Los Angeles Department of Water & Power

2024 SLTRP Meeting #3

May 16, 2024

Power **S**ystem **P**lanning **D**ivision

Agenda

9:00 – 9:05 am	**Welcome and Introductions**
9:05 – 9:15 am	**Meeting Purpose, Agenda Overview, Guide for Productive Meetings and Mentimeter Connection**
9:15 – 9:35 am	**LA100 Equity Strategies Implementation**
9:35 – 9:50 am	**Review of SLTRP Advisory Group Feedback (Meeting #2)**
9:50 – 10:20 am	**SLTRP Modeling Overview and Sample Model Run (Current System Next 5-years)**
10:20 – 10:30 am	*Break*
10:30 – 10:50 am	**Draft 2024 SLTRP Scenario and Sensitivity Matrix**
10:50 – 11:35 am	**SLTRP Advisory Group Breakout Sessions**
11:35 – 11:55 am	**SLTRP Breakout Sessions Reporting Back and Mentimeter**
11:55 – 12:00 pm	**Wrap Up and Next Meeting**

Next Meeting: *June 27, 2024; 9:30 am – 12:00 pm*
Location: *Zoom (Virtual)*

Advisory Group Roles

Provide input and feedback based on the expertise, knowledge, and resources of the organizations, institutions, and constituent groups represented by the Advisory Group Members

- **Provide Perspectives.** Discuss major issues that LADWP will face in the next 10-20 years. Provide input and review of strategic scenarios that are used in the resource analysis and final recommendations for near-term actions.
- **Continue the Collaborative Dialogue.** Build upon the momentum from the LA100 Equity Strategies Study and 2022 SLTRP Process.
- **Conduct Outreach to Respective Constituent Groups.** Bring diverse input into the process and keep constituents informed of the SLTRP process.
- **Consider Broader Community Input.** During Advisory Group discussions think of the various communities and considerations throughout the City of Los Angeles.
- **Provide Technical Information & Perspectives.** Add value through your areas of expertise.

Advisory Group Roles

Provide input and feedback based on the expertise, knowledge, and resources of the organizations, institutions, and constituent groups represented by the Advisory Group Members

Continued…

- **Read Pre-Meeting Materials.** Prior to each meeting materials and agendas will be distributed and you are expected to be prepared for the meeting. This includes reading and reviewing the 2022 SLTRP and LA100 Equity Strategies Study Report.
- **Participate in All Meetings.** A total of six (6) meetings are anticipated between March and December 2024. Meetings are expected to alternate between in-person and virtual. Each meeting will be conduced in 2-3 hours segments.
- **Alternate Representatives.** If you cannot attend a meeting, then please send an alternate on your behalf.
- **Balancing Perspectives.** To maintain stakeholder balance – only one representative per member organization in meeting discussions.

2024 Advisory Group Members

Stakeholder Category	Organization(s)	# of Representatives
Academia	CSUN, UCLA, USC	6
Business and Workforce	CEERT, Center for Sustainable Energy, Central City Assoc, IBEW – Local 18, LABC, LA Chamber, VICA, LABC	17
City Government	CLA, City Attorney, Council Districts, Rate Payer Advocate, Mayor's Office, Civil & Human Rights and Equity Dept., CEMO, Housing Authority, LA City Planning, LADOT	26
Neighborhood Council	DWP Advocacy Committee, DWP MOU Oversight Committee, Neighborhood Council Sustainability Alliance, SLAANC	5
Environmental Community	CBE, EDF, Food and Water Watch, NRDC, LAANE, Sierra Club, Climate Resolve, Community Build, Enterprise Community Partners, Esperanza Community Housing, LA Cleantech Incubator, Move LA, PACE, Pacoima Beautiful, RePower, SLATE-Z, So. Cal. Association of Non-Profit Housing; SCOPE	20
Premier Accounts and Key Customers	LAUSD, LAWA, Metro, POLA, Valero Wilmington Refinery	10
Utilities	Southern California Gas, SCPPA, Water and Power Associates	6
Total		**90**

Note: *LA100 Equity Strategies Steering Committee has been integrated into the SLTRP Advisory Group Roster*

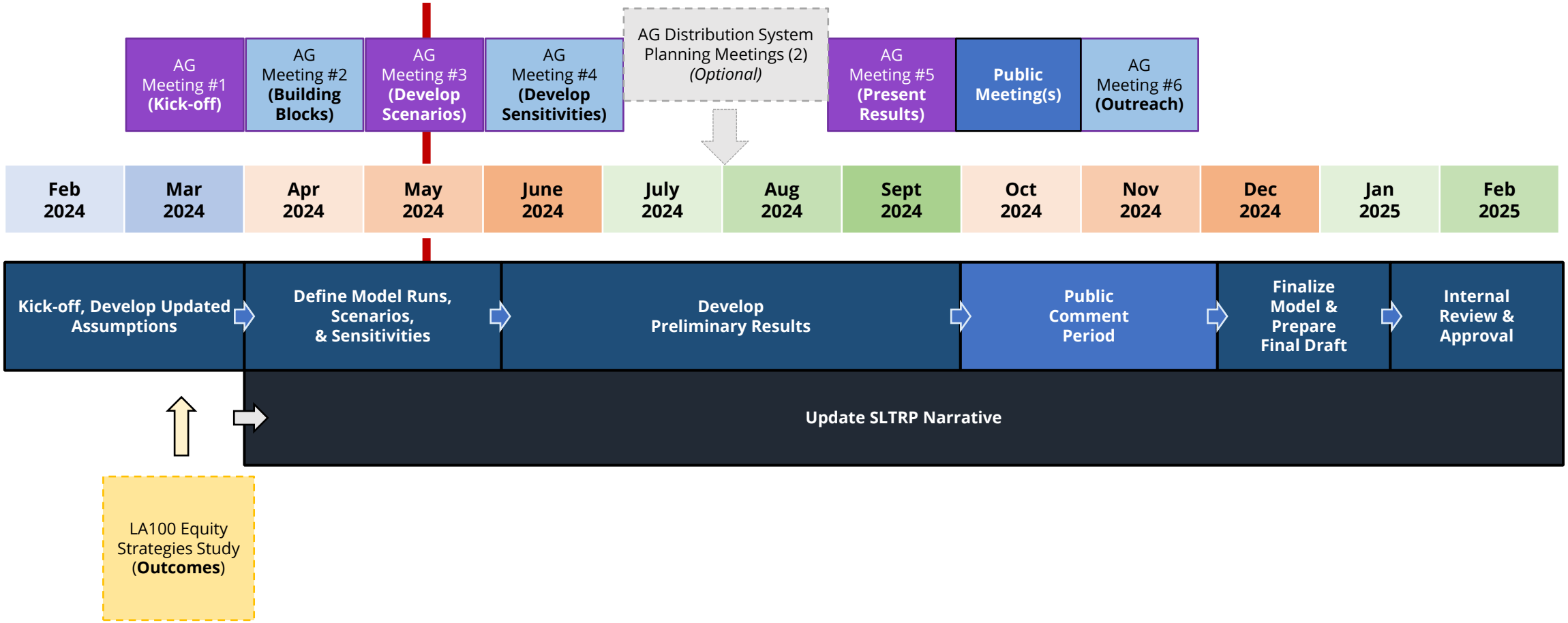
Guidelines

1. Everyone commits to all members having equal time to contribute input and perspectives
2. Keep input concise so all members have time to participate
3. Actively listen to others, seek to understand perspectives
4. Offer ideas to address questions and concerns raised by others
5. Participate by using the Submitting Questions in Mentimeter or Raise Name Tent

In-person Meeting

Virtual Meeting

2024 SLTRP Schedule



Note: Specific dates and meetings are subject to change.

Join at menti.com | use code 5208 4750

Mentimeter

Instructions

Go to

www.menti.com

Enter the code

5208 4750

Or use QR code

LA100 EQUITY STRATEGIES IMPLEMENTATION

STATUS UPDATE

EQUITY STRATEGY IMPLEMENTATION

STRATEGIC LONG-TERM RESOURCE PLAN (SLTRP)

2024 SLTRP:

- Is a roadmap to LADWP's clean energy transition
- Initiated in March 2024 as a refinement to the 2022 SLTRP
- Includes Equity Strategies Steering Committee members

Integrating Equity Strategies to the SLTRP:

- Demonstrates LADWP's continued commitment to equity
- Provides a venue for public and transparent engagement

EQUITY STRATEGY IMPLEMENTATION

POWER SYSTEM EQUITY REVIEW PROCESS

Equity Review Process:

- Develop criteria for evaluating equity in Power System programs/projects
- Equity Determination of existing Power System programs
- Incorporate equity in the development of new Power System programs and projects
- Develop steps for achieving equity outcomes with stakeholders input

Continuous Monitoring

- Develop performance metrics
- Incorporate a flexible process to ensure sustained progress towards equity goals
- Communicated results with internal and external stakeholders

EQUITY STRATEGY IMPLEMENTATION: LADWP POWER-BY-EQUITY INITIATIVES

Initiatives	Description	Community Benefits			
		Affordability	Access	Jobs	Air Quality
EV Hubs (Charging Plazas)	Provide EV charging access across the City of LA	✓	✓	✓	✓
Used EV Rebate	Provide $4,000 rebate for used EVs	✓	✓	-	✓
EV Charger Rebate	Provide up to $1,500 to purchase and install Level 2 chargers	✓	✓	✓	✓
Metro, LAWA, and POLA Electrification	Provide and support the electrification of Metro, LAWA, and POLA to significantly reduce GHG emissions throughout the City of LA	-	✓	✓	✓
Heavy Duty Truck Charging Infrastructure	Provide and support EV charging infrastructure for heavy duty trucks across the City of LA	-	✓	✓	✓
Solar Rooftop	Proliferate solar across the City of LA by leasing their rooftop to install solar in exchange of a direct monthly payment	✓	✓	✓	✓
Shared Solar	Provide access to solar energy for multi-family residents (mostly renters) with no individual rooftops	✓	✓	✓	✓
Cool LA	Provide air conditioner incentive to low income residents particularly to those vulnerable to heat waves	✓	✓	-	✓
Commercial Direct Install	Provide assessments and free efficiency upgrades to qualifying business customers.	✓	✓	✓	✓
Comprehensive Affordable Multifamily Retrofit (CAMR)	Assist low income buildings in retrofitting to reduce both energy and water usage	✓	✓	✓	✓
Project Powerhouse Affordable Housing	Accelerate the delivery of affordable housing projects at a reduced cost	✓	✓	✓	-
Home Energy Improvement Program (HEIP)	Provide a free home assessment to identify energy efficiency improvement areas. The program also performs necessary upgrades identified in the assessment.	✓	✓	✓	✓
EZ Save	Provide discount and explore higher discount to low income customers to reduce their electric bill	✓	✓	-	-
Senior Citizen/Disability Lifeline Rate	Provide discount to low income senior and disabled customers to reduce their electric bill	✓	✓	-	-
Level Pay	Provide option to pay higher seasonal bill across a 12-month period	✓	✓	-	-
Extended Payment Programs	Provide option to pay electric and water bill up to a period of 36 months for all customers and 48 months for low income customers	✓	✓	-	-

EQUITY STRATEGY IMPLEMENTATION

IMPLEMENTATION TIMELINE

NEXT STEPS

- Allocate resources and identify relevant stakeholders to support the implementation of equity-focused initiatives.
- Continue engagement with external stakeholders to foster a culture of continuous improvement .
- Provide progress update to Board of Commissioners every 6 months

Equity Strategies Advisory Committee Update

Gregory Reed, Sr. AGM
Office of Diversity, Equity & Inclusion
Los Angeles Department of Water and Power

