PERMITTING REFORM, COOPERATIVE FEDERALISM, AND CROSS AGENCY PARTNERSHIP

Eric C. Massey, Director
Sustainability

BOTTOM LINE UP FRONT

Permitting Reform

- **Need:** More generation and transmission of electricity, fast
- **Goal:** Timely and defensible permits for required infrastructure
- **Outcome:** Increased electricity supply to meet increased demand

Cooperative Federalism

- **Need:** Environment protection ***and*** national security ***and*** economic development
- **Goal:** Predictability and greater alignment of local, state and federal regulators
- **Outcome:** Improved policies, procedures and delegation of decision making

Cross Agency Partnerships

- **Need:** Faster pathways to all required permits
- **Goal:** Improve collaboration and innovation; identify and solve regional problems
- **Outcome:** Accelerated infrastructure development

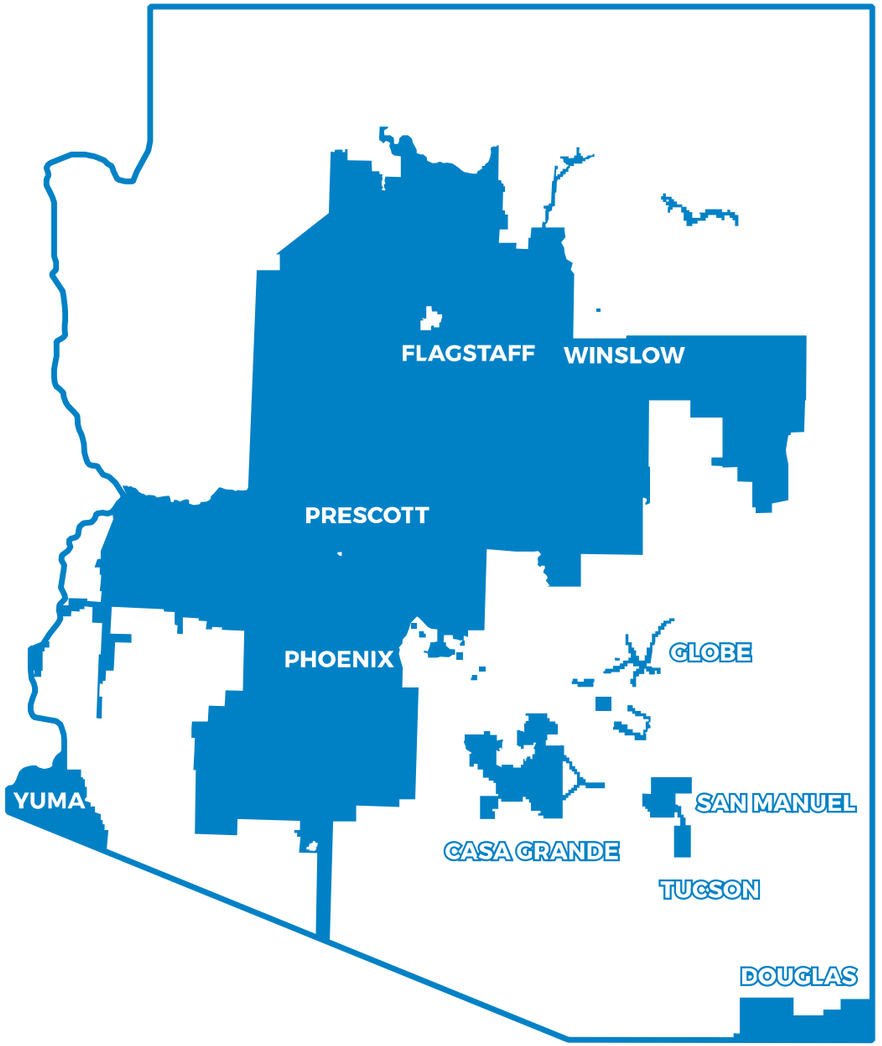
APS IS A PUBLIC SERVICE CORPORATION

- APS At A Glance
- Current State
- Reliability Challenges
- Air Quality Challenges

APS **SERVICE TERRITORY**

Since 1886, Arizona's largest and longest-serving utility.

- 34,646 square mile service territory
  - 11 of 15 counties
  - 1.4 million customer accounts (89% residential)
  - Approximately 45% of Phoenix
- ~6,000 employees
- Peak demand is ~8,200 megawatts
- Investor owned (PNW)



OUR **STRATEGY**

RELIABLE **AFFORDABLE** **CLEAN** **CUSTOMER CENTRIC**

SERVING AS A REGULATED UTILITY

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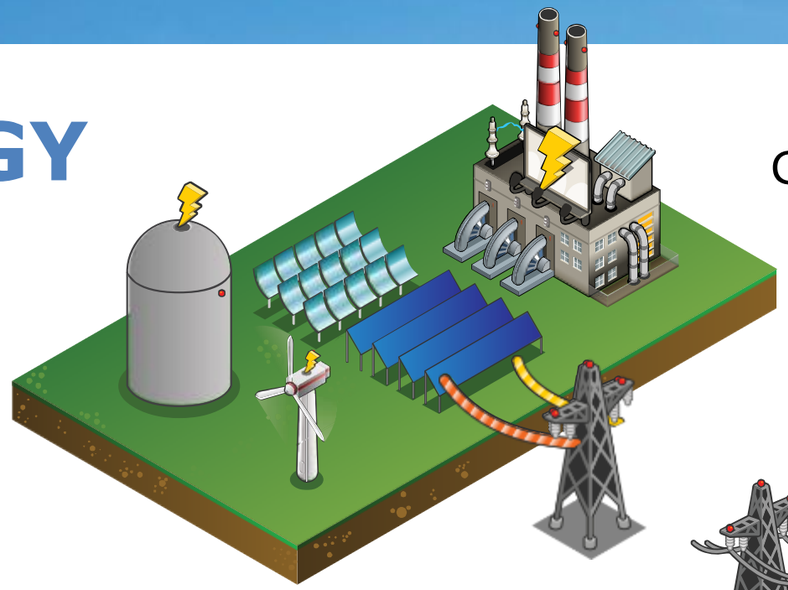
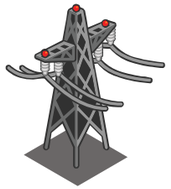
THE **ENERGY GRID**

