Energy Affordability: The Rapid Rise of Electricity Prices in CA from 2018-2024 and Implications for Microgrid Development

Presented by James Dodenhoff
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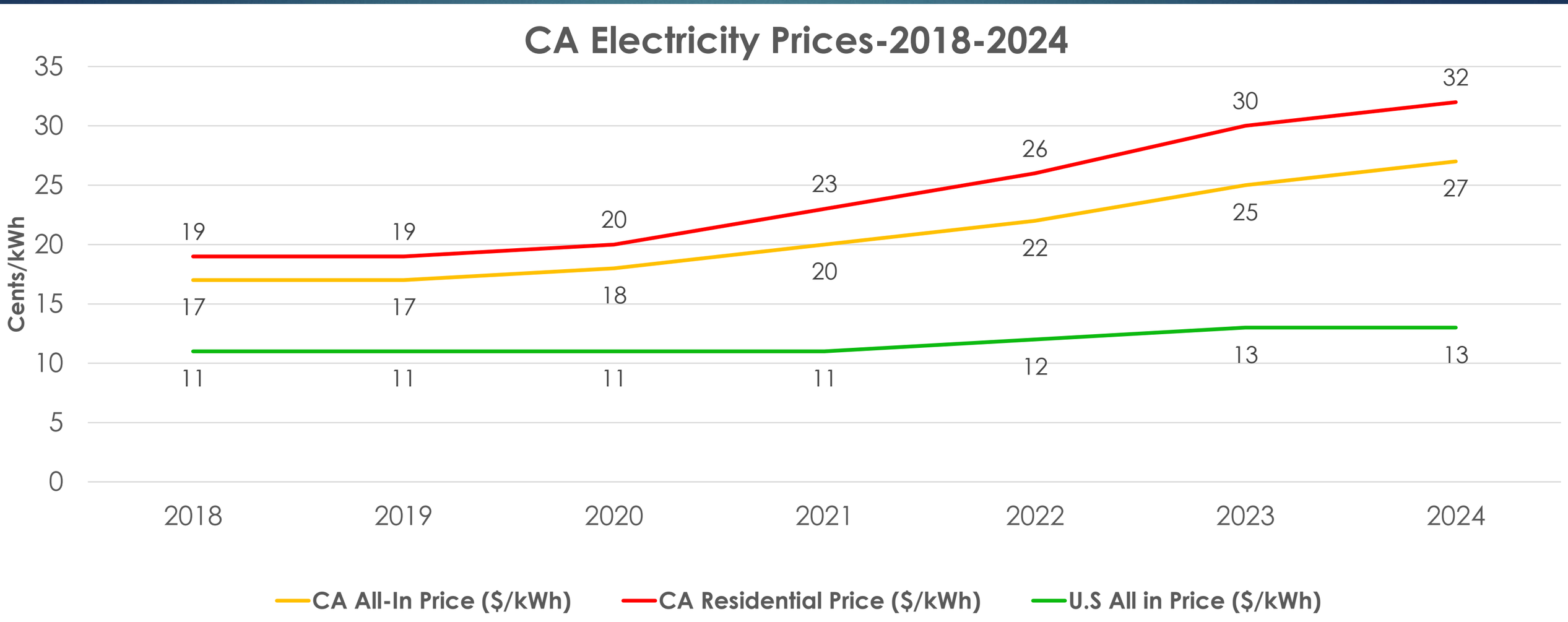
All-In Electricity Prices in CA: 2018 vs 2024



Source: U.S. Energy Information Administration Data

Electricity Price Comparison to Sample States

Source: U.S. Energy Information Administration Data

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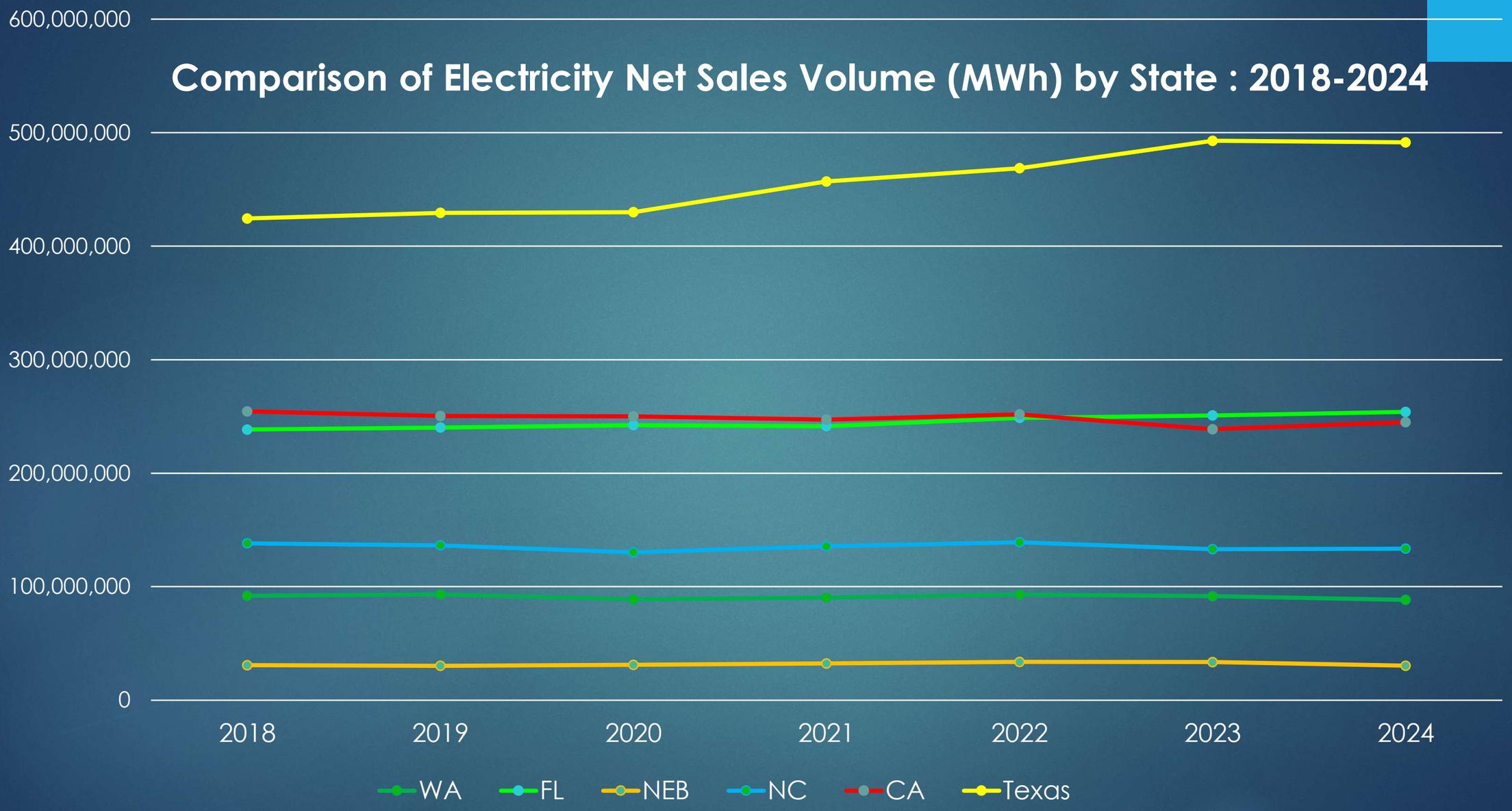
Volume Trends in Retail Electricity Sales to Customer