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

UCLA

LA DWP

Equity Strategies Advisory Committee

DWP-NC MOU Committee

ESAC Highlights

SLTRP Engagement Facilitation

City Council District Briefings

April 23, 2024 Presentation to DWP Board of Commissioners

Next Steps

- June 6: ESAC Bi-Monthly Meeting
  - ❖ FY 24/25 Workplan • Equity Criteria • Metrics • Public Involvement
  - ❖ Adhoc ESAC Working Group

Equity Strategies Implementation

Community Involvement:

- Public Awareness
- Green Economy Jobs
- Small Business Support and Inclusion
- Public Agency Collaboration

Transparency and Accountability:

- Equity Metrics
- Goals and Progress Reporting
- Public Health
- Customer Incentives Programs

Transition to 100% Clean Energy :

- Strategic Long Term Resources Plan
- In-Basin and External Generation
- Grid Resiliency and Reliability
- Solar and Battery Storage
- Affordability & Energy Burden

Clean Energy Programs:

- EV Adoption & Charging Infrastructure
- Building Decarbonization
- Expanded Community Solar
- Electric Service Panel Upgrades

Equity Metrics Data Initiative (EMDI)

- 50 Board-Identified Equity Metrics
- 15 Metrics selected for Board reporting (2016)
- ESAC review & development of recommended updates
- Board consideration & approval to amend EMDI
- Reporting: DWP Bi-Annual Reports & UCLA Energy Atlas

Thank you

2024 SLTRP

Q&A

2024 SLTRP

REVIEW OF SLTRP AG GROUP FEEDBACK (THEMES AND BREAKOUT SESSIONS)

Advisory Group Comment Themes & LADWP Responses

New Technologies

- Offshore Wind resources are assumed to be cited primarily off North CA and Oregon coasts. **Offshore Wind in LA is possible.**

DER Programs

- The SLTRP's focus is high-level and **DERs are a small component of the resource mix**. Specific DER planning schedules can be gathered separate from the SLTRP.
- **DER programs are factored** into system cost in the modelling, and into the rate analysis to analyze potential cost saving measures for customers.

Forecast Assumptions

- Renewable pricing forecast assumptions from NREL use nominal pricing. **The upward cost trend is due to measured inflation**. LCOE pricing includes Capital, O&M, Interest, and Retirement costs
- Hydrogen pricing forecasts from Bloomberg are **volatile due to tech immaturity**. Modeling practices will help alleviate volatility.
- **Natural gas pricing** forecasts are from Platts.
- Most **forecast assumptions** are derived from LADWP teams or public sources (e.g. Retail Sales Forecast, Solar Buildout, GHG Allowances, etc.)

Advisory Group Comment Themes & LADWP Responses

Meeting Format

- First meeting was presentation heavy and will likely not reflect future meeting correspondence.

System Reliability

- Power System Reliability Program (**PSRP**) is a **priority** among LADWP programs due to increased electrification putting pressure on **distribution system**.
- Strategic Transmission Plan emphasizes **transmission corridors** which will require partnership with CAISO.

Hydrogen

- Other than at IPP, LADWP currently has no plans to self-produce hydrogen fuel or other infrastructure (e.g. pipelines)
- LADWP aims to **avoid** using hydrogen produced with **potable water**.
- IPP Renewed "Must Run Requirements" will be always enforced from in-service date onwards, barring unplanned outages or future requirements changes.
- Scattergood Modernization RFP release assumed for late 2026. Design plan will come later. Current assumptions posit low-capacity factor and seasonal storage model with increasing hydrogen blend.
- **Alternative technology** studies were conducted in the 2022 SLTRP. Evaluation for the 2024 SLTRP still in consideration. NREL will evaluate technology developments and report findings.

Advisory Group Members

Breakout 1

- **Andrea Vega**, Food & Water Watch
- **Teresa Cheng**, Sierra Club
- **Miguel Miguel**, Pacoima Beautiful
- **Tony Wilkinson**, Neighborhood Council
- **Cris Liban**, METRO
- **William Kysella**, City Attorney
- **Ruth McCormack**, SLATE-Z

Breakout 2

- **Dan Kegel**, Neighborhood Council Sustainability Alliance
- **Fred Pickel**, City of LA OPA
- **Mayte Sanchez**, LACI
- **Robert Sausedo**, Community Build
- **Lauren**, LAANE
- **Jed Tovani**, SoCal Gas
- **Bill Barlak**, Water and Power Associates

Breakout 3

- **Sylvia Wallis**, LAUSD
- **Martin Marrufo**, IBEW
- **Zelinda Welch**, USC
- **Olivia Walker**, NRDC
- **John White**, CEERT
- **Ravi Sankaran**, NCSA
- **David Fink**, LABC

Breakout 4

- **Loraine Lundquist**, Institute for Sustainability
- **Nancy Ibrahim**, Esparanza Community Housing
- **Bonny Bentzin**, UCLA
- **Jonathan Parfrey**, Climate Resolve,
- **Julia Dowell**, Sierra Club
- **Gabriela Juarez**, LA City Planning Dept

What is your organization's #1 discussion topic around energy?

Breakout 1

Ensuring the **2028 Olympics energy demands** are met **affordably and ethically**, emphasizing protection of water resources, equitable health impacts for low-income communities, and scrutinizing the **cost-effectiveness of fully transitioning to renewable energy**.

Breakout 2

Addressing the challenges of creating a clean, equitable economy through modernized energy grids, **affordability, rate equity, and environmental impact assessments,** while managing the exponential **growth in energy demand** from advancements like artificial intelligence.

Breakout 3

Expressing concerns about the readiness for **2035 energy goals**, focusing on electrification, decarbonization, infrastructure costs, safety, and the resilience of the grid, while exploring strategies like FIT+ and hydrogen to ensure **sustainability and equity**.

Breakout 4

Discussing the challenges of sustainable urban planning, electrification, and decarbonization in LA, focusing on housing, infrastructure resilience, community equity, and the impact of large events like the Olympics and World Cup on vulnerable populations, alongside broader concerns about **air pollution and the transition from gas to hydrogen**.

What are some ways LADWP could leverage lessons learned from the 2022 SLTRP process?

Breakout 1

Strategies for **addressing climate impact** on utilities, suggesting a deeper analysis of climate patterns for cost projection, utilizing national resources for informed planning, and prioritizing equity in communication and resource distribution.

Breakout 2

The **comprehensive evaluation of costs, impacts, and risks associated with energy policies,** emphasizing the need for detailed future scenario modeling that includes economic uncertainties, extreme weather, and social equity to effectively plan and **adapt energy strategies**.

Breakout 3

Not enough people participated in 2022 SLTRP to be able to respond or refrained from commenting.

Breakout 4

Emphasizing the importance of **integrating community feedback, particularly from vulnerable groups**, into LADWP's planning processes, stressing the need for equal consideration of health, wellness, financial, and equity impacts alongside other criteria in **cost-benefit analyses** to better reflect community needs and ongoing efforts.

What would you like to see out of this year's SLTRP scenarios?

Breakout 1

Discussing the **challenges of ensuring air quality** and managing the **unintended consequences of new technologies**, achieving **100% reliability with high storage demands**, and the importance of workforce development.

Breakout 2

Group did not reach this question due to time constraints.

Breakout 3

Discussing the importance of **detailed, realistic energy scenarios that separate decision points,** include new technologies like long-duration energy storage, provide honest feasibility assessments, reflect true infrastructure upgrade costs, and consider **equity and affordability** in rate increases.

Breakout 4

Discussing the need for **energy scenarios avoiding hydrogen combustion**, focusing instead on high-distributed energy resources, resilience planning for extreme heat, legal commitment to 2035 renewable goals, enhancing transparency and accessibility of program information, and emphasizing distributed systems to handle **climate-related challenges** like wildfires.

What additional scenarios would be important to your organization, besides the SB100 and 100% carbon free by 2035 bookends?

Breakout 1

Emphasizing the need for **detailed analysis of energy strategies**, including testing variables independently, conducting micro-scale analysis on low-income communities, and **updating non-combustion scenarios** to incorporate advances in long-duration energy storage.

Breakout 2

Confusion about what achieving **100% renewable energy** entails, including the **need for backup and firm power**, and there's a call for scenarios that demonstrate resilience without outages or weather impacts, along with a need for better public communication from LADWP and consideration of **climate change risks and low sales growth** due to conservation efforts.

Breakout 3

Exploring **non-combustible energy options and scenarios**, utilizing rebates and incentives at various levels, addressing challenges in long-term storage, and overcoming limitations like caps on solar for projects such as electrifying bus yards.

Breakout 4

Group did not reach this question due to time constraints.

Breakout Sessions Key Takeaways

Advisory Group Meeting #2 Breakout Sessions Key Takeaways		
No.	**Takeaway**	**LADWP Recommendation**
1	LADWP should emphasize on **Equity and Affordability**. There's a consistent concern across discussions about the need to make the energy transition equitable, especially protecting low-income and vulnerable communities from the costs and impacts of infrastructure changes.	LADWP always endeavors to determine the least cost/best fit portfolio of energy generation and storage assets through robust computer modeling. Maintaining affordable rates and reliability is one of the key pillars of ensuring an equitable energy transition. Additionally, in the coming years, LADWP will be implementing many of the recommendations in NREL's Equity Strategies Report.
2	There is a strong push for exploring **non-combustible energy options** and scenarios that include long-term energy storage and higher storage levels to support decarbonization goals.	LADWP will contract with NREL to study the feasibility of non-combustion energy options.
3	There are concerns about the feasibility and **implementation of current technologies and policies**, particularly around hydrogen combustion and the overall effectiveness of current renewable energy strategies.	LADWP will continue to monitor developments in new technologies and continuously update subsequent SLTRPs to reflect these developments.

Breakout Sessions Key Takeaways

Advisory Group Meeting #2 Breakout Sessions Key Takeaways		
No.	**Takeaway**	**LADWP Recommendation**
4	There is an urgent call for better **management of risks** associated with climate change and energy demand, especially during extreme weather events and high-demand periods.	LADWP will evaluate several sensitivities, including a "high load" sensitivity to ensure adequate reliability during extreme weather events. Additionally, LADWP will continue to employ a robust computer modeling process using stochastic Monte Carlo simulations or weather to further ensure reliability.
5	LADWP should include different levels of incentives, rate restructuring to **protect vulnerable communities**, and ensuring financial models reflect true costs and benefits, including those related to public health and safety.	LADWP currently offers numerous discount and rebate programs for disadvantaged and vulnerable communities. LADWP will contract with NREL to evaluate impacts of local criteria pollutants.
6	LADWP should call for **adherence to existing laws** and commitments like LA100 for 2035 to ensure that all planning and development align with these legal frameworks.	LADWP will continue to evaluate scenarios that achieve 100% carbon-free energy by 2035.
7	There is a recognized need for **workforce development** to support the energy transition.	LADWP will continue to update its Integrated Human Resources Plan on a regular basis to reflect the personnel and training needs of LADWP through the energy transition.