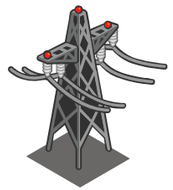


Generation

Transmission

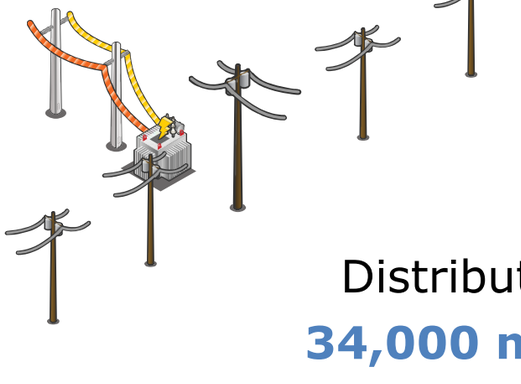
6,000 miles





Residential Customers

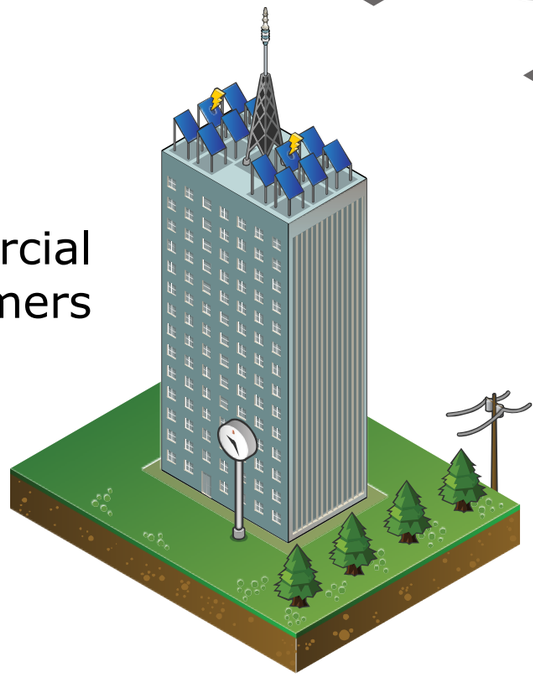
Substation



Distribution

34,000 miles

Commercial Customers

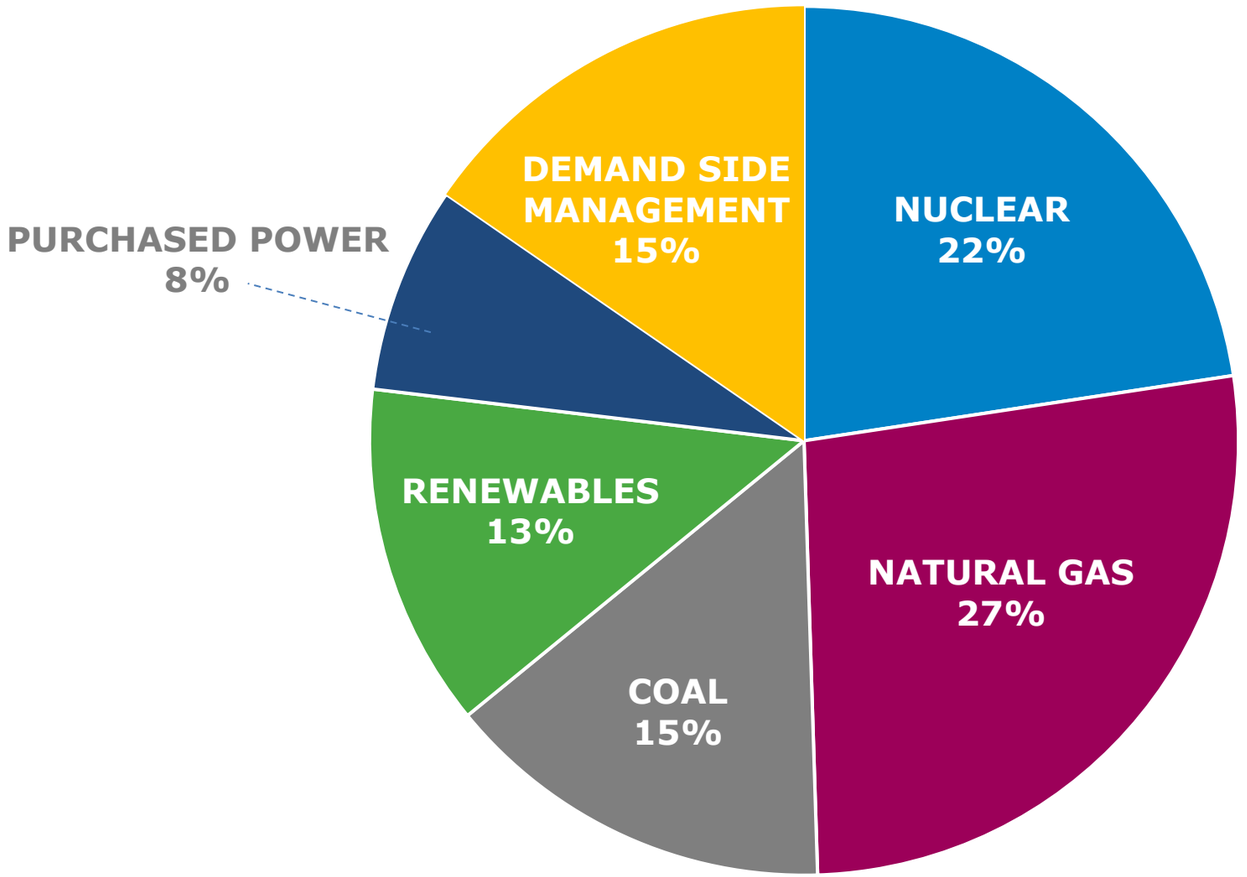


CLEAN ENERGY GOALS

- 100% clean, carbon-free electricity to customers by 2050
- 2030 target; 65% clean energy with 45% from renewable resources
- 2031 exit coal-fired generation