Source: U.S. Energy Information Administration Data

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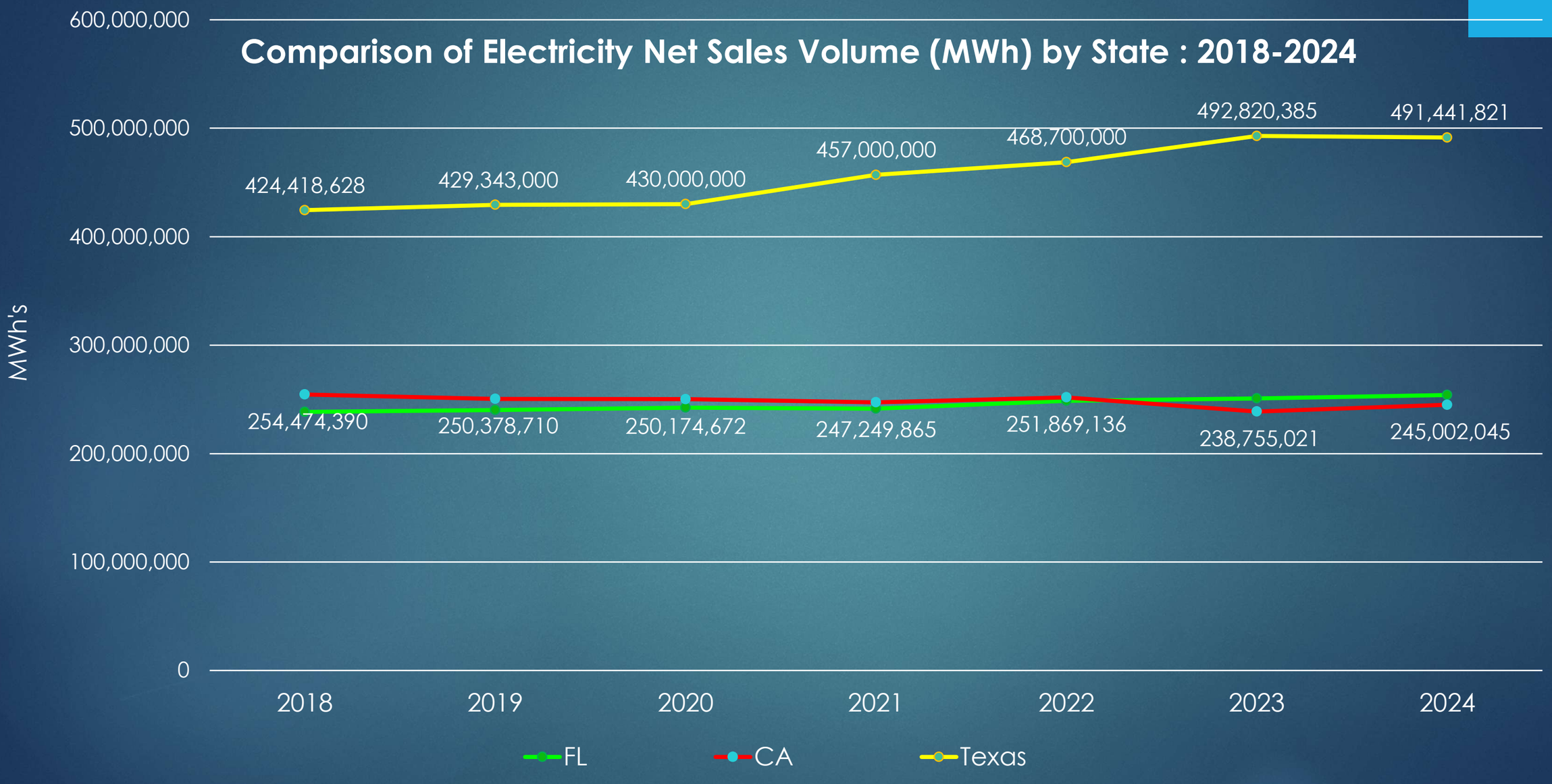

Source: U.S. Energy Information Administration Data

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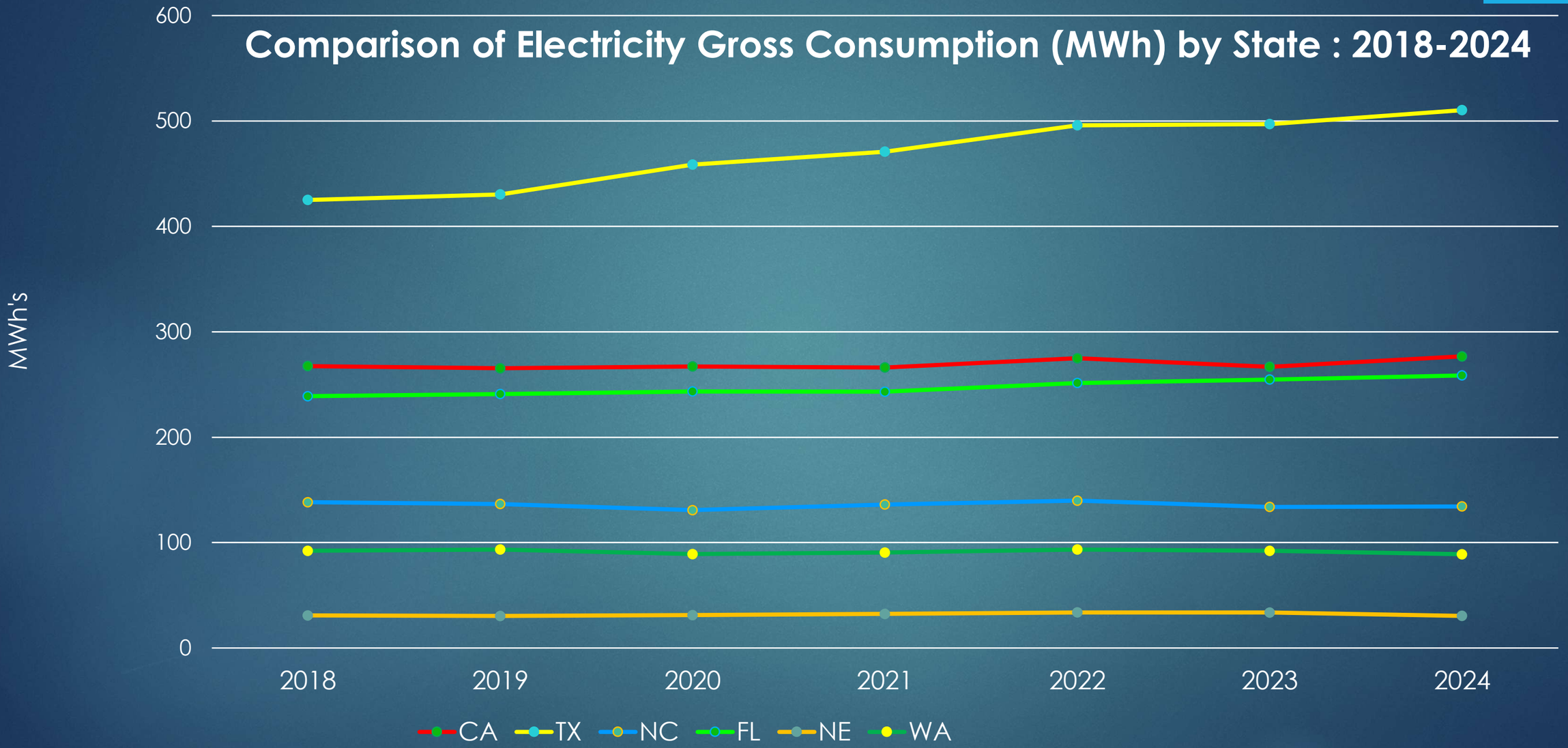
Volume Trends in Retail Electricity Consumption by End-Use Customer