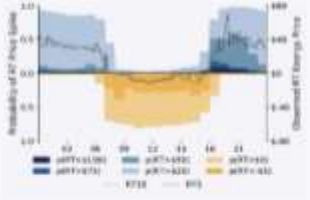
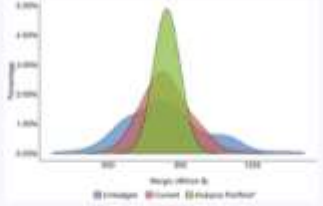
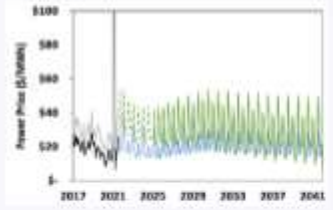
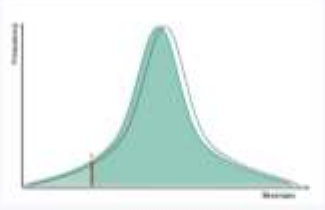
2024 SLTRP

OVERVIEW OF SLTRP MODELING AND SAMPLE MODEL RUN (CURRENT SYSTEM NEXT 5-YEARS)

About Ascend Analytics

- Founded in 2002 with ~150 employees in Boulder, Oakland, and Bozeman
- Six integrated service lines for asset operations, portfolio analytics, and planning
- Custom analytical solutions and consulting

The Ascend Product Suite

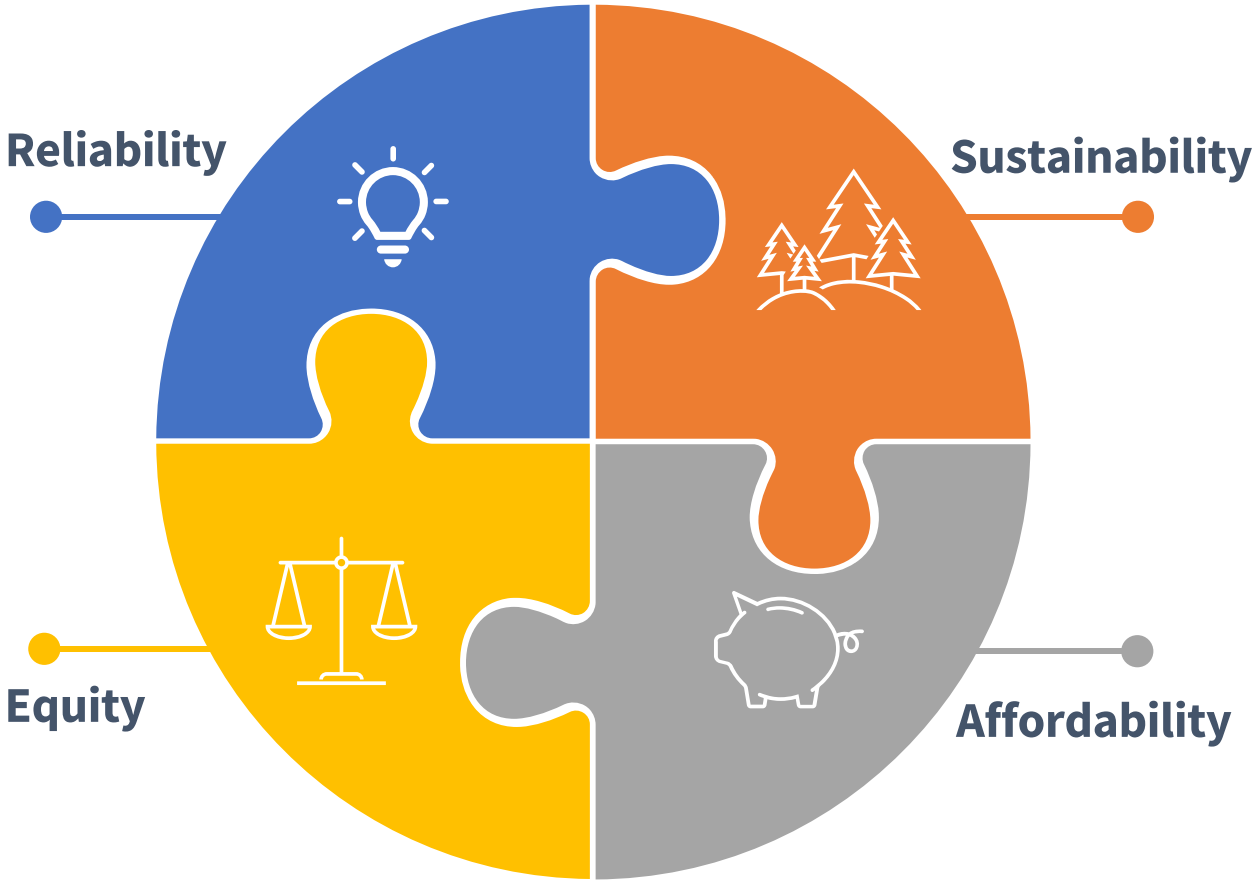
DAILY OPS 5 minutes to 5 days	HEDGING & PLANNING 1 month up to 30+ years	VALUATION/SITING 1 month to 30 years	MARKET FORECAST Next month to 30 years	MERCHANT FINANCE 5 to 10 years	TRANSACTIONS Development Cycle
SmartBidder™	PowerSIMM™	BatterySIMM™	AscendMI™	Ensurance™	AEX
			Market Intelligence	*Merchant Storage Financing*	*Ascend Energy Exchange*
Bid Optimization & Scheduling Services	**Portfolio Risk Management & Resource Planning**	**Energy Storage & Renewables Valuation**	**Price & Market Forecasts for the Energy Transition**	**Finance Merchant Storage**	**Clean Asset Marketplace**
Forecasts Future Grid States	**Evaluate Risk & Return**	**Capture Nodal Volatility**	**Market Forwards & Forecasts**	**Remove Downside Risk**	**Project Sales**
					

Process for Resource Planning Modeling

1. Identify goals and needs.
   - New Resources
   - Renewable requirements
   - Define Priorities for planning
2. Forecast items affecting future resource needs (Predictions for uncertain inputs)
3. Develop scenarios to model future conditions
   - Policy drivers for clean energy
   - Technology costs or availability
   - System changes (transmission, EV adoption)
4. Analyze the future electric system over each scenario
   - Capacity Expansion
   - Resource Adequacy
   - Production Cost Models
5. Test the robustness of the resource selection with uncertainty of assumptions in sensitivity analysis
   - Peak demand growth
   - Fuel costs
   - Carbon costs
6. Report outputs

Resource Planning Modeling Goals

- Identify resources best suited to match the needs of LADWP
- Provide insight into future system operations
- Create resource portfolios that meet the community priorities at the lowest possible cost



Resource Planning Modeling Attempts to Answer These Questions

What resources should LADWP acquire?

Capacity expansion models select resources to meet planning targets

Will those resources provide reliable service?

Resource adequacy determines likelihood that resources can serve load

How will the system operate with the new resources?

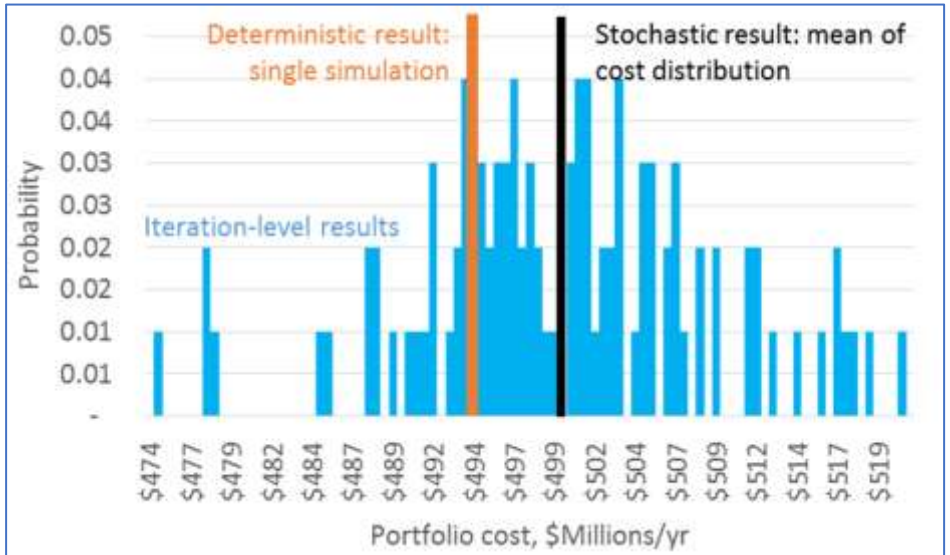
Production cost simulates system operations for costs, GHG emissions, renewable generation, etc.

Models Require Predicting the Future

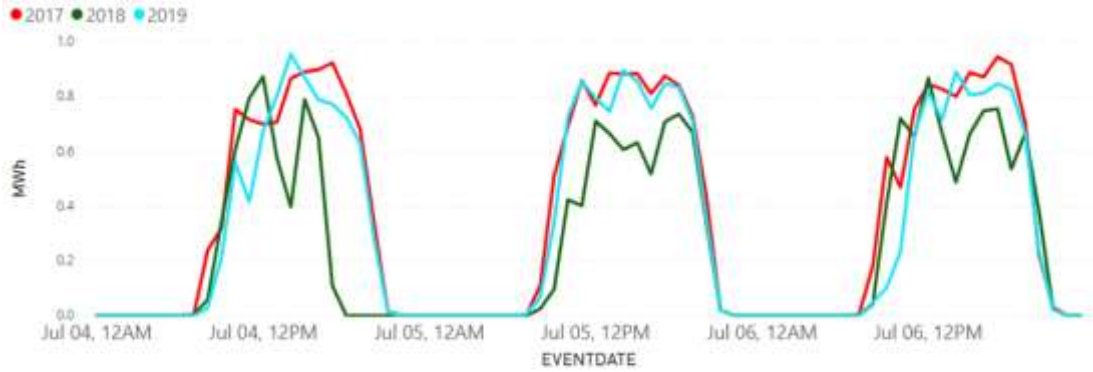
Renewable Generation	• Wind and solar production over time • Weather Variability
Changes in Customer Load	• Distributed Generation • Building Electrification • Electric Vehicles
Generation Costs	• Natural gas costs • Carbon emissions costs • Hydrogen fuel costs
Resource Costs	• Renewable PPA costs • Energy storage costs • Hydrogen costs
Availability of Future Resources	• Geothermal Development • Long Duration Storage • Hydrogen Infrastructure

Uncertainty with Stochastic Analysis

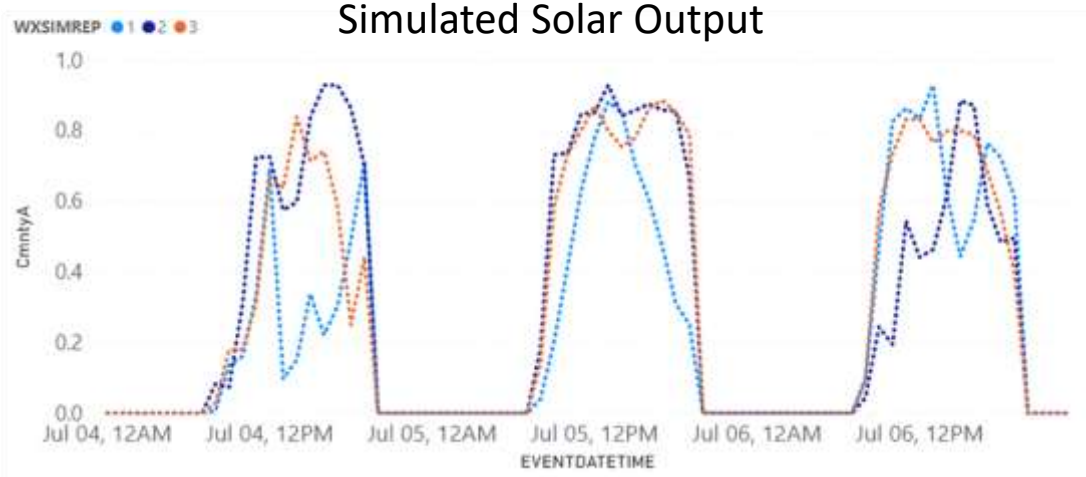
- Stochastic analysis provides a method to account for uncertainty and variability in power systems.
- PowerSIMM runs a set of simulations to cover a broad range of future conditions. Simulations represent a future path with independent representations of solar, wind, load and dispatch decisions.
- Outputs show a range of values for important variables such as costs, renewable generation, GHG emissions.