A **BALANCED** AND CLEAN ENERGY SUPPLY

ACTUAL ENERGY DELIVERED IN **2023**



APS IS A PUBLIC SERVICE CORPORATION

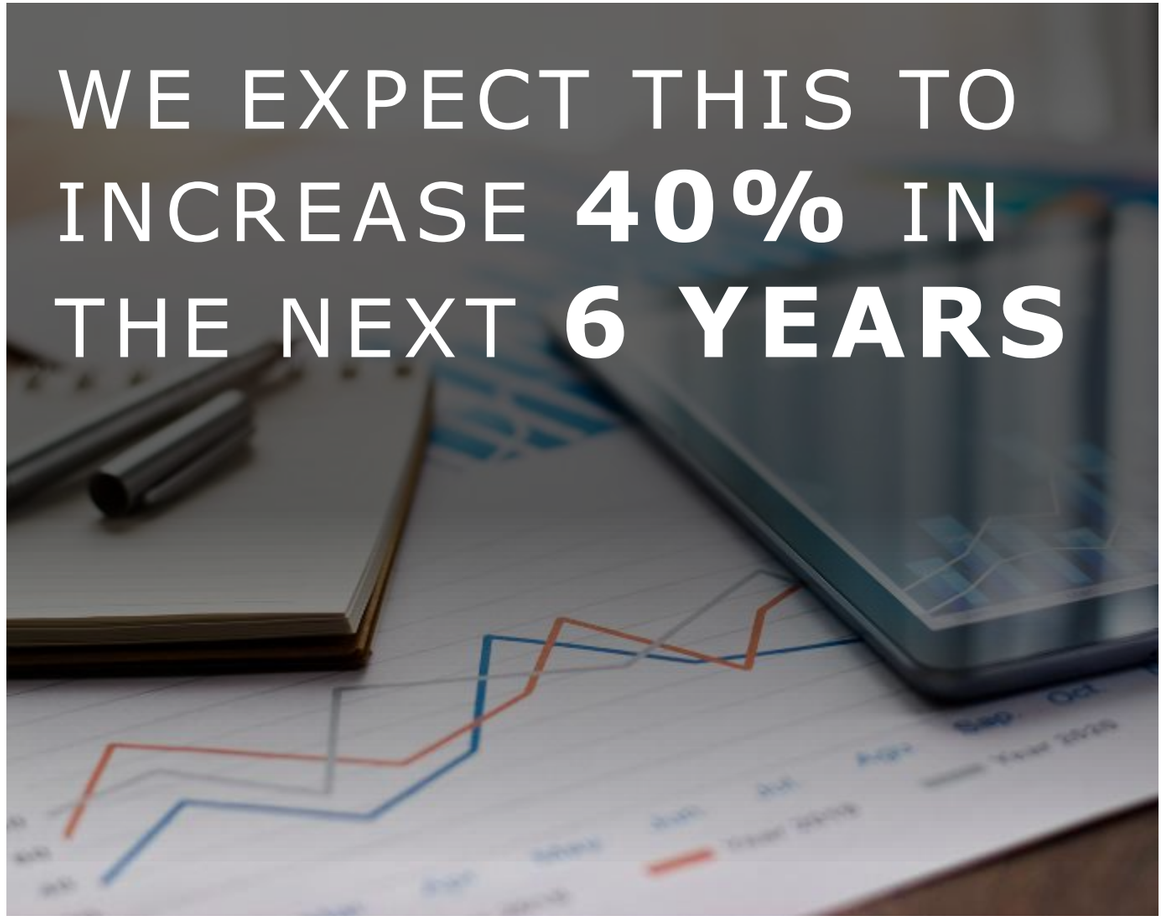
- APS At A Glance
- Current State
- **Reliability Challenges**
- Air Quality Challenges

RELIABILITY **CHALLENGES**

- Load Growth
- Extreme Weather
- Resource Adequacy
- Responsible Decarbonization
- Transmission Constraints

IT TOOK NEARLY **140 YEARS** TO REACH TODAY'S PEAK DEMAND LEVELS

WE EXPECT THIS TO INCREASE **40%** IN THE NEXT **6 YEARS**



COMMERCIAL AND INDUSTRIAL **GROWTH**

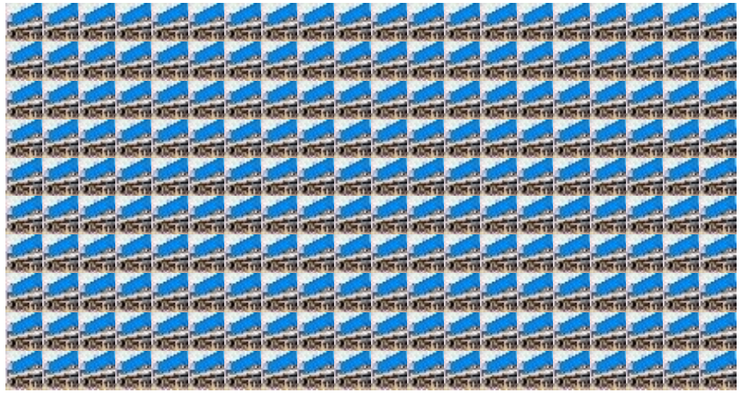
2023 Integrated Resource Plan

POWER NEEDS VARY ACROSS OUR CUSTOMERS

Large grocery store: ~1MW

- A typical large grocery store requires **1MW** of energy – less than **1% of a typical single data center's power**

Data center: ~200MW



- One data center needs as much power as **~32K homes**
- Requests are as high as **1,200-2,000 MW per site (~200-320K homes)**

Palo Verde: ~4,000MW

- APS' share is **~1,150 MW** of Palo Verde, which is the largest generation facility in our portfolio

We have 11,000 MW (and growing) of data center requests today

RELIABILITY **CHALLENGES**

- Load Growth
- **Extreme Weather**
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EXTREME HEAT IN PHOENIX, ARIZONA

Calendar Year	Daily Low > 90 °F	Daily High > 100 °F	Daily High > 110 °F	Daily High > 115 °F
Average Days	7	111	21***	2
2023 Days	35	145*	55	22*
2024 Days	39*	143**	70*	12

* Record
** Includes streak of 113 consecutive days (previous record was 76)
*** Since 2021, Phoenix has averaged 42 days a year at 110 ºF or hotter

