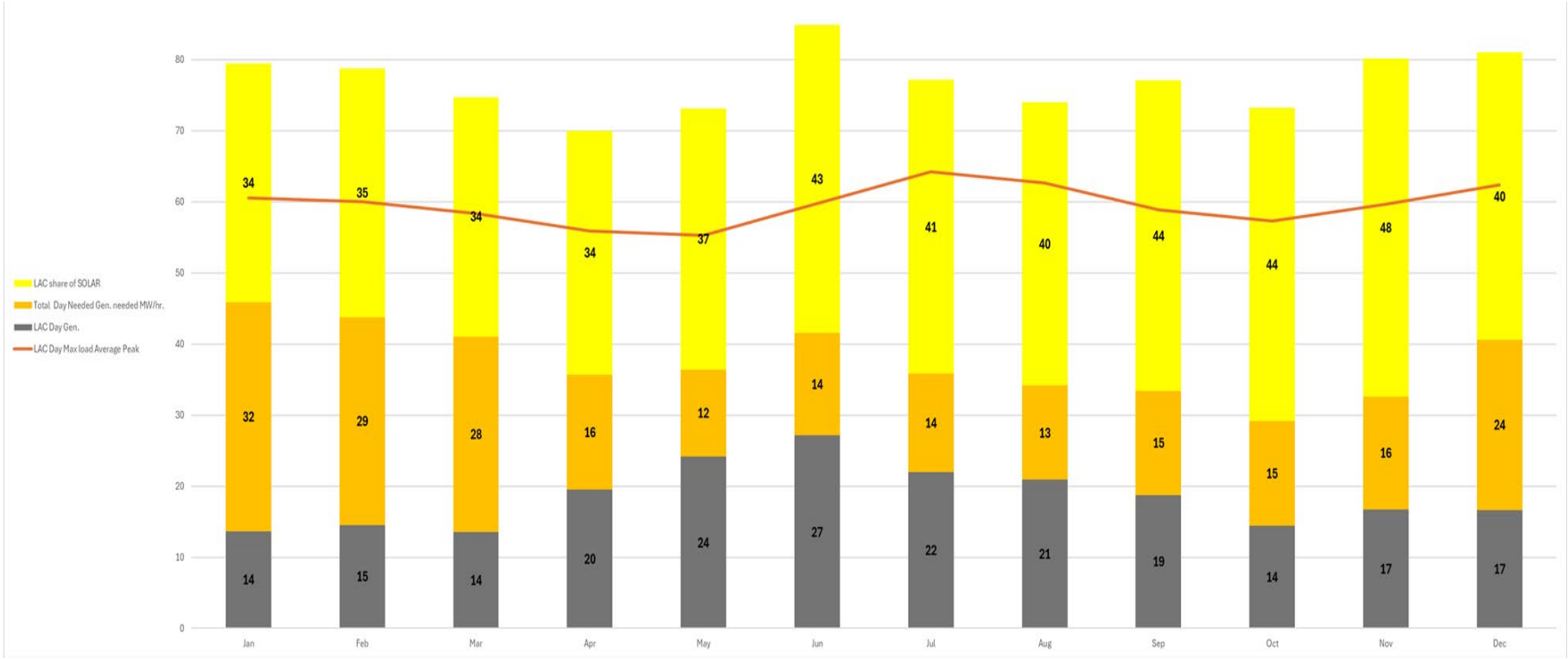
# Additional Power Blocks Needed

- From March 2026, current contracted generation won't meet load, need more day and night power
- Months in green use CGTG for reserve margin, months in yellow will rely on market purchases for reserve margin

| Month | Daytime Power Needed(MW) | Nighttime Power Needed(MW) |
|---|---|---|
| Jan | 32 | 30 |
| Feb | 29 | 28 |
| Mar | 28 | 26 |
| Apr | 16 | 16 |
| May | 12 | 6 |
| Jun | 14 | 6 |
| Jul | 14 | 15 |
| Aug | 13 | 16 |
| Sep | 15 | 19 |
| Oct | 15 | 24 |
| Nov | 16 | 27 |
| Dec | 24 | 29 |

Note: The values above are net of the planned solar and storage share to Sandia/Kirtland and the third party.