Historic Solar Output

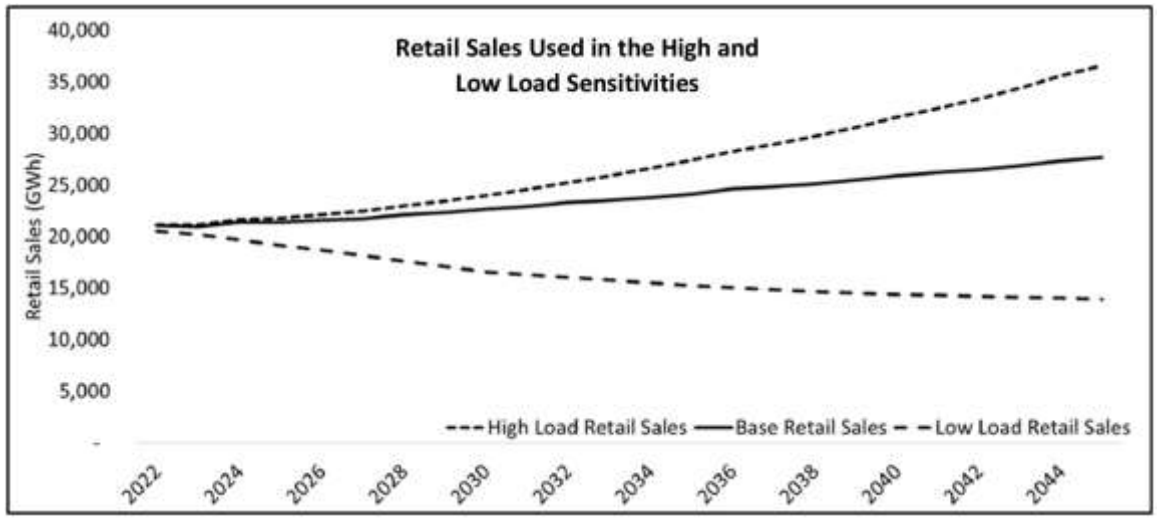


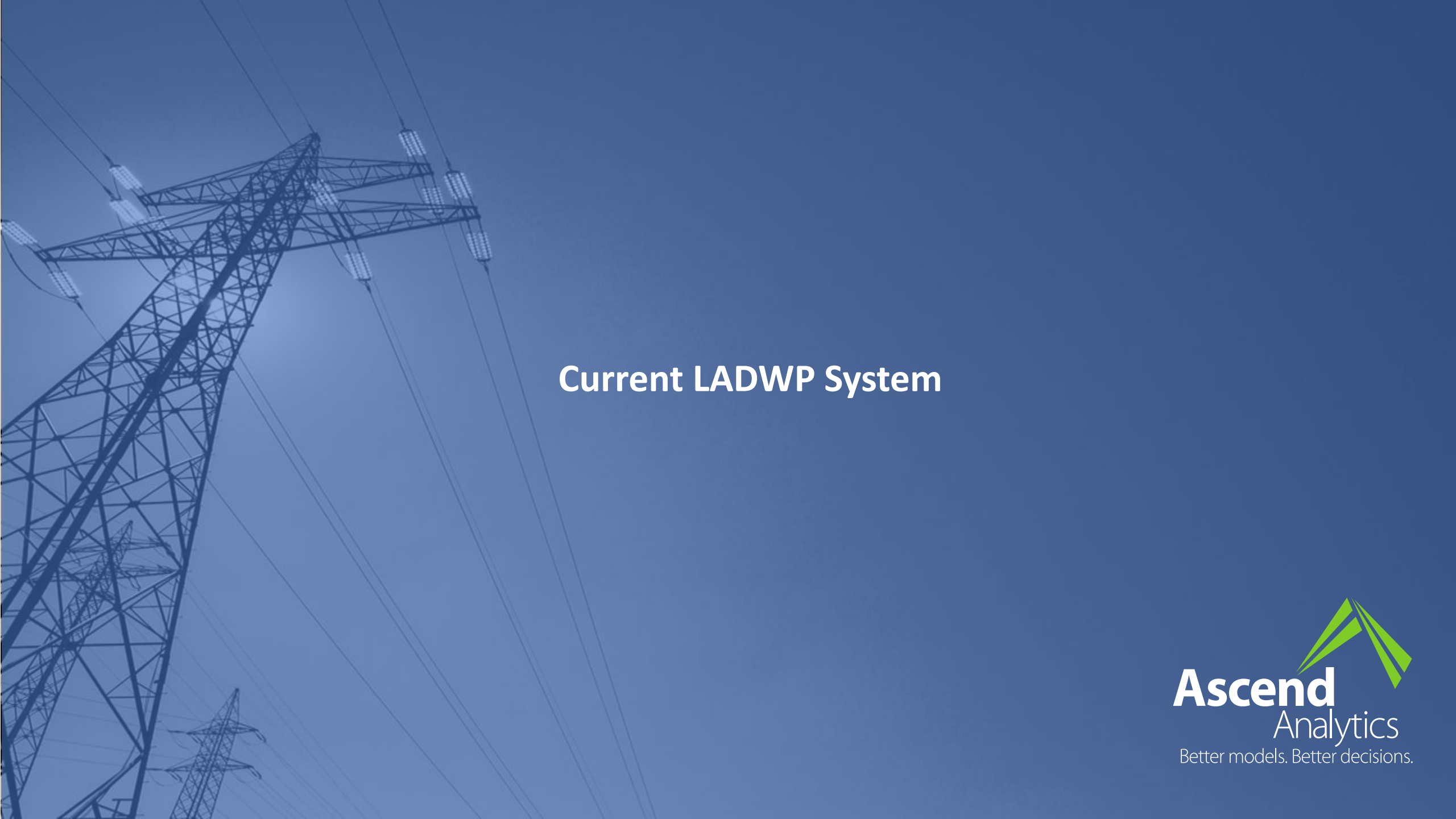
Simulated Solar Output



Sensitivity Analysis

- The last modeling phase incorporates testing to determine the level to which assumptions affect outcomes
- We are asking “what if” questions for further insight.
- What if the load forecast is different? How much will this matter in our planning decisions?
  - Test the model with a “high load forecast” representing our best guess at how far off we could be in the load forecast.
  - Compare results from a base load forecast to a high load forecast to understand how much the forecast uncertainty matters with costs, carbon emissions, renewable goals, reliability, etc.



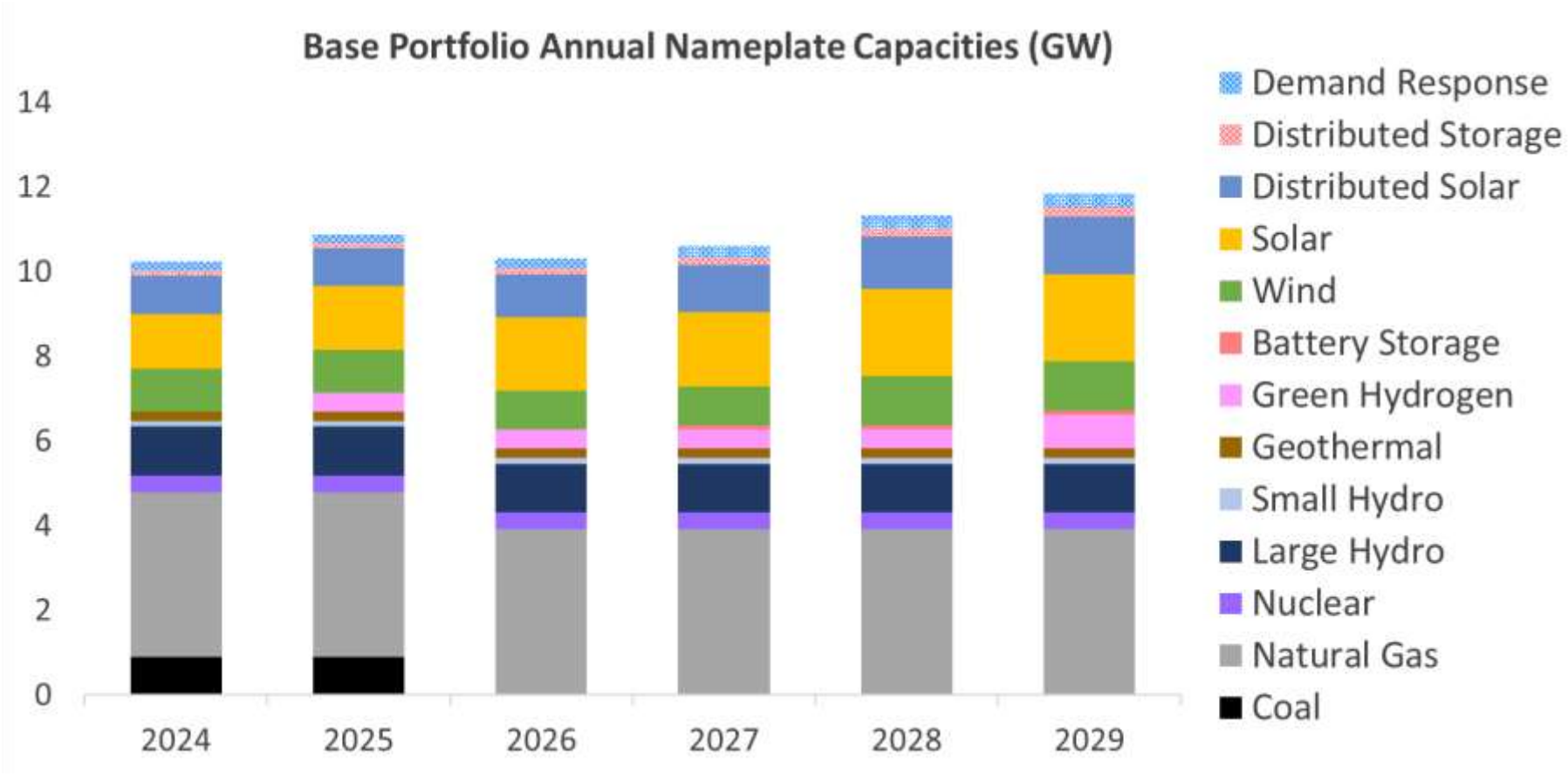


Current LADWP System

Ascend Analytics

Better models. Better decisions.