RELIABILITY **CHALLENGES**

- Load Growth
- Extreme Weather
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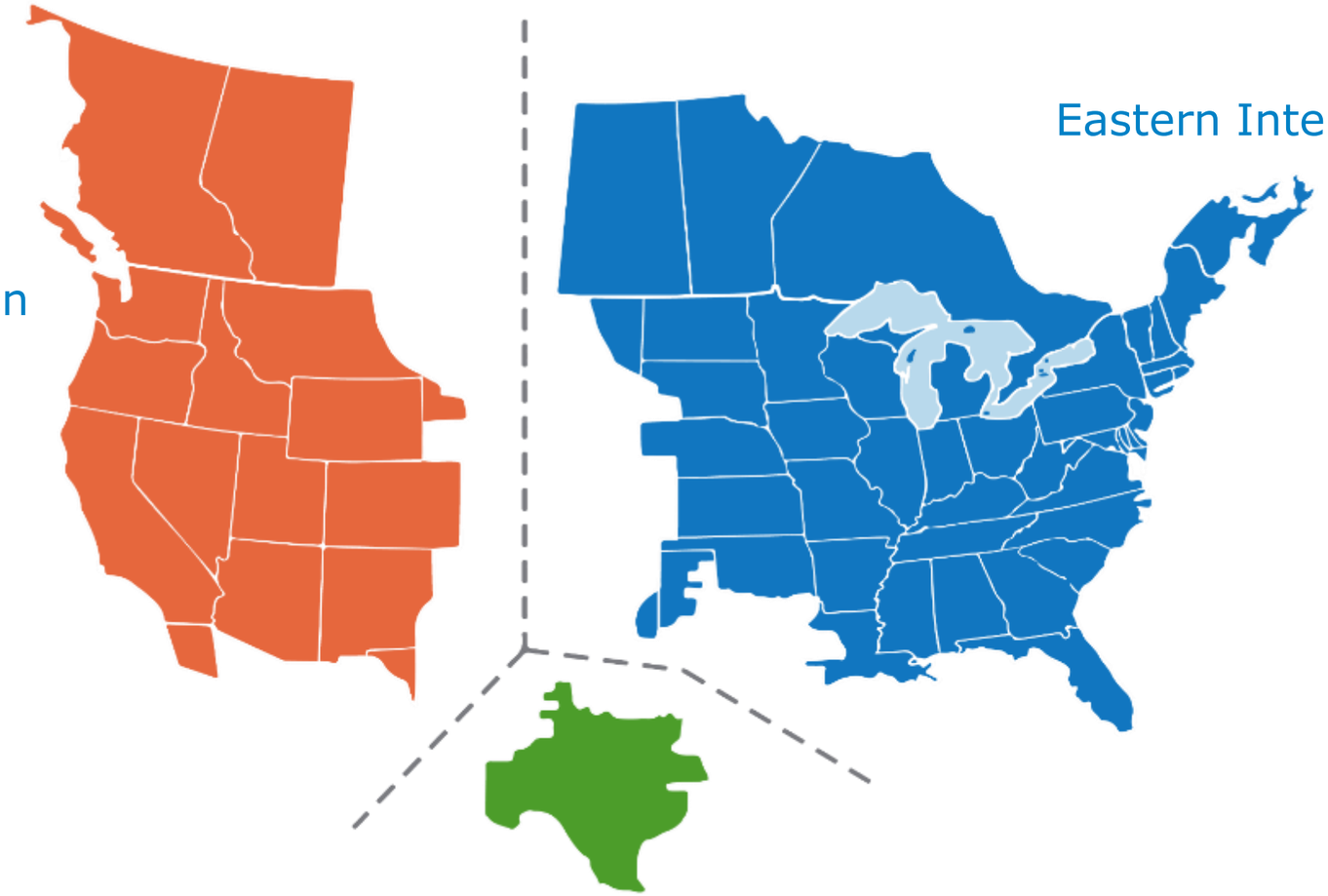
THE **GRID** IS DIVIDED INTO **3 INTERCONNECTIONS**

Western Interconnection



Eastern Interconnection

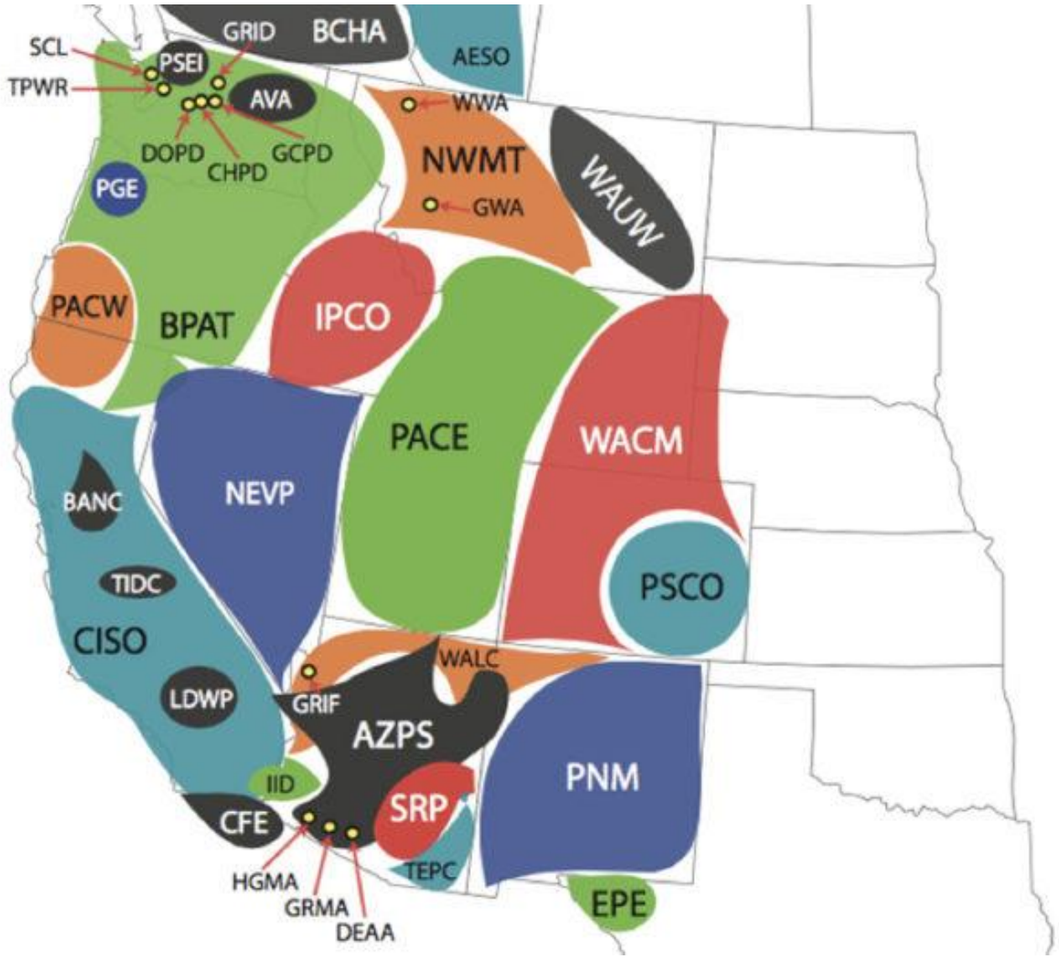
Electricity Reliability Council of Texas Interconnection