# LAPP Daytime Load & Gen after March 2024

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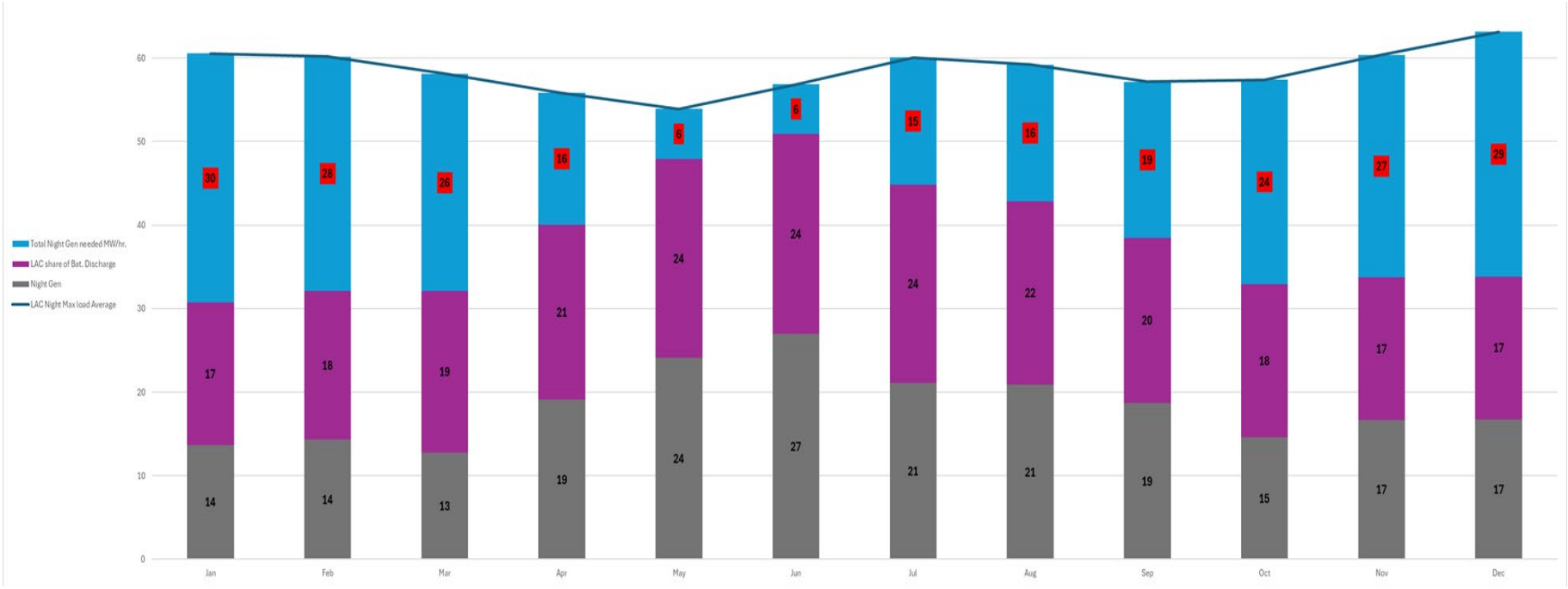
# LAPP Nighttime Load & Gen after March 2024




Note: The values above are net of the planned storage share to Sandia/Kirtland. The battery discharge values during the winter months are lower than the summer Months because the battery energy is spread across a longer nighttime duration.

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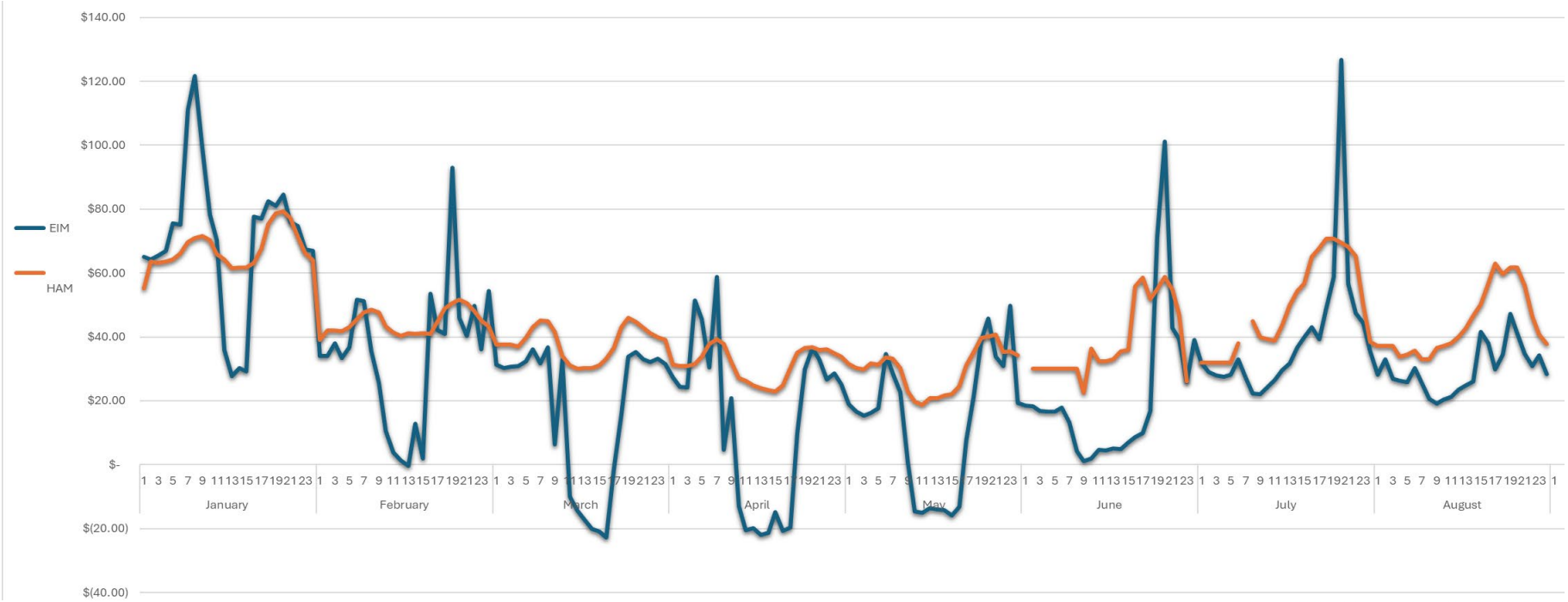
# Evolving Market Challenges

- EIM and hour-ahead (HAM) average hourly market pricing shows the effects of increasing solar capacity – lower prices mid-day
- PPAs significantly higher cost than average HAM prices
- Energy storage can store excess PPA solar power or market purchase of low-cost day power for use at night



# Seeking Software Solutions

- Exploring software solutions for improving load and generation forecasting with intermittent solar, hydro and wind power
- Want to optimize power purchase and sales in the Energy Imbalance Market and expected regional Day-Ahead Market

# New IRP is Recommended

- New IRP after July 2025 Electric Coordination Agreement is effective – needed due to the changes since 2022
  - Will consider:
    - Updated loads and new planned and candidate resources
    - DPU Electrification Study and County Electric Vehicle plan
    - DOE/LANL electrification and energy storage plans
    - Evolving market short and long-term power pricing

# The End