Base Model with Current and Contracted Resources

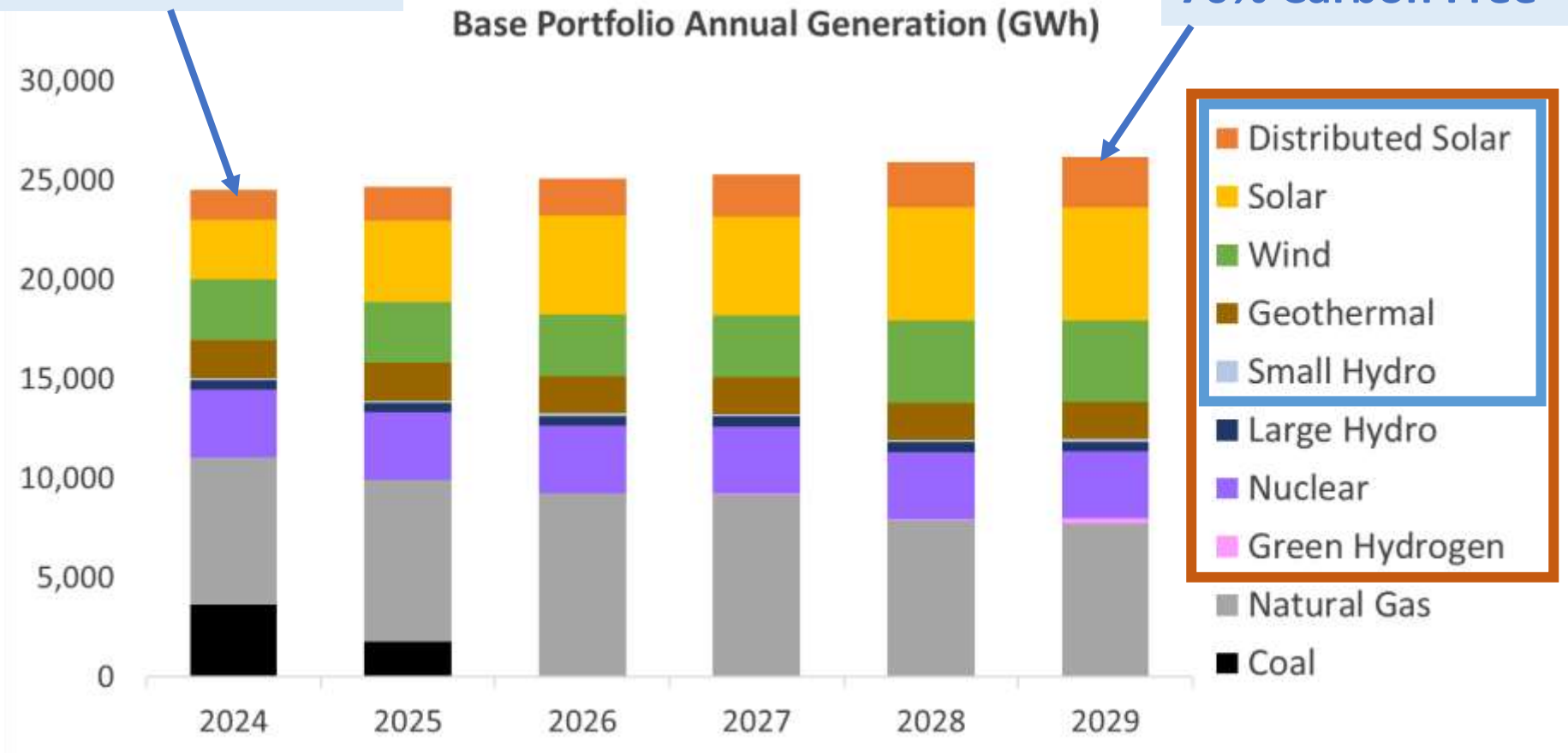


Green Hydrogen added at IPP in 2025 and Scattergood in 2029

Annual Energy Generation by Resource Type

40% Renewable
55% Carbon Free

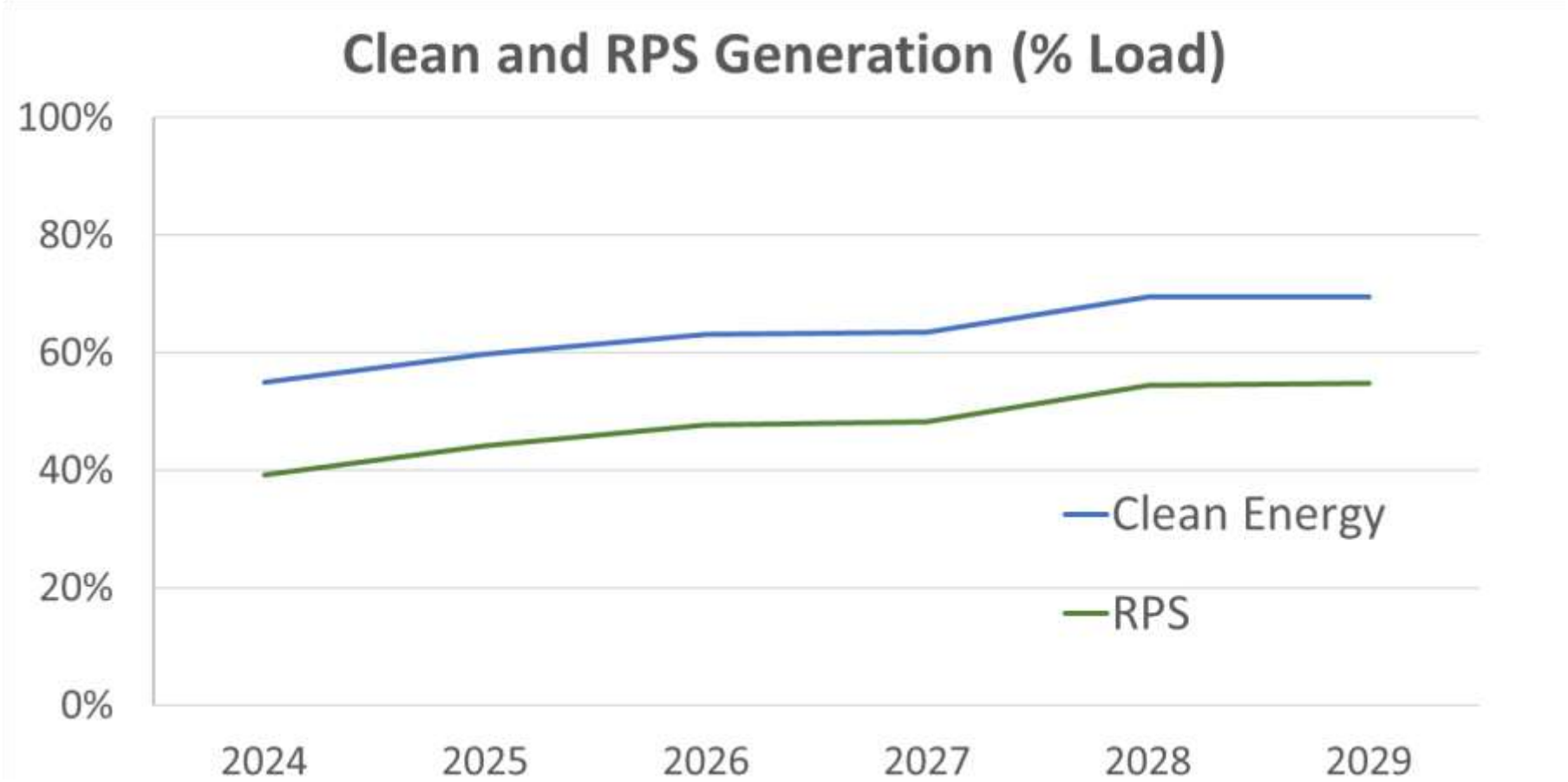
55% Renewable
70% Carbon Free



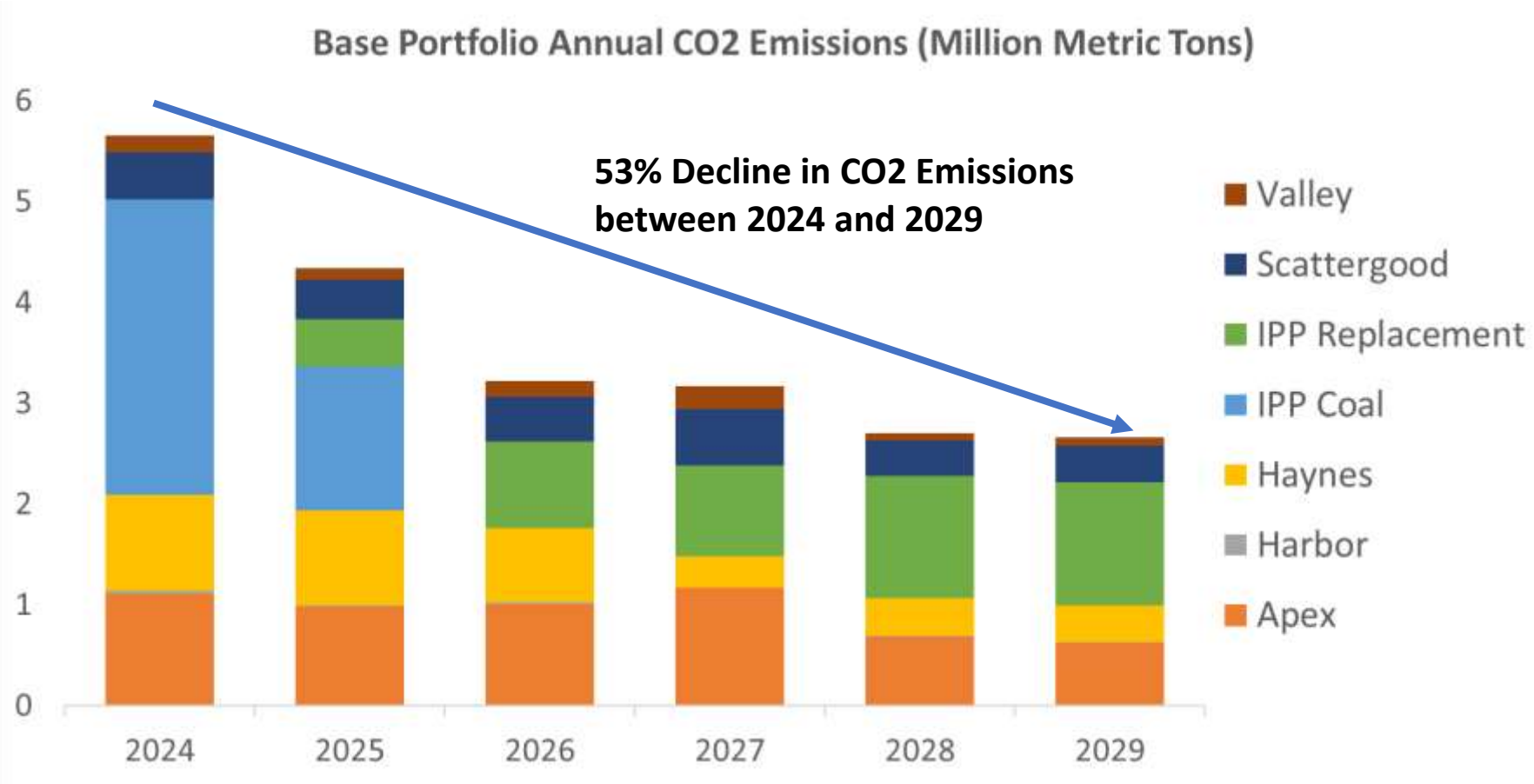
Renewable Resources (RPS Energy)

Carbon Free Resources (Clean Energy)