Source: U.S. Energy Information Administration Data

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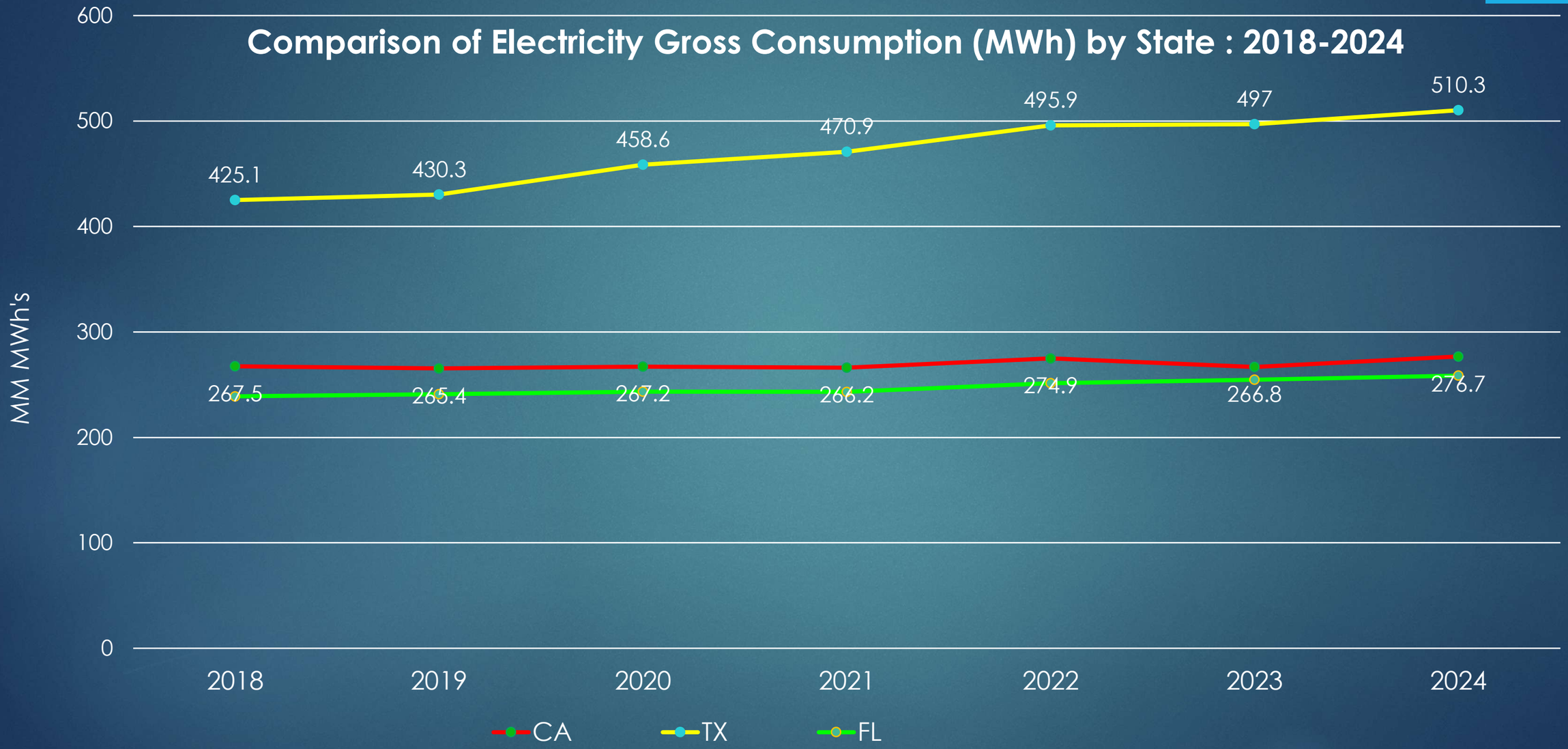

Source: U.S. Energy Information Administration Data

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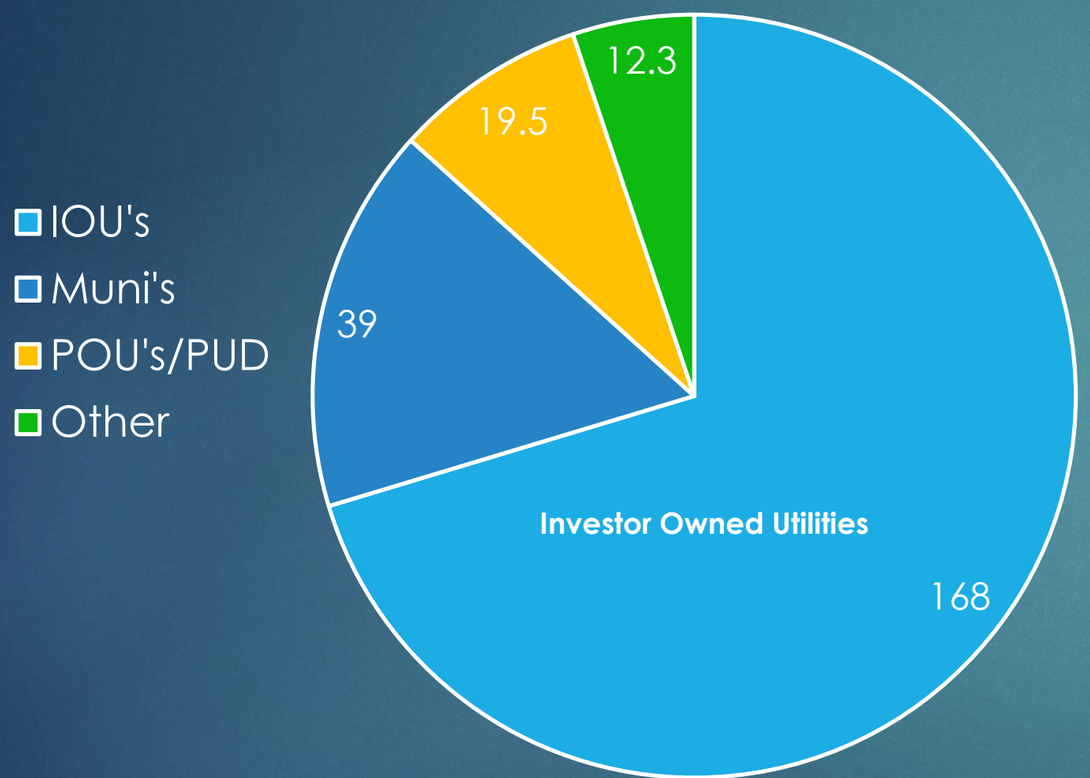
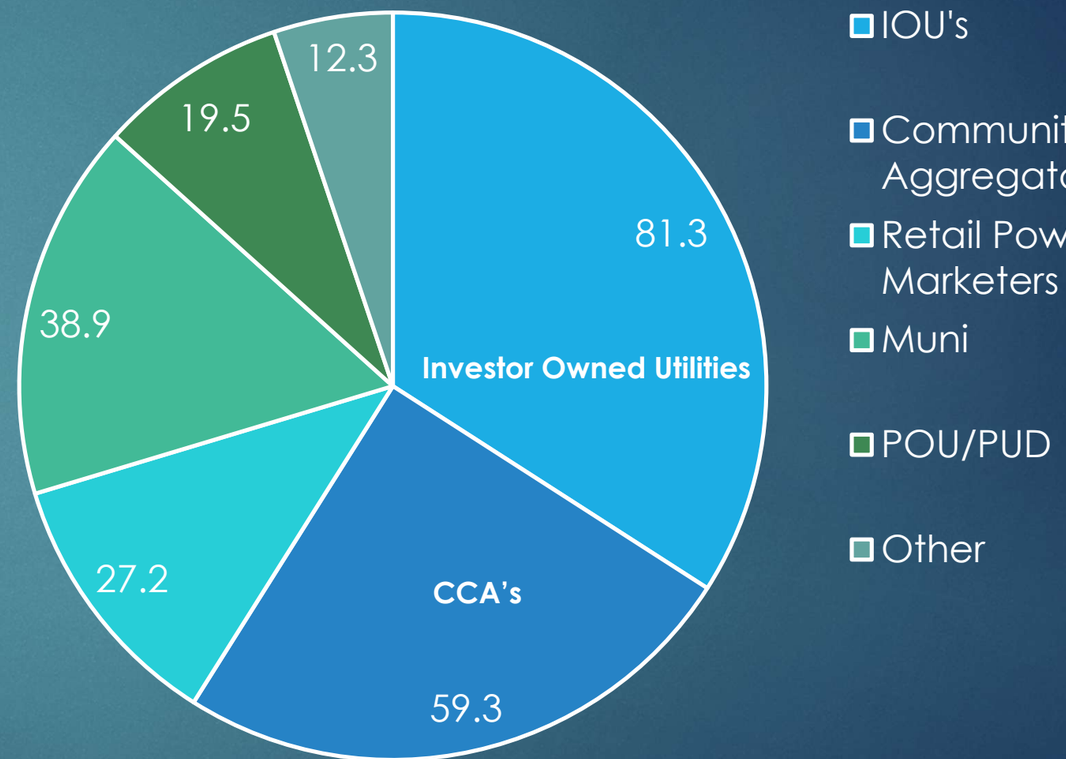
Electricity Service Provider Ownership
CA-2023: What Type of Entities provide electricity service?