WECC **BALANCING AUTHORITIES**

APS IS ITS OWN BALANCING AUTHORITY

FOCUS AREAS

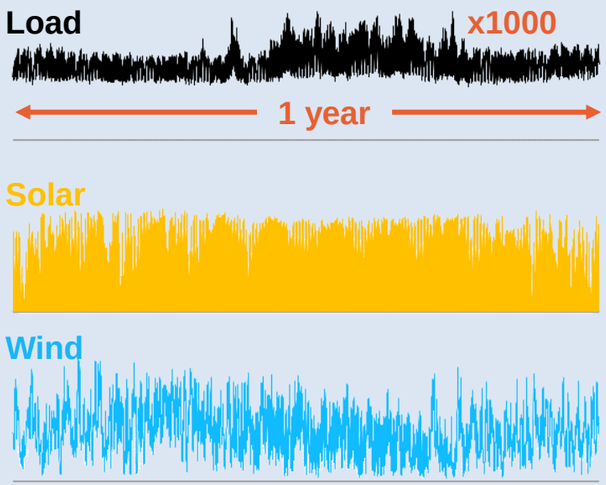
- ☐ Reliability
- ☐ Customer Cost Savings
- ☐ Integrate Clean Energy



RESOURCE ADEQUACY: BEST PRACTICES

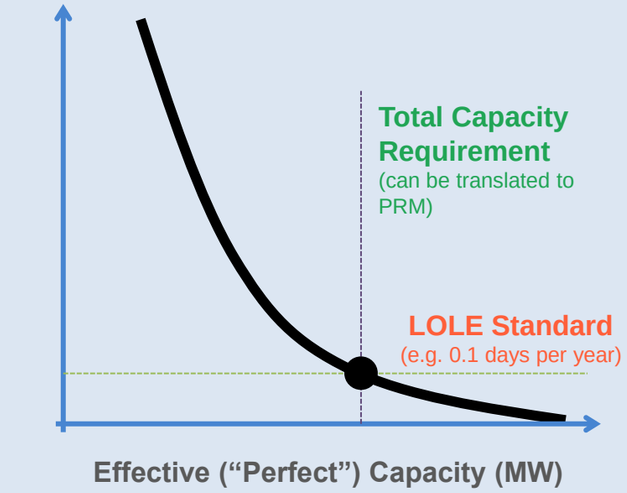
Develop a representation of the loads and resources of an electric system in a loss of load probability model

LOLP modeling allows a utility to evaluate resource adequacy across all hours of the year under a broad range of weather conditions, producing statistical measures of the risk of loss of load



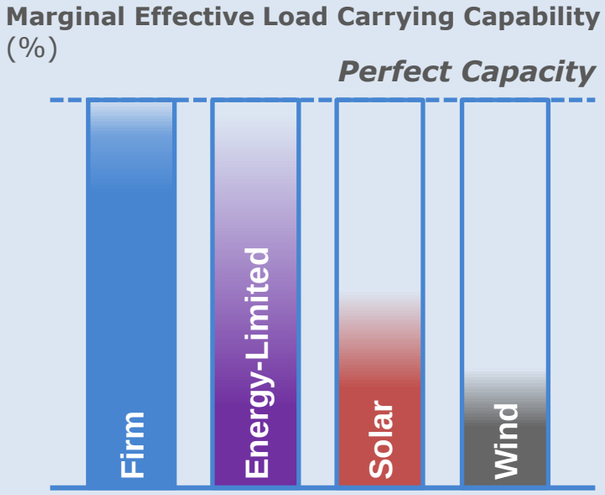
Identify the amount of perfect capacity needed to achieve the desired level of reliability

Factors that impact the amount of perfect capacity needed include load & weather variability, operating reserve needs



Calculate capacity contributions of different resources using effective load carrying capability

ELCC measures a resource's contribution to the system's needs relative to perfect capacity, accounting for its limitations and constraints



RELIABILITY **CHALLENGES**

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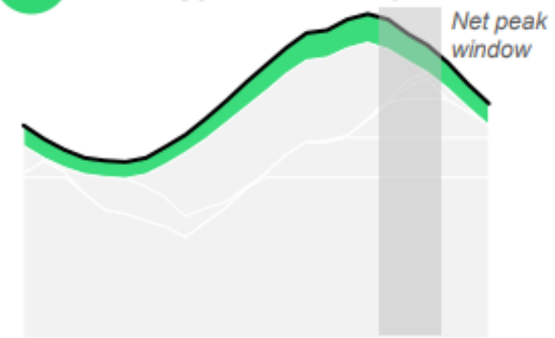
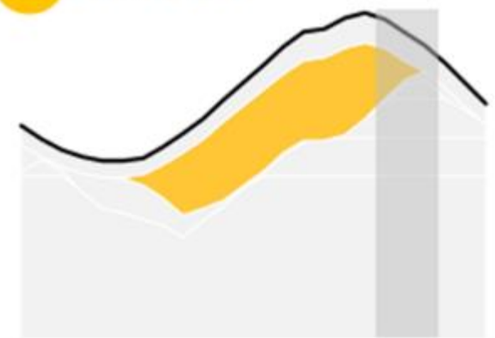
RESOURCE **CAPABILITIES**