RPS and Clean Energy by Year



Annual Carbon Emissions



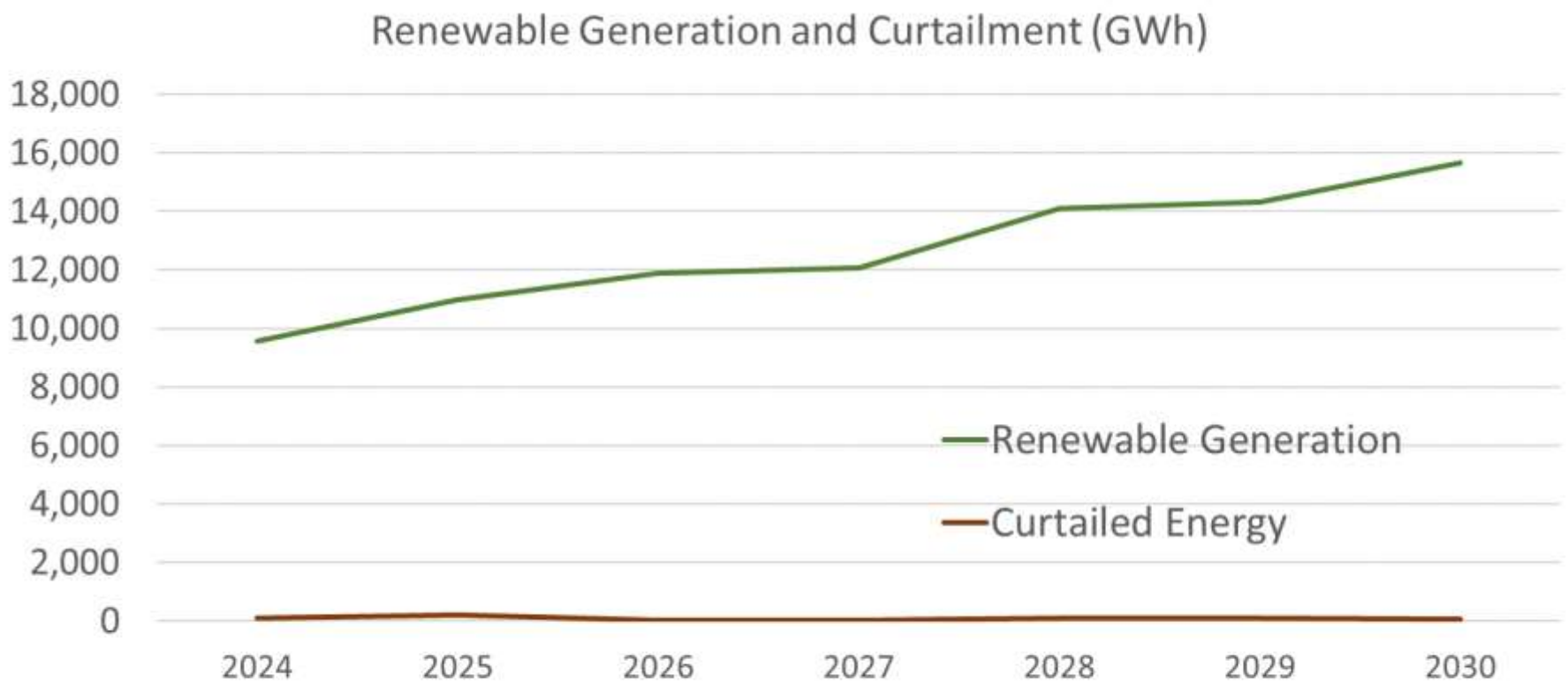
Clean Energy Around the Clock in 2028

- Clean energy exceeds load during the daytime.
- The drop in renewable generation in the evening hours shows an opportunity for additional storage to shift excess solar into the evening hours.
- Geothermal and wind can provide energy during sundown hours.
- Carbon free energy from large hydro, nuclear and hydrogen will fill more evening and night hours.

	% Clean Energy Serving Load (2028)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1:00	51	50	58	59	52	45	42	42	39	51	50	47
2:00	54	52	61	60	52	47	44	45	40	54	53	50
3:00	57	54	62	62	56	50	45	46	42	57	56	51
4:00	58	55	64	63	56	51	46	49	44	59	58	52
5:00	56	55	61	64	55	51	45	50	45	58	57	51
6:00	55	53	59	64	61	61	50	50	44	57	55	50
7:00	52	50	70	85	92	79	71	75	61	73	53	49
8:00	49	62	98	112	115	97	88	90	81	94	85	52
9:00	88	92	114	117	117	102	93	99	91	101	102	92
10:00	100	102	117	116	115	102	93	102	94	103	105	99
11:00	102	104	117	114	113	101	91	96	93	100	104	100
12:00	101	104	115	112	111	99	88	92	91	96	102	100
13:00	100	103	114	110	110	97	85	87	89	93	99	99
14:00	98	101	112	108	106	94	80	79	86	89	96	96
15:00	94	98	109	104	102	89	73	70	78	82	91	91
16:00	86	92	104	98	94	80	66	63	69	71	80	80
17:00	69	74	89	86	83	72	60	57	60	61	62	61
18:00	58	56	69	69	70	63	55	52	53	53	55	57
19:00	57	55	62	61	62	56	48	45	46	52	55	55
20:00	56	54	60	60	58	52	44	41	45	51	53	53
21:00	52	50	60	58	58	52	42	40	42	47	48	49
22:00	46	45	58	57	56	49	39	35	38	43	43	45
23:00	47	44	53	53	52	45	37	36	37	43	44	44
0:00	50	47	55	55	50	44	39	38	36	47	46	44

Renewables and Curtailment

At current levels of renewables, the model shows roughly 1% of energy curtailments



2024 SLTRP

Q&A

2024 SLTRP

DRAFT 2024 SLTRP SCENARIO AND SENSITIVITY MATRIX

Sales vs Generation

Accounting for the production and sales of clean energy are not the same

"Carbon Free" refers to the entire generation portfolio consisting of clean energy resources

"Energy Sales" refers to the load being served by clean energy resources (not including losses, curtailments, etc.)

100 **Energy Units** → ***Assumed 12% Loss*** → **Energy Units** 88

Generation — **Electricity Sales**

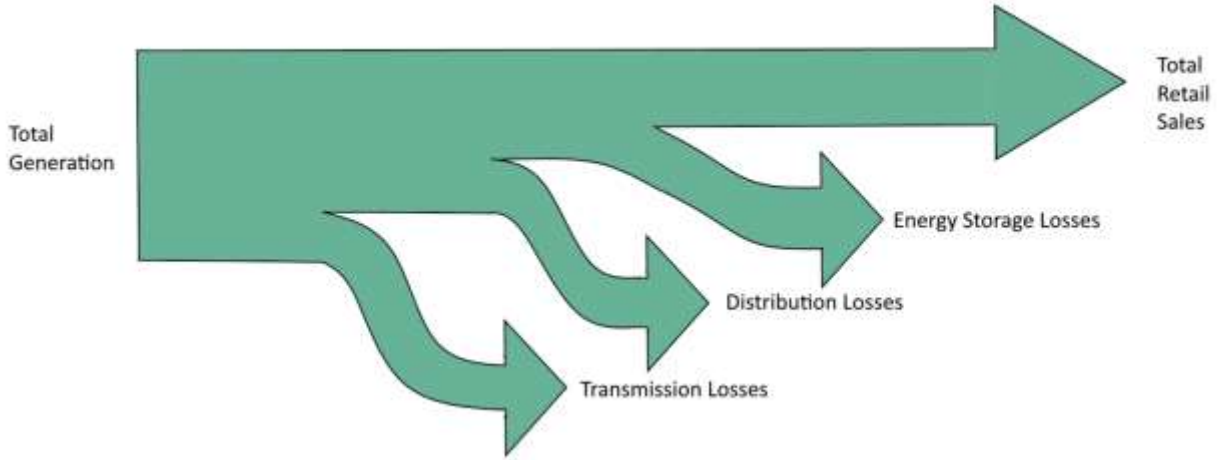
23,000 GWh — **20,240 GWh**

1. **Line Losses (Transmission & Distribution)**
2. **Energy Storage Losses**
3. **Generation Curtailments**

Loss of 2.76 billion kwh

2024 SLTRP Bookends

Carbon Free



Energy Sales

Carbon Free (CF)		Energy Sales (ES)
Total Generation	**Target**	Total Retail Sales
Included	**Losses & Curtailments**	Not Included

2024 SLTRP Bookends

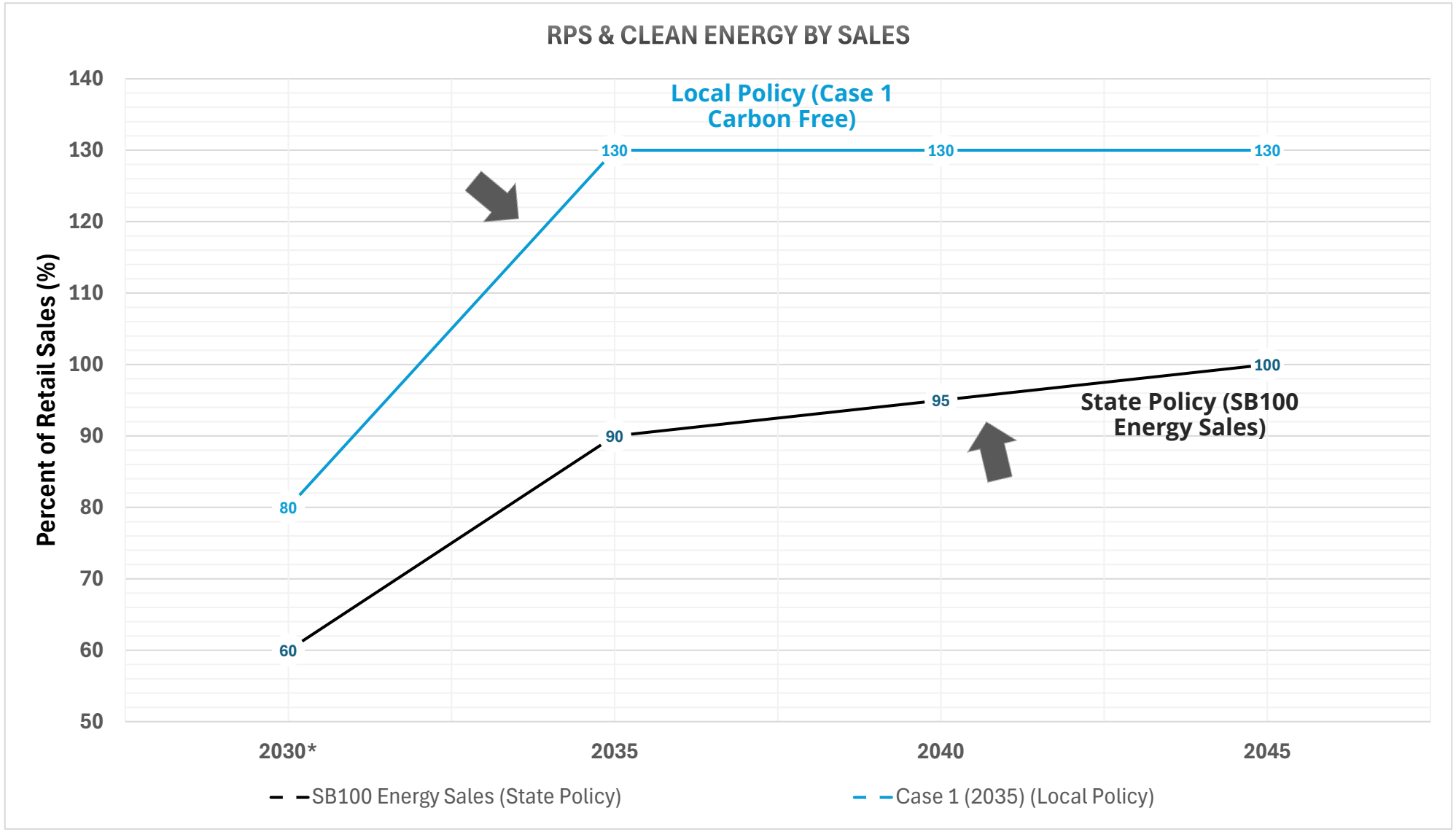
		2024 SLTRP Draft Scenarios	
		State Policy (SB 100 ES)	Local Policy (100% carbon-free by 2035)
	2030 Renewable Portfolio Standard Target	At least 60%	80%
	Compliance Year for 100% zero carbon/Carbon-Free	2045 (100% zero carbon by sales)	2035
Eligible Technologies	Solid Biomass	Yes*	Yes*
	Biogas/Biofuels	Yes*	Yes*
	Fuel Cells	Yes*	Yes*
	Hydro - Existing	Yes*	Yes*
	Hydro - New	Yes*	Yes*
	Hydro - Upgrades	Yes*	Yes*
	Natural Gas	Yes*	Yes*
	Green H2 Turbines	Yes*	Yes*
	Nuclear - Existing	Yes*	Yes*
	Nuclear - New	Yes*	Yes*
	Wind, Solar, Geo, Small Hydro	Yes*	Yes*
	Energy Storage	Yes*	Yes*
Maintain existing in-basin gas capacity (non-OTC units)	Haynes, Scattergood, Harbor, Valley	Yes	Yes, until H2 technology and market are sufficiently mature
DERs	Local Solar, Local Storage, etc.	Most realistic and likely	Optimistic
RECs	Financial Mechanisms (RECs/Allowances)	Yes	Yes
Load	Customer Demand	High/low sensitivities	High/low sensitivities
	Energy Efficiency	Most realistic and likely	Optimistic
	Demand Response	Most realistic and likely	Optimistic
	Electrification	Most realistic and likely	Optimistic
Transmission	New or Upgraded Transmission Allowed	Both new and upgraded transmission allowed	Both new and upgraded transmission allowed
Fuel Prices	Natural Gas, H2, etc.	High/low sensitivities	High/low sensitivities
GHG Prices	GHG Allowance Prices	High/low sensitivities	High/low sensitivities
Storage Prices	Li-Ion, flow, etc.	High/low sensitivities	High/low sensitivities