Transmission & Distribution (MM MWh's)



Generation (MM MWh's)



Investor-Owned Utilities Provide the Majority of Electricity Services in Most States and Drive Pricing Trends

Source: U.S. Energy Information Administration Data

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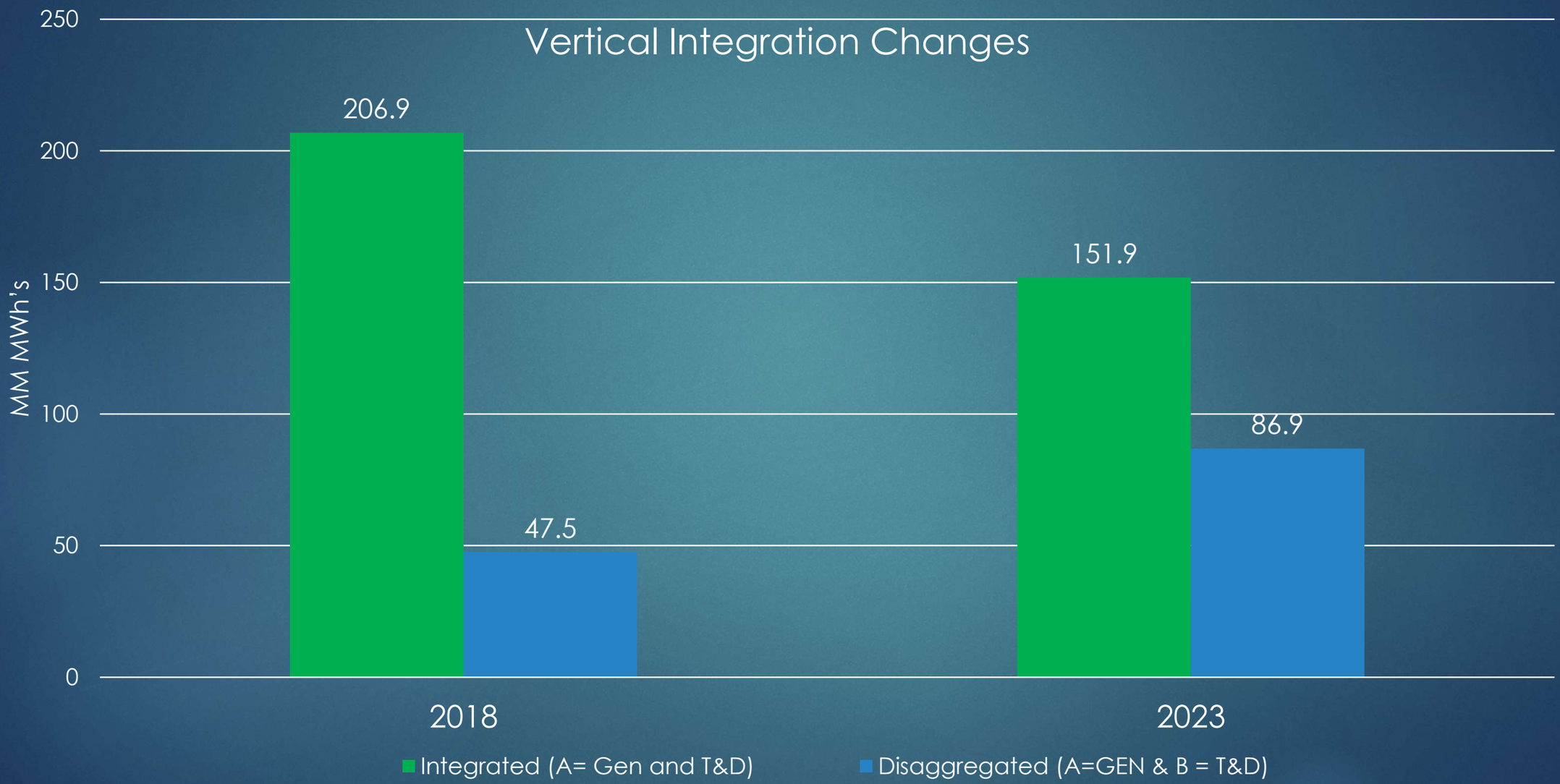
CA-Fully Integrated vs Disaggregated: 2018 vs 2023 Volume Comparison



Source: U.S. Energy Information Administration Data

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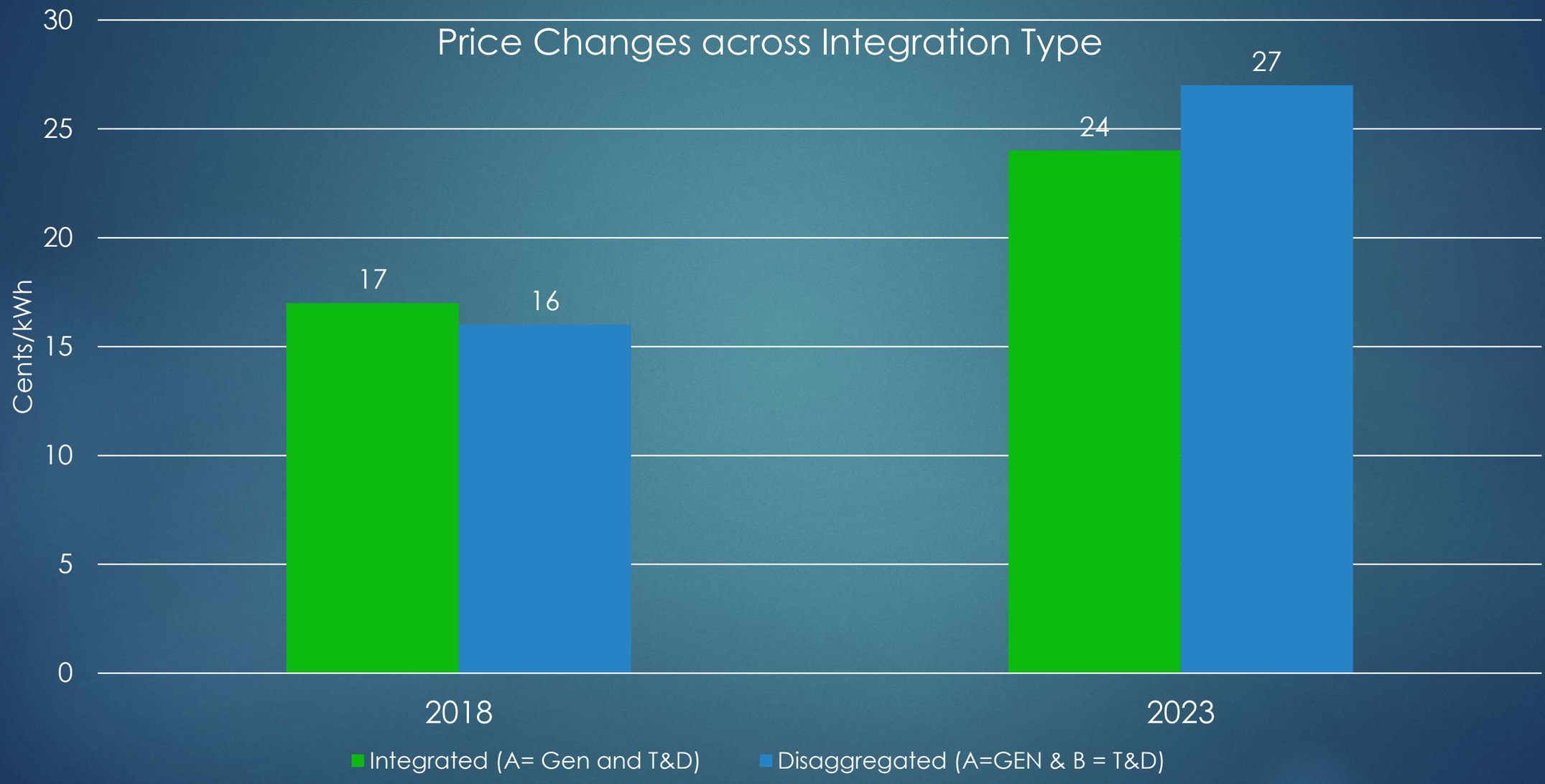