1 Energy Efficiency



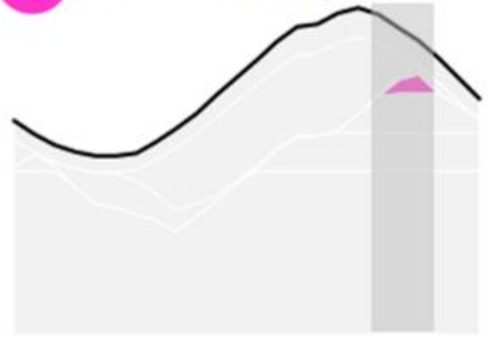
Reduces load in all hours, including peak periods

2 Solar PV



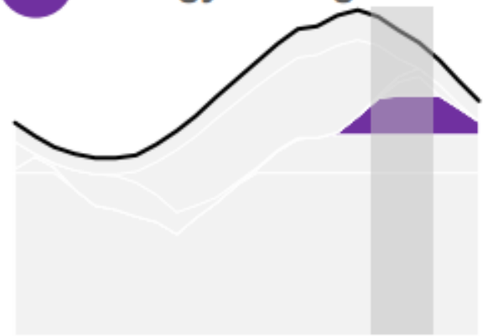
Provides low-cost, abundant energy during daylight hours

3 Demand Response



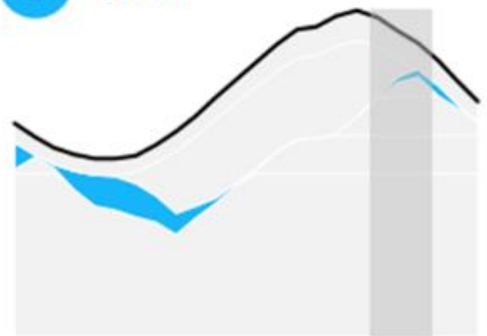
Meets peaking needs for short periods on most critical days

4 Energy Storage



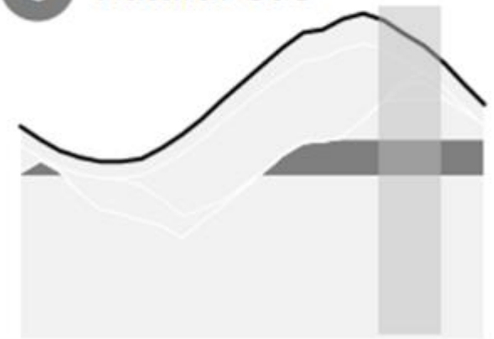
Meets peaking needs with limited duration