**Note: Optimal portfolio will be determined through the capacity expansion model*
***Note: Zero carbon includes RPS + nuclear + large hydro*

Draft

2024 SLTRP Bookends

***Note:** SB100 achieves 100% clean energy by 2045 based on retail sales; figures for other scenarios are shown in terms of retail sales for benchmarking purposes*



Advisory Group's Feedback and Addressing Equity

Core Themes

1) Ensure reliability, especially for the **LA 2028 Olympics**
2) Emphasize **Equity** and **Affordability**
3) Address **Climate Change** (higher peak loads and extreme events)
4) Vet through **feasibility** and **implementation challenges**
5) Interest in **non-combustion** options

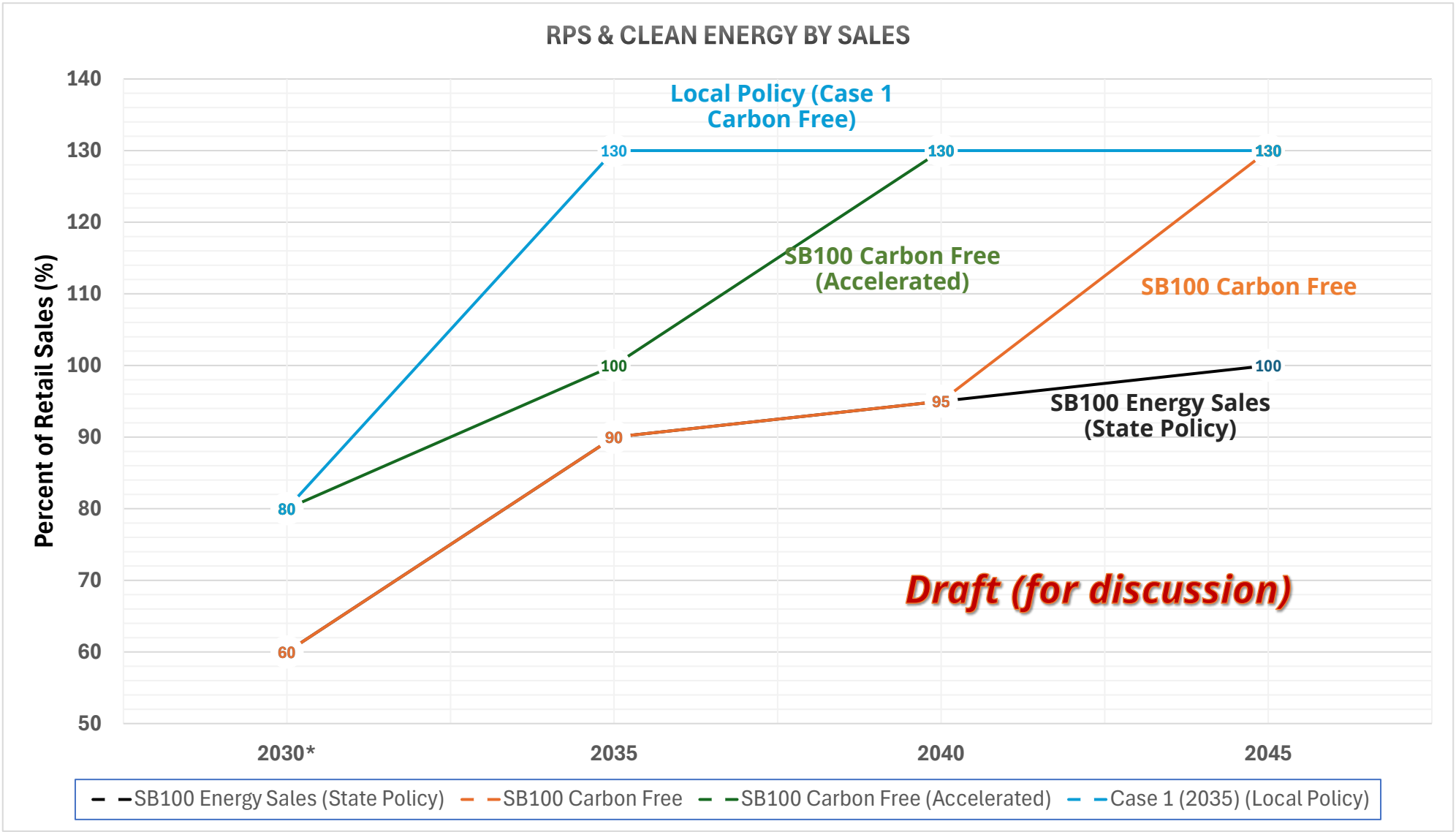
Incorporating Equity into Scenarios

- **Affordability**
  - Discussion on strategies to ensure **affordable access** to resources for all community sectors.
  - Impact of resource allocation on low-income households to **improve cost affordability** and **minimize energy burden**
- **Energy Burden** (scenarios will be evaluated based on energy bills to income ratio)
  - Incorporation of the **UCLA Energy-Burden Tool** to support in developing a more equity-responsive SLTRP, and to estimate the ongoing bill impacts of building decarbonization (transition from natural gas to electric appliances), energy efficiency upgrades, and DERs
  - Proposing measures to **reduce disproportionate energy costs** on vulnerable populations.
- **Customer Programs** (Energy Efficiency, Local Solar, Local Storage, Electrification)
  - Enhanced focus on Energy Efficiency (EE) initiatives tailored for diverse communities, and **expansion of** local solar **programs**.
  - **Accelerating investments** in infrastructure projects across all scenarios, and in essential customer programs.
- **LA100 Equity Strategies Implementation**
  - Ensuring a clean energy transition is achieved in an equitable manner while all communities **share in the benefits and burdens**.
  - Seeking **to improve energy equity and justice** through community engagement, and an LA100 Equity Strategies Advisory Group.

Draft

Proposed 2024 SLTRP Scenarios

***Note:** SB100 achieves 100% clean energy by 2045 based on retail sales; figures for other scenarios are shown in terms of retail sales for benchmarking purposes*



Draft

Range of Possible Draft Scenarios

Load growth is they key driver for modeling

SB 100 Energy Sales (State Policy)

(60% RPS by 2030, 90% clean energy by 2035, 100% clean energy by 2045)

Scenario	Plan A				Plan B				Plan C				Plan D			
Load Growth	**Low**	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

SB 100 Carbon Free

(60% RPS by 2030, 90% clean energy by 2035, 100% carbon-free by 2045)

Scenario	Plan E				Plan F				Plan G				Plan H			
Load Growth	**Low**	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

SB100 Carbon Free (Accelerated)

(80% RPS by 2030, 100% clean energy by 2035 based on sales, carbon free by 2045 or earlier)

Scenario	Plan I				Plan J				Plan K				Plan L			
Load Growth	**Low**	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

Case 1 (2035) (Local Policy)

(80% RPS by 2030, 100% carbon-free by 2035)

Scenario	Plan M				Plan N				Plan O				Plan P			
Load Growth	**Low**	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

Draft

Filtered Draft Scenarios

Focusing on only "Expected" loads allows for synchronization with Financial Services Organization's Forecasts

SB 100 Energy Sales (State Policy)

(60% RPS by 2030, 90% clean energy by 2035, 100% clean energy by 2045)

Scenario	Plan A (1)				Plan B				Plan C				Plan D			
Load Growth	Low	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

SB 100 Carbon Free

(60% RPS by 2030, 90% clean energy by 2035, 100% carbon-free by 2045)

Scenario	Plan E (2)				Plan F				Plan G				Plan H			
Load Growth	Low	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

SB100 Carbon Free (Accelerated)

(80% RPS by 2030, 100% clean energy by 2035 based on sales, carbon free by 2045 or earlier)

Scenario	Plan I (3)				Plan J				Plan K				Plan L			
Load Growth	Low	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

Case 1 (2035) (Local Policy)

(80% RPS by 2030, 100% carbon-free by 2035)

Scenario	Plan M (4)				Plan N				Plan O				Plan P			
Load Growth	Low	Expected	High	Stress	Low	**Expected**	High	Stress	Low	Expected	**High**	Stress	Low	Expected	High	**Stress**

Draft

Detailed Scenarios

		2024 SLTRP Scenarios (Actionable)			
		SB100 Energy Sales (State Policy)	**SB100 Carbon Free**	**SB100 Carbon Free (Accelerated)**	**Case 1 (2035)** (Local Policy)
	2030 RPS Target	At least 60%	At least 60%	80%	80%
	Target for 100%	2045	2045	2040	2035
	Type of Energy Goal	Energy Sales	Carbon Free Generation	Energy Sales	Carbon Free Generation
Eligible **Technologies**	**Solid Biomass**	Yes*	Yes*	Yes*	Yes*
	Biogas/Biofuels	Yes*	Yes*	Yes*	Yes*
	Fuel Cells	Yes*	Yes*	Yes*	Yes*
	Hydro - Existing	Yes*	Yes*	Yes*	Yes*
	Hydro - New	Yes*	Yes*	Yes*	Yes*
	Hydro - Upgrades	Yes*	Yes*	Yes*	Yes*
	Natural Gas	Yes*	Yes*	Yes*	Yes*
	Green H2 Turbines	Yes*	Yes*	Yes*	Yes*
	Nuclear - Existing	Yes*	Yes*	Yes*	Yes*
	Nuclear - New	Yes*	Yes*	Yes*	Yes*
	Wind, Solar, Geo, Small Hydro	Yes*	Yes*	Yes*	Yes*
	Energy Storage	Yes*	Yes*	Yes*	Yes*
Maintain existing in-basin gas capacity (non-OTC units)	**Haynes, Scattergood, Harbor, Valley**	Yes	Yes, until 2045	Yes, until H2 technology and market are sufficiently mature	Yes, until 2035 (assuming H2 technology and market are sufficiently mature)
	Local Solar, Local Storage, etc.	Most realistic and likely	Most realistic and likely	Most realistic and likely	Optimistic
	Financial Mechanisms (RECs/Allowances)	Yes	Yes	Yes	Yes
Load	**Customer Demand**	High/low sensitivities	High/low sensitivities	High/low sensitivities	High/low sensitivities
	Energy Efficiency	Most realistic and likely	Most realistic and likely	TBD, but must be achievable and realistic	Optimistic
	Demand Response	Most realistic and likely	Most realistic and likely	TBD, but must be achievable and realistic	Optimistic
	Electrification	Most realistic and likely	Most realistic and likely	TBD, but must be achievable and realistic	Optimistic
	New or Upgraded Transmission Allowed	Both new and upgraded transmission allowed	Both new and upgraded transmission allowed	Both new and upgraded transmission allowed	Both new and upgraded transmission allowed
	Natural Gas, H2, etc.	High/low sensitivities	High/low sensitivities	High/low sensitivities	High/low sensitivities
	GHG Allowance Prices	High/low sensitivities	High/low sensitivities	High/low sensitivities	High/low sensitivities
	Li-Ion, flow, etc.	High/low sensitivities	High/low sensitivities	High/low sensitivities	High/low sensitivities

**Note: Optimal portfolio will be determined through the capacity expansion model*

***Note: Zero carbon includes RPS + nuclear + large hydro*

Draft

Possible Price Sensitivities

6 SB 100 Energy Sales (State Policy)

(60% RPS by 2030, 90% clean energy by 2035, 100% clean energy by 2045)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	N/A	N/A	N/A
Renewables ($)	Low	Normal	High

6 SB100 Carbon Free (Accelerated)

(80% RPS by 2030, 100% clean energy by 2035 based on sales, carbon free by 2045 or earlier)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	N/A	N/A	N/A
Renewables ($)	Low	Normal	High