Source: U.S. Energy Information Administration Data

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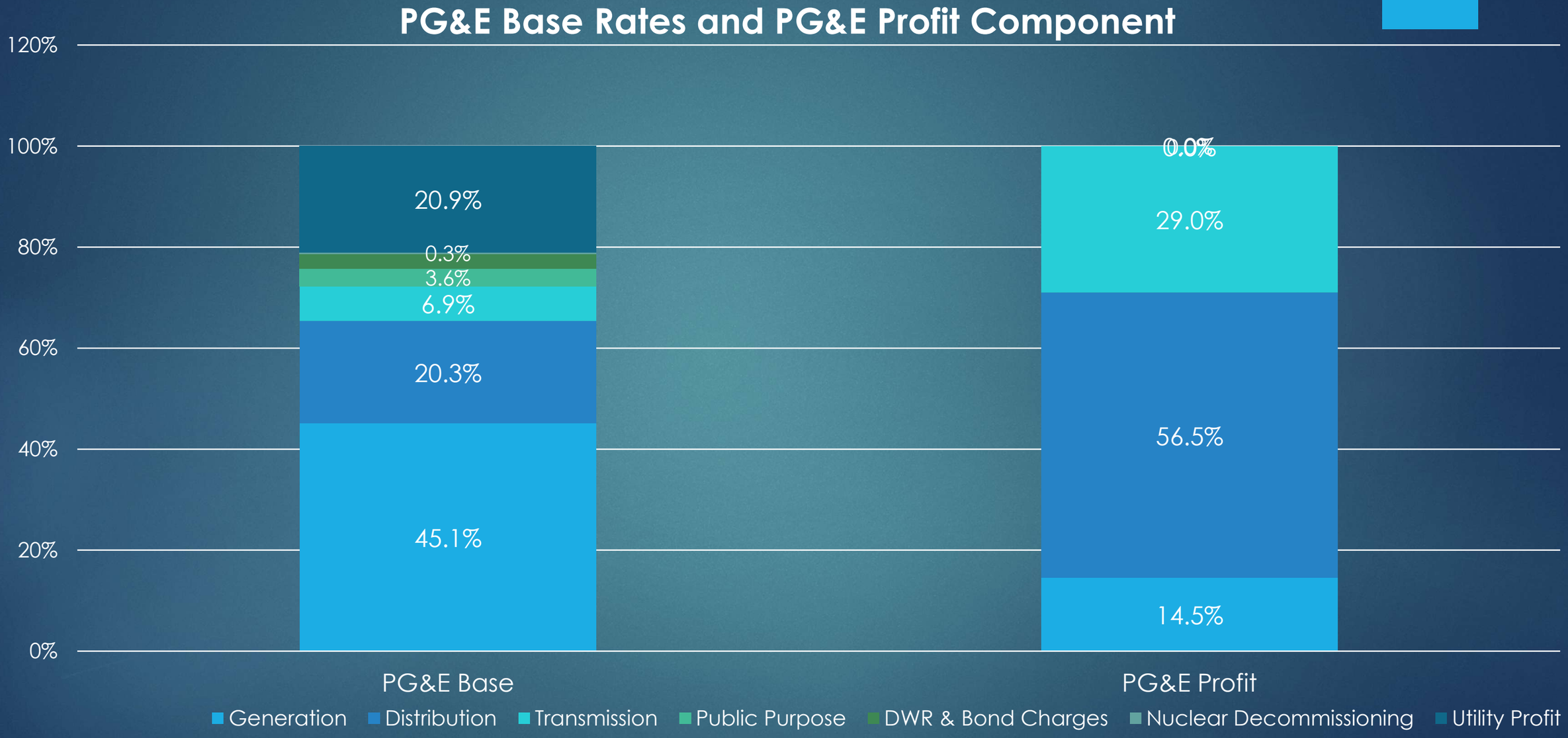
CA- Breakdown of Cost Elements Driving PG&E Electricity Rates-2023



Source: PG&E-CPUC AB 67 Report (2023 Edition), Utility General Rate Case Filings, CPUC Decisions on Authorized ROE/Cost of Capital

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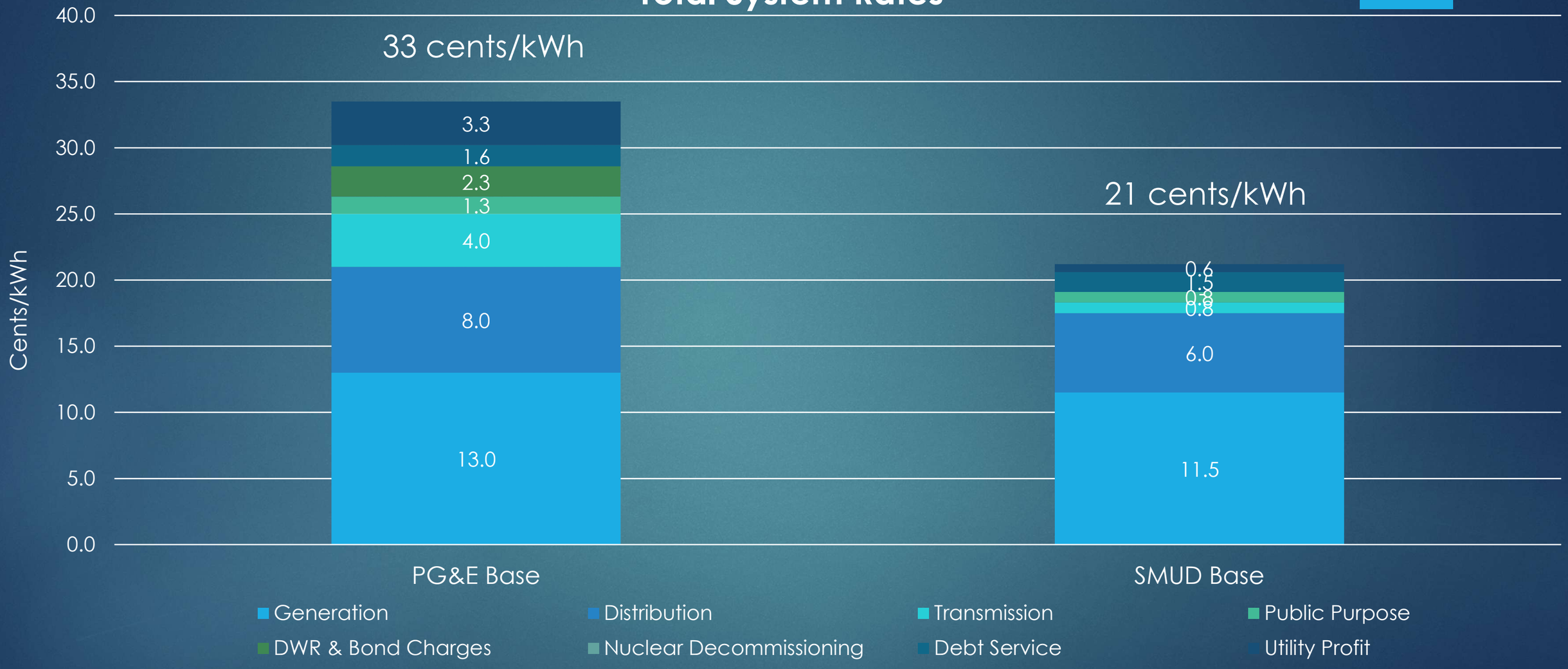
CA- Comparison of SMUD Base Rates vs PG&E Base Rates-2023



