

PULSE ON THE POWER MARKET //

Rising to the Challenge:

Enabling an Accelerated Energy Transformation



Neva Espinoza

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2025 GENERATION SYMPOSIUM



Rising to the Challenge

Enabling an Accelerated Energy Transformation



Neva Espinoza
Chief Generation Officer
EPRI

October 2025

EPRI Shaping the Future of Clean Energy Globally



40 COUNTRIES, 400+ ENERGY COMPANIES

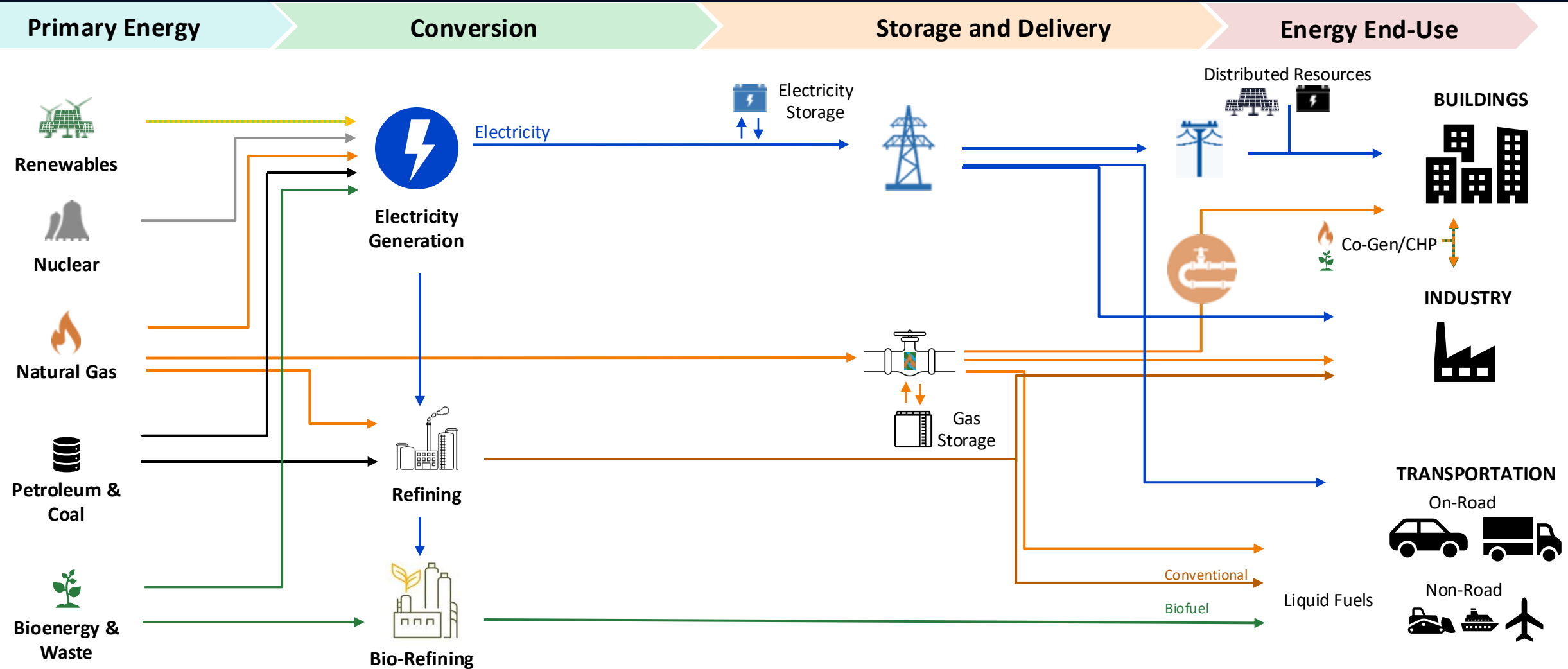
Independent

Non-Profit

Collaborative

ENERGY ECONOMY

Powering Prosperity and Protecting the Planet
globally electricity ~20% of end use

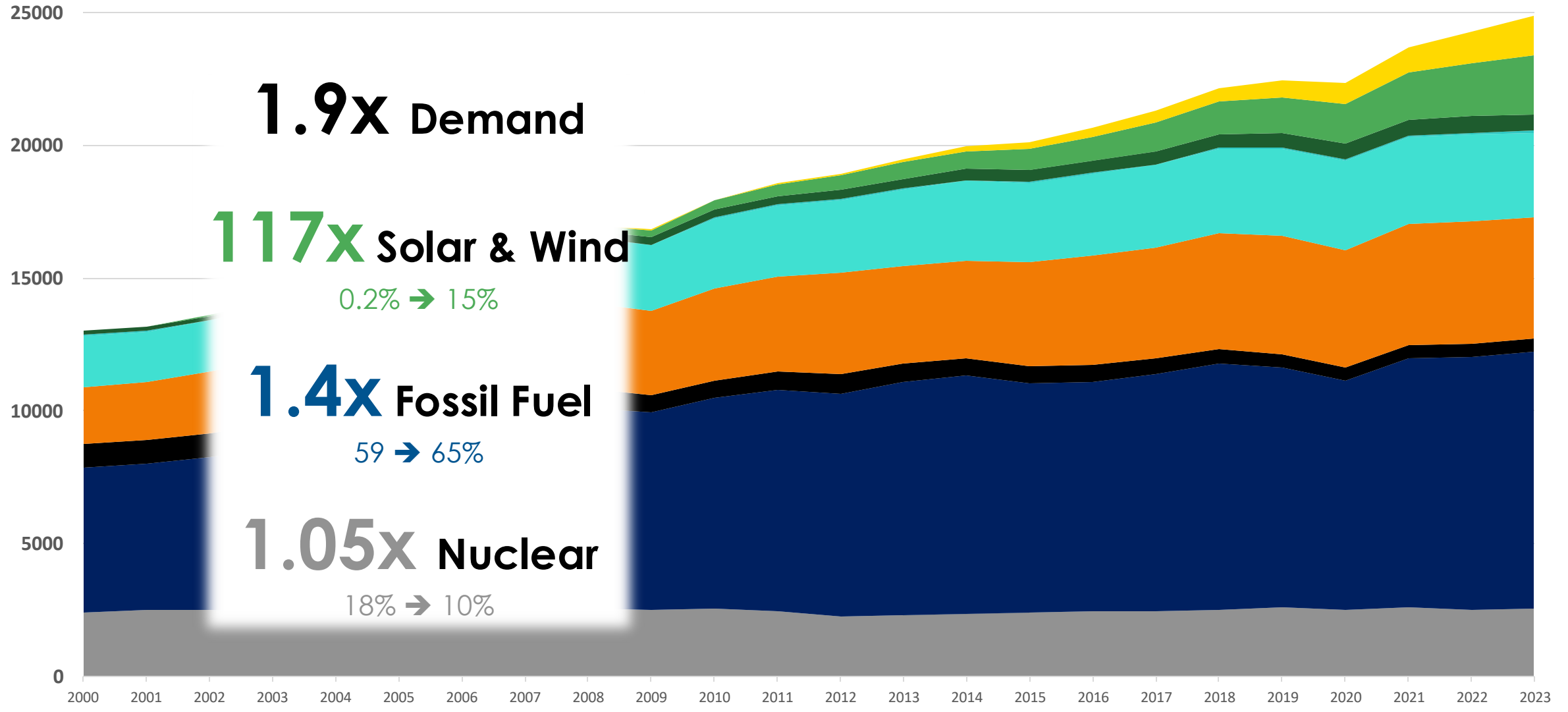




G20 Electricity Supply



TWh