5 Wind



Provides low-cost energy with high variability

6 Natural Gas



Meets peaking needs and can generate for longer periods if needed

Blueprint for a Low Carbon Grid

Scalable Low-Cost Clean Energy Resources

Today: wind, solar, efficiency

Future: nuclear SMR, CCS

Balancing Resources

Today: batteries, pumped storage, hydro, demand response

Future: advanced flexible loads, other storage technologies

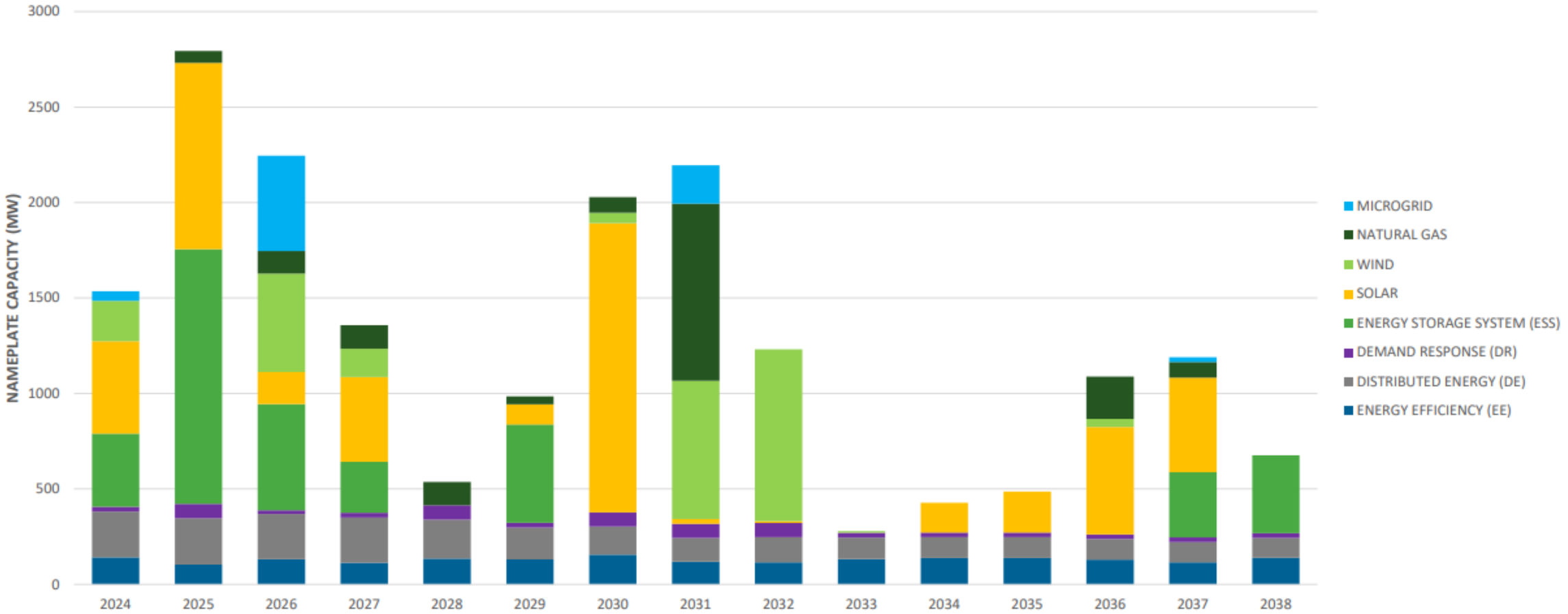
Firm Resources

Today: nuclear, natural gas, geothermal

Future: hydrogen, long-duration storage, nuclear SMR, CCS

ANNUAL **NEW GENERATION NEEDS**

2023 INTEGRATED RESOURCE PLAN - PREFERRED SCENARIO (2023-2038)



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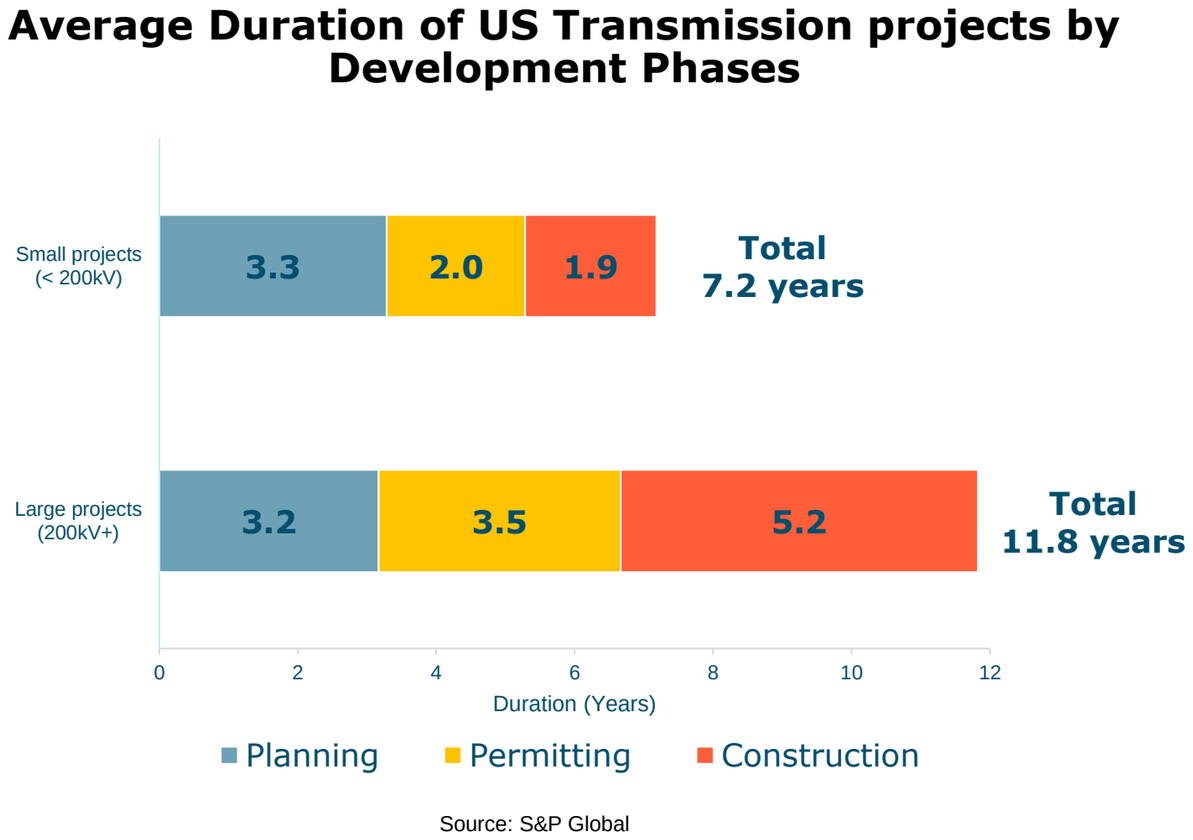
TRANSMISSION DEVELOPMENT **TIMELINES**

- Transmission development timelines vary based many factors including project voltage, line length, and permitting requirements
- E3 analyzed data for transmission projects expected to come online from 2023 onwards across the United States and found that the average time to develop small (< 200 kV) projects and the average time to build large projects (>200 kV) is 12 years
- The tail ends of these timelines could be significantly longer – with small projects taking up to 11 years and large projects taking up to 18 years to get built



Source: S&P Global

Notes:
1. Planning timeline has been assumed to be the time between public announcement and initiating the permitting process
2. COD is assumed to mark the end of the construction period.
3. Average length of small projects analyzed is 18.2 miles. Longer transmission could have higher construction times.
4. Average length of large projects analyzed is 190 miles