Source: CPUC AB 67 Report (2023 Edition), Utility General Rate Case Filings, CPUC Decisions on Authorized ROE/Cost of Capital; SMUD; **Sacramento Municipal Utility District (SMUD).** *2023 Annual Report: Five-Year Summary and Audited Financial Statements.* Sacramento, CA: SMUD, 2024. Available at: https://www.smud.org/-/media/Documents/Corporate/About-Us/Company-Information/Reports-and-Documents/2025/SMUD-2024-Audited-Financial-Statements.ashx

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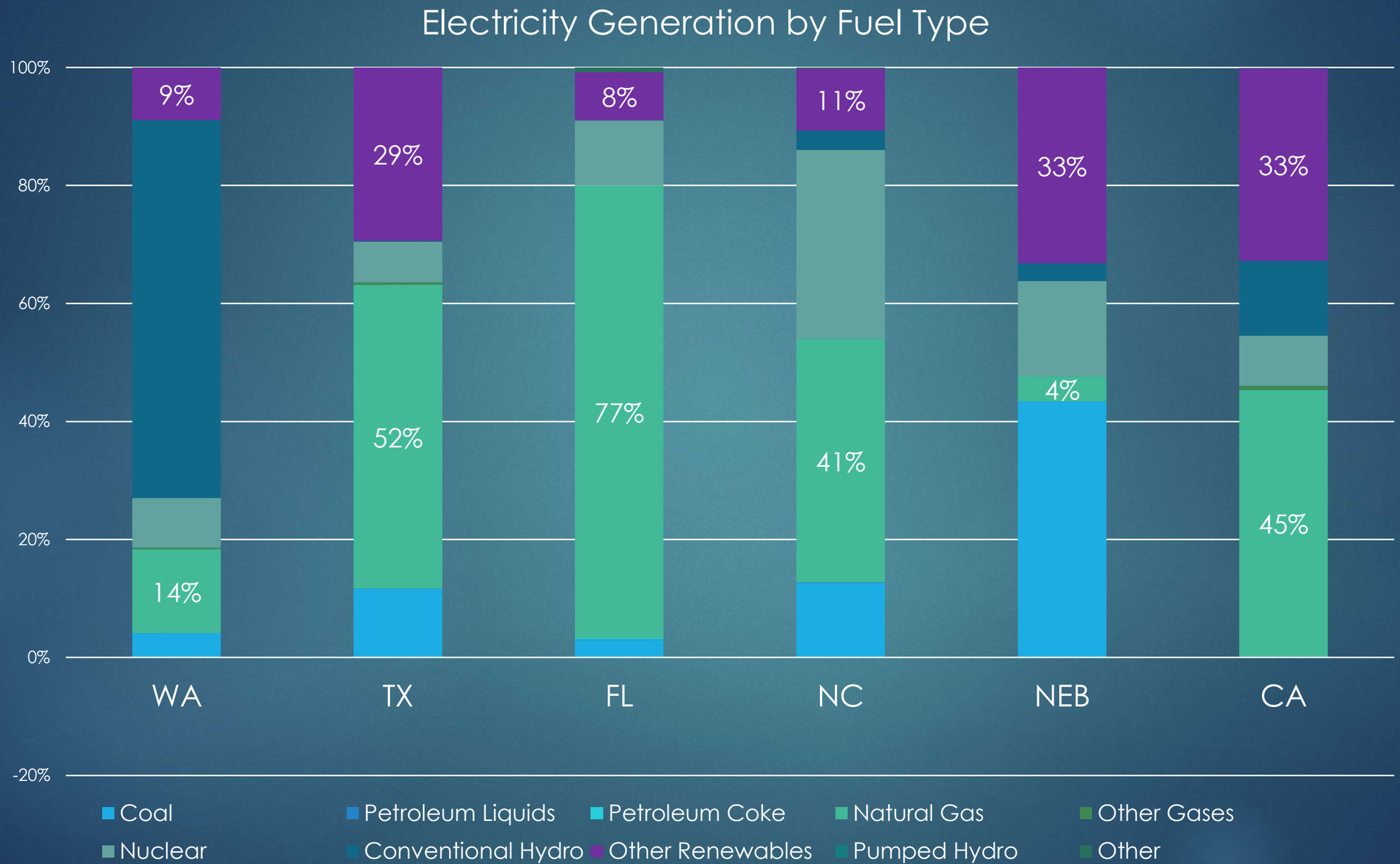
Comparison of Generation Type by Fuel Type



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Fly-Over of Unique Cost Drivers that have increased IOU electricity prices in CA

Cost Driver	Cost Category	Contribution to Rate Increases
Wildfire Mitigation Costs and Grid Hardening	Transmission & Distribution	15-20%
Erosion of Utility Sales Volume from RE (aka Solar Cost Shift)	Primarily Transmission & Distribution	10-15%
Erosion of Utility Sales amidst "decoupled" ratemaking	Primarily Transmission & Distribution	5-10%
Regulatory Mandates	Generation and Interconnect	5-10%
Capacity Based Buffer Requirements for LSE Resource Adequacy	Generation	5-15%
Fuel Cost Volatility (Natural Gas)	Generation	0-5%
High Cost of Capital, Finance Charges	Profits and Interest Expenses	5-10%

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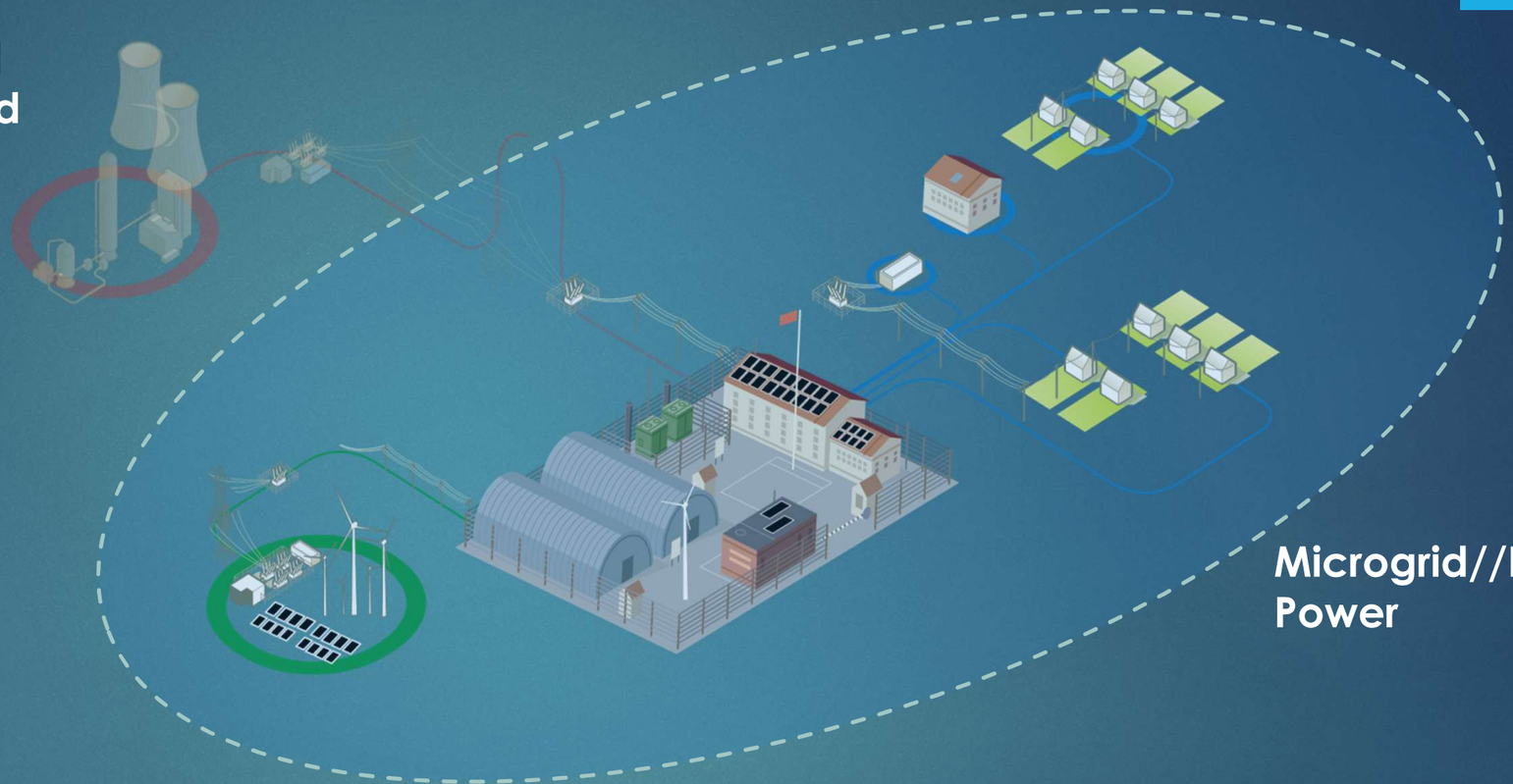
Implications of Utility Connected Pricing for Microgrids