6 SB 100 Carbon Free

(60% RPS by 2030, 90% clean energy by 2035, 100% carbon-free by 2045)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	N/A	N/A	N/A
Renewables ($)	Low	Normal	High

8 Case 1 (2035) (Local Policy)

(80% RPS by 2030, 100% carbon-free by 2035)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	Low	Normal	High
Renewables ($)	Low	Normal	High

26 Total Combinations

Draft

Filtered Price Sensitivities

Ratepayer Advocate recommends focusing on bookends

1

SB 100 Energy Sales (State Policy)

(60% RPS by 2030, 90% clean energy by 2045)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	N/A	N/A	N/A
Renewables ($)	Low	Normal	High

2

Case 1 (2035) (Local Policy)

(80% RPS by 2030, 100% carbon-free by 2035)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low	Normal	High
Gas Market ($)	Low	Normal	High
Hydrogen Market ($)	Low	Normal	High
Renewables ($)	Low	Normal	High

2

Recommended Price Sensitivities

Draft

What If Analysis

Six (6) "What If" factors applied to Four (4) Scenarios

6

Implementation Risk	Description	"What-if" Sensitivities Applied 100% by 2035 Case
Demand Side Resources	Demand Response Local Solar and Storage Energy Efficiency	Reaching only half of LADWP's DER targets due to low customer adoption
Low Load	Transportation/Building Electrification	Low Load
High Load	Transportation/Building Electrification	High Load
Resource Constraint	*Shortfall of resources due to challenges*	*Unable to exceed current build rates*
Climate Change	*Impacts of Climate change on resources*	*High peak loads, lower output from weather. Future wildfire.*
Hydrogen Supply	*Impacts of the volatility of hydrogen resources*	*Unable to fully supply hydrogen fuel*
Note: *Applied to 100% by 2035 scenario only (Local Policy)*		

24

Total Combinations

Draft

Summary Breakdown

Six (6) “What If” factors applied to Four (4) Scenarios with Two (2) Different Price Sensitivities

Final Recommended Case

Focused Development

Evaluate metrics, including affordability among scenarios. Allows for optimal use of time and resources to complete analysis within one year

“What If” Analysis

Focused on 6 Implementation Risks

Based on the scenario most subject to risk (Local Policy)

Price Sensitivities

Based on Commodity Pricing

Filtered from 26 Combinations to 2

Scenarios

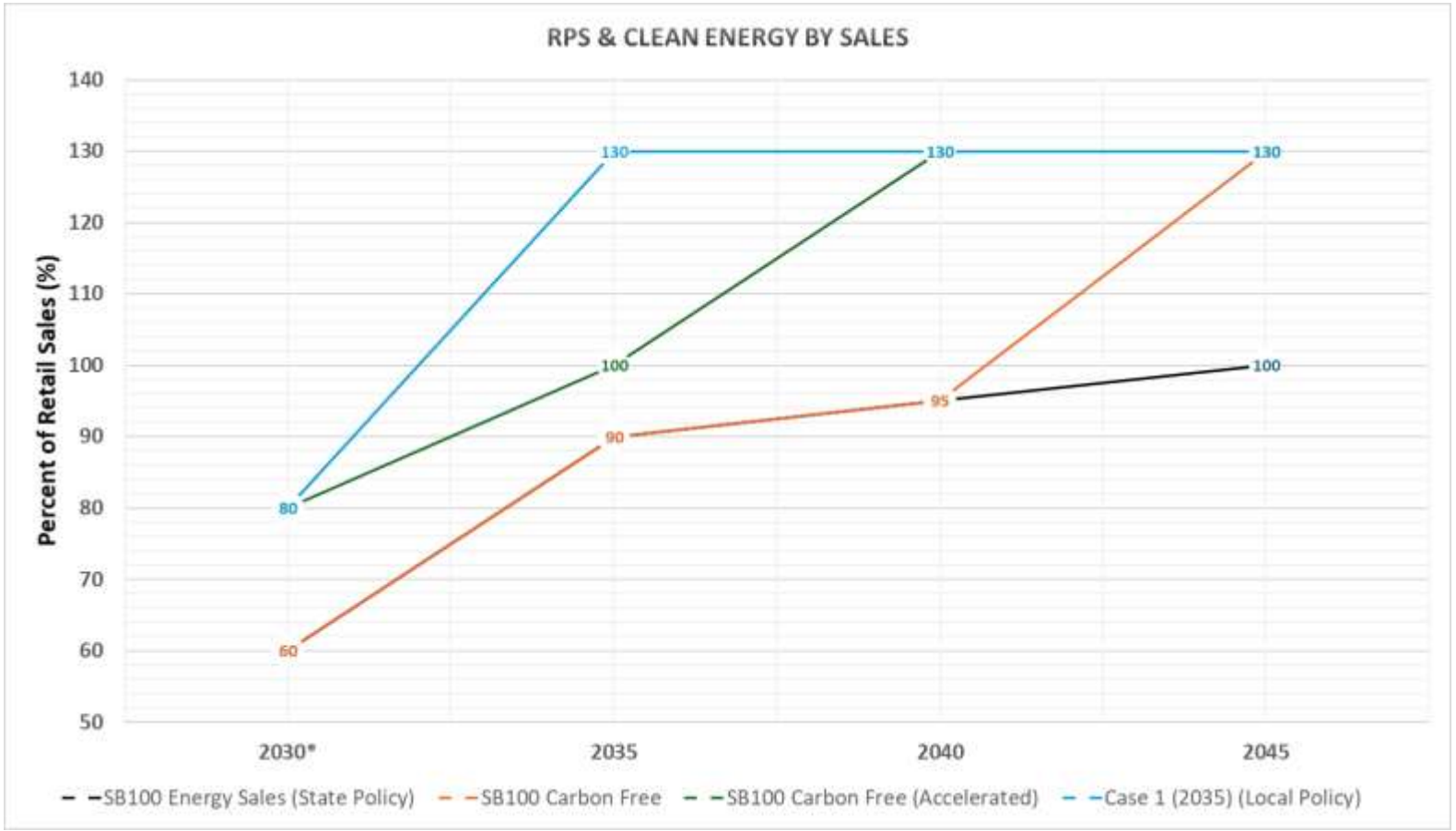
Based on Load Growth

Filtered from 16 to 4

Draft (for discussion)

Proposed 2024 Modeling

Proposed 2024 SLTRP Core Scenarios



Proposed 2024 SLTRP Sensitivities

1 SB 100 Energy Sales (State Policy)
(60% RPS by 2030, 90% clean energy by 2035, 100% clean energy by 2045)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low		High
Gas Market ($)	Low		High
Hydrogen Market ($)	N/A	N/A	N/A
Renewables ($)	Low		High

2 Case 1 (2035) (Local Policy)
(80% RPS by 2030, 100% carbon-free by 2035)

Load Growth	Low	Expected	High
Carbon Policy ($)	Low		High
Gas Market ($)	Low		High
Hydrogen Market ($)	Low		High
Renewables ($)	Low		High

Implementation Risk	Description	"What-if" Sensitivities Applied 100% by 2035 Case
Demand Side Resources	Demand Response Local Solar and Storage Energy Efficiency	Reaching only half of LADWP's DER targets due to low customer adoption
Low Load	Transportation/Building Electrification	Low Load
High Load	Transportation/Building Electrification	High Load
Resource Constraint	*Shortfall of resources due to challenges*	*Unable to exceed current build rates*
Climate Change	*Impacts of Climate change on resources*	*High peak loads, lower output from weather. Future wildfire.*
Hydrogen Supply	*Impacts of the volatility of hydrogen resources*	*Unable to fully supply hydrogen fuel*

Note: *Applied to 100% by 2035 scenario only (Local Policy)*

2024 SLTRP

BREAKOUT SESSIONS AND MENTI-METER

Breakout Session

Introductions

1. Name and Organization

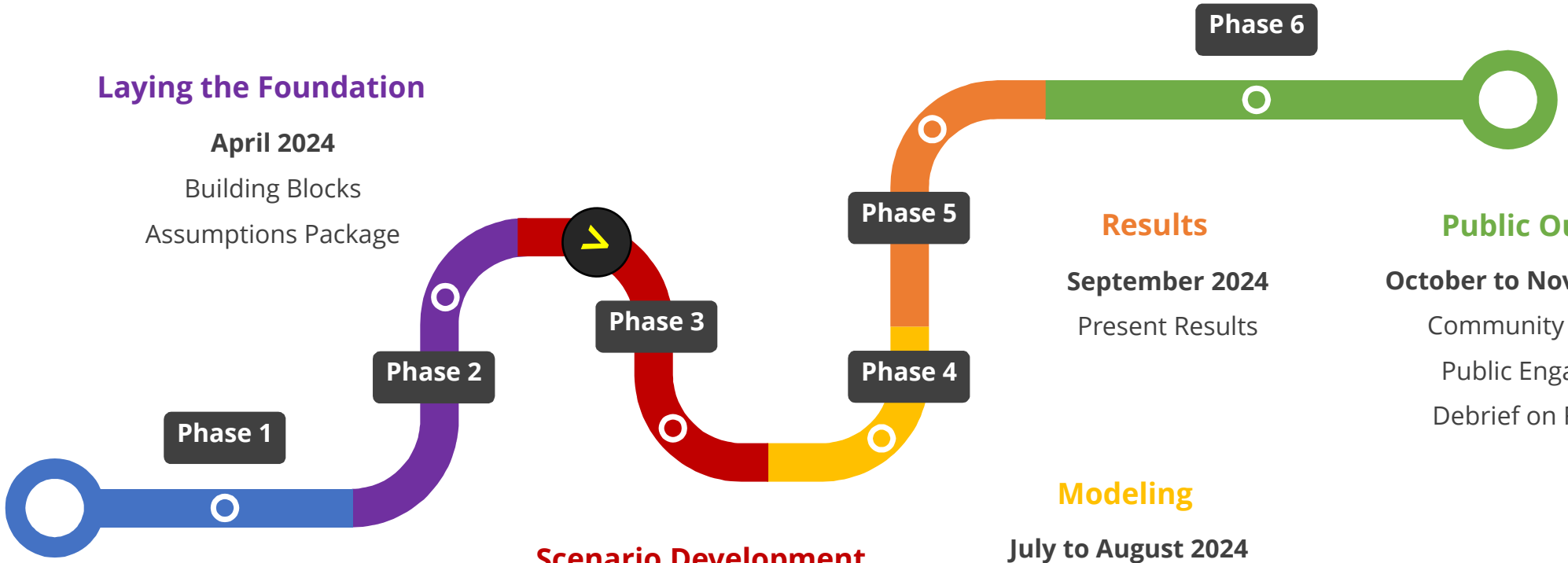
Draft Scenario and Sensitivity Matrix

1. What do you view as **strengths** of the draft scenario and sensitivity matrices?
2. Does the draft **scenario** matrix align with your organization's **priorities and interests**, and if not, why?
3. Does the draft **price** sensitivity matrix align with your organization's **priorities and interests**, and if not, why?
4. Does the draft **"what-if"** sensitivity matrix align with your organization's **priorities and interests**, and if not, why?

2024 SLTRP

BREAKOUT SESSIONS REPORTING & DISCUSSION AND MENTIMETER

NEXT STEPS – MEETING MAP



Laying the Foundation

April 2024

Building Blocks

Assumptions Package

Launch

March 2024

Kickoff

Scenario Development

May to June 2024

Developing Scenarios

Finalizing Sensitivities

Modeling

July to August 2024

Modeling

Optional Distribution System Planning AG Meetings

Results

September 2024

Present Results

Public Outreach

October to November 2024

Community Outreach

Public Engagement

Debrief on Feedback

Los Angeles Department of Water & Power

Thank You!

Email us @

PowerSLTRP@ladwp.com