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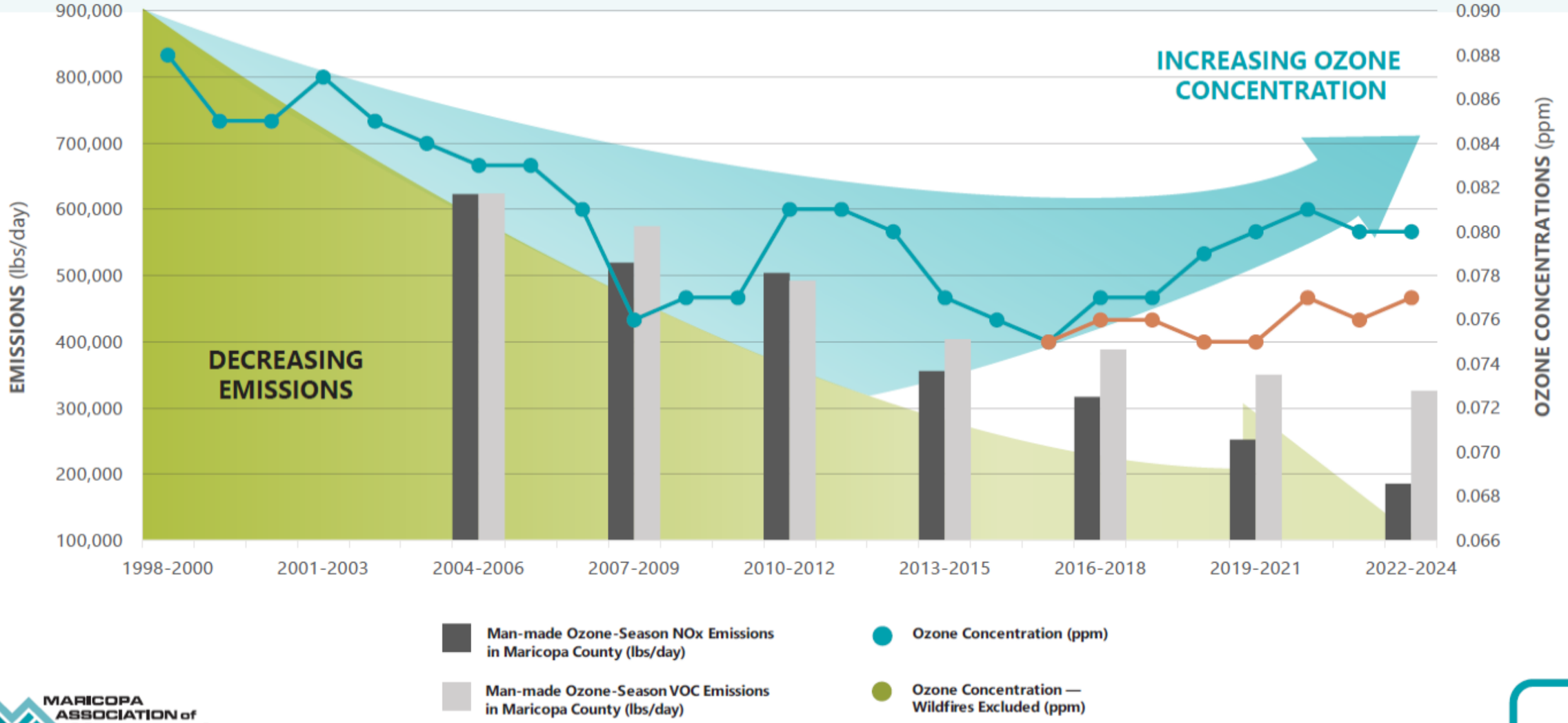
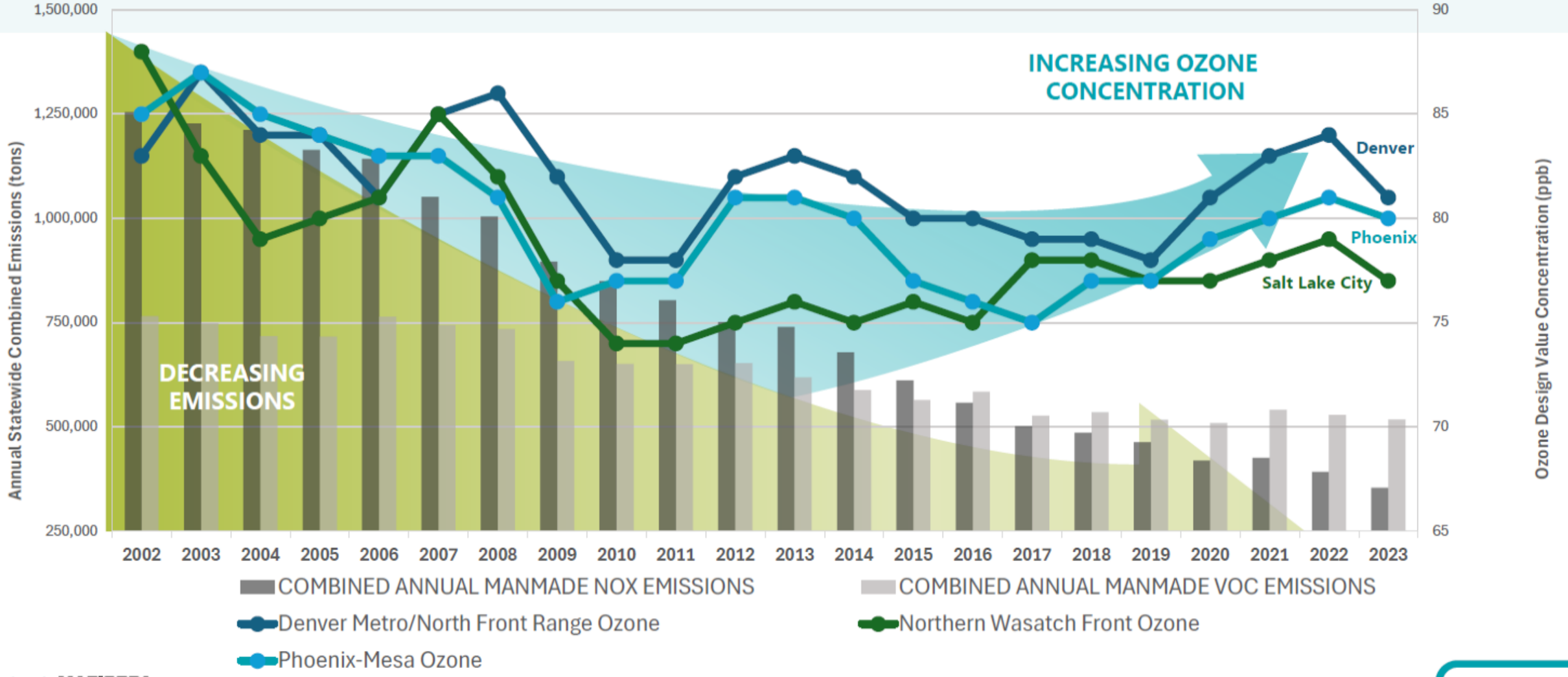
Ozone Challenge – Decreasing Emissions, Increasing Concentrations



MARICOPA ASSOCIATION of GOVERNMENTS

Same Pattern Observed Across the Intermountain West



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EMISSION REDUCTION CREDIT (ERC) REQUIREMENTS

	ATTAINMENT	MARGINAL	MODERATE	SERIOUS	SEVERE	EXTREME
New Large Source	100	100	100	50	25	10
Required ERCs	0	110	115	60	32.5	15
Change to Large Source	40	40	40	25	25	
Required ERCs	0	44	46	30	32.5	

MARICOPA ASSOCIATION of GOVERNMENTS

ERCS AVAILABLE IN MARICOPA COUNTY

MARICOPA ASSOCIATION of GOVERNMENTS

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