Feasibility Study → Financing → Design & Engineering → Construction → Factory Testing → Install/ Commissioning → Training → Operations & Maintenance

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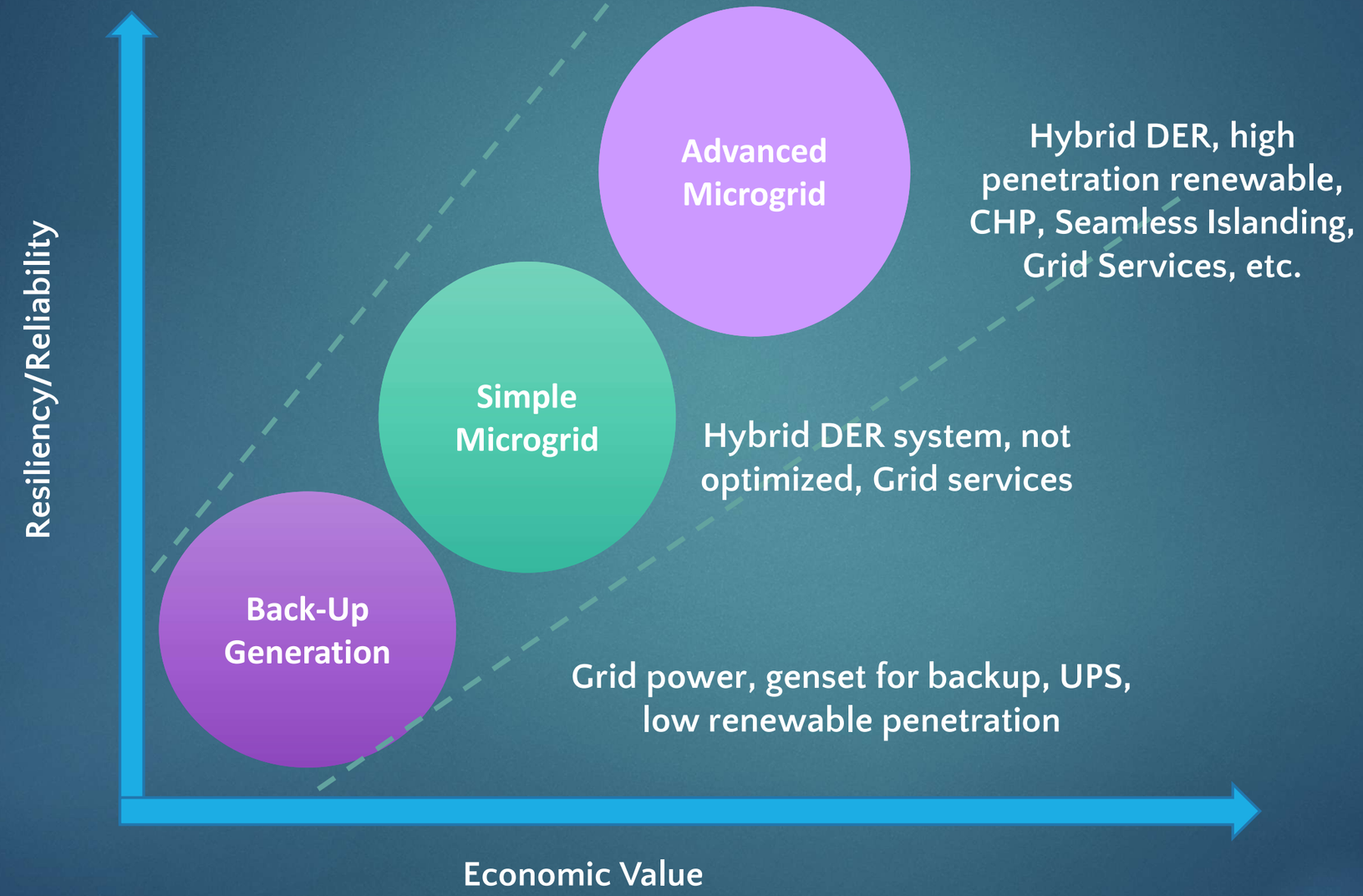
Microgrid Capabilities (Value) Grow with Complexity



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Customer Use Cases Drive Sensitivity to Grid Connected Electricity Prices

Economics/Cost Minimization	**Islanded Mode of Operation (Resiliency)**
Carbon Minimization/Green Ops	**Grid Connected Mode of Operation**
Peak Load Shaving	**Demand Response/ Critical Load Support**
Grid Connected Transition	**Islanded Transition**
Regulatory/Local Planning Compliance	**EV Integration**
DER Optimal Power Flow	**Optimal Economic Dispatch**
Frequency Control	**Extreme Weather Preparedness**
Volt/Var Control	**Integration with Existing ADMS System**
Power Quality	**DER Optimal Power Flow**
DER Monitoring, Control and Integration	**Storm Preparedness**
	Cost Minimization

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Conceptual Hospital Microgrid in San Diego

Current Paradigm

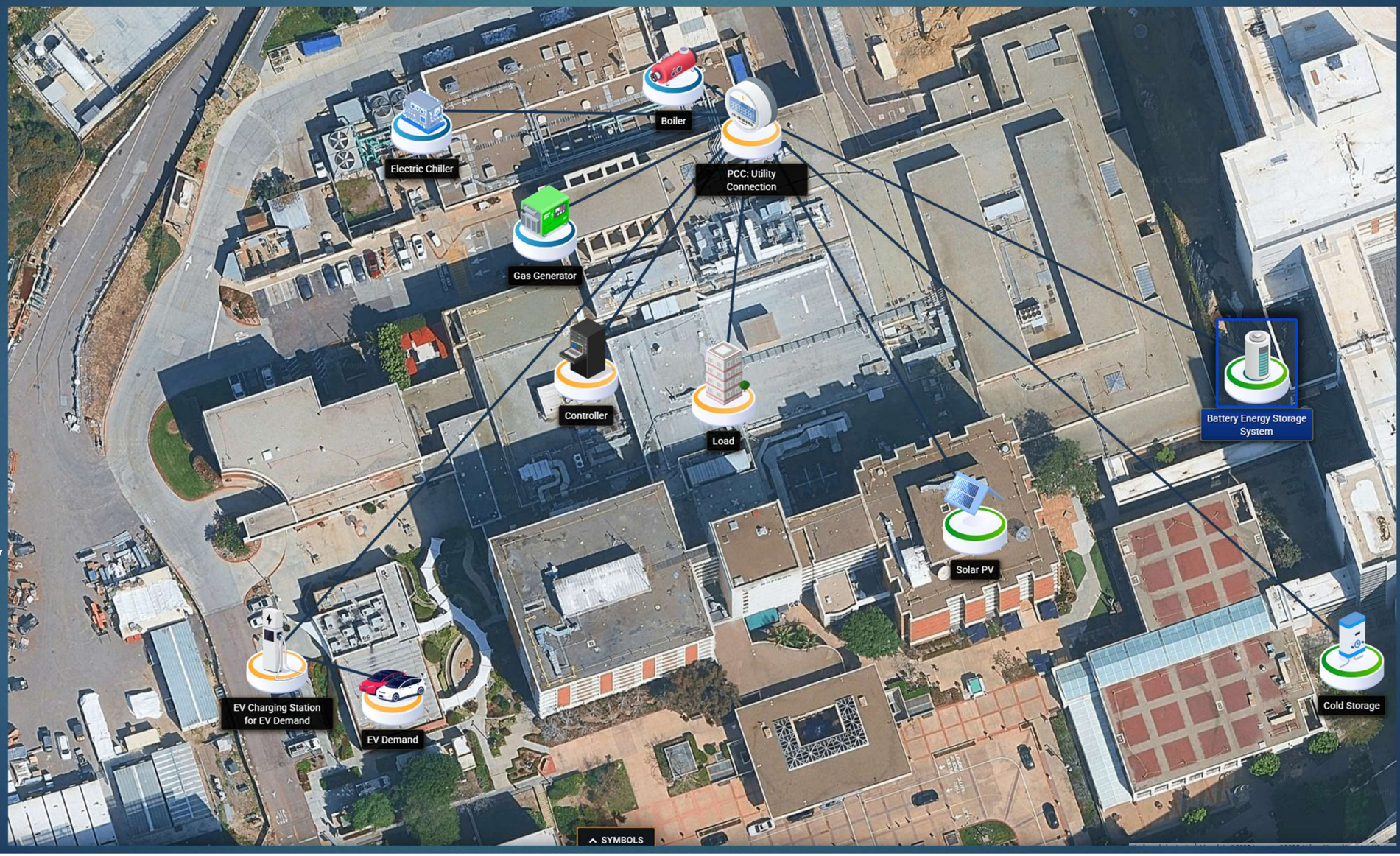
New Paradigm

Primary Gen Assets

Secondary Gen Assets

Back-Up Gen Assets

Primary Gen Assets



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Questions, Comments, or Observations

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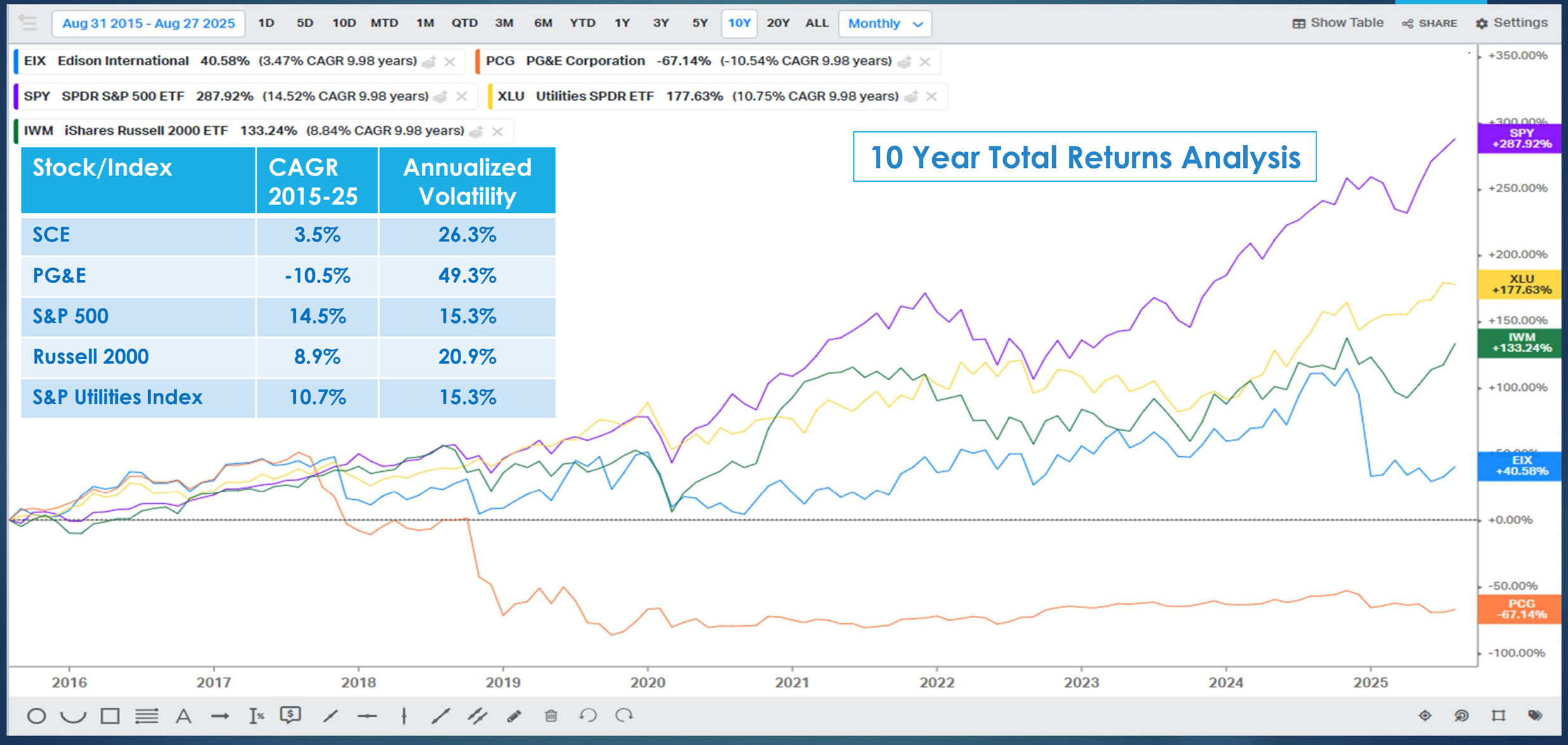
Safe, Reliable, and Affordable?
For Whom is the CA IOU monopoly working?

Stock/Index	CAGR 2015-25	Annualized Volatility
SCE	3.5%	26.3%
PG&E	-10.5%	49.3%
S&P 500	14.5%	15.3%
Russell 2000	8.9%	20.9%
S&P Utilities Index	10.7%	15.3%



Source: Koyfin

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Abstract and Bio

Electricity Affordability: The Rapid Rise of Electricity Prices in California from 2018-2024 and Implications for the Energy Transition

This presentation provides observations around the rapid rise of electricity prices in CA from 2018-2024. Energy Affordability has become the most important issue in the electricity industry in CA and in many states throughout the U.S. This preliminary work is focused upon California, but also provides price and volume comparisons with selected states including Texas, North Carolina, Florida, New Jersey, Pennsylvania, Michigan, Washington, and Nebraska. At this point in this project, we are particularly focused on characterizing the marketplace, both by type of service provider (e.g. IOU, municipal utility, coop, etc.) and by industry structure (e.g. fully integrated vs disaggregated generation). As we continue, we intend to develop a detailed analysis, quantification and comparison of cost and price increase drivers, providing the underlying reasons and root causes for CA electricity price increases since 2018 and a comparison against selected survey states. Lessons learned and unintended consequences will be provided which demonstrate how electricity affordability is impacting the energy transition in the U.S.

James Dodenhoff
Principal, Silent Running Energy Advisory Services
Culver City, CA

James is a leading expert in clean energy, decarbonization, and sustainability with over 25 years of experience reshaping the energy sector with particular focus on the Western U.S. Jim has held leadership, business development, management and consultative roles with a broad group of market participants including microgrid control solution providers, energy/advisory consulting firms, electric utilities, recycled product manufacturers and environmental service firms. Jim has previous stints in the clean energy space with Southern California Edison, DNV GL Energy, and S&C Electric. He currently runs his own firm, Silent Running Energy, an Energy Advisory firm for commercial and industrial businesses. Jim has an M.B.A in Strategy/Finance from the UCLA Anderson Graduate School of Management and a Bachelor of Science Degree in Energy Studies/Mechanical Engineering from Brown University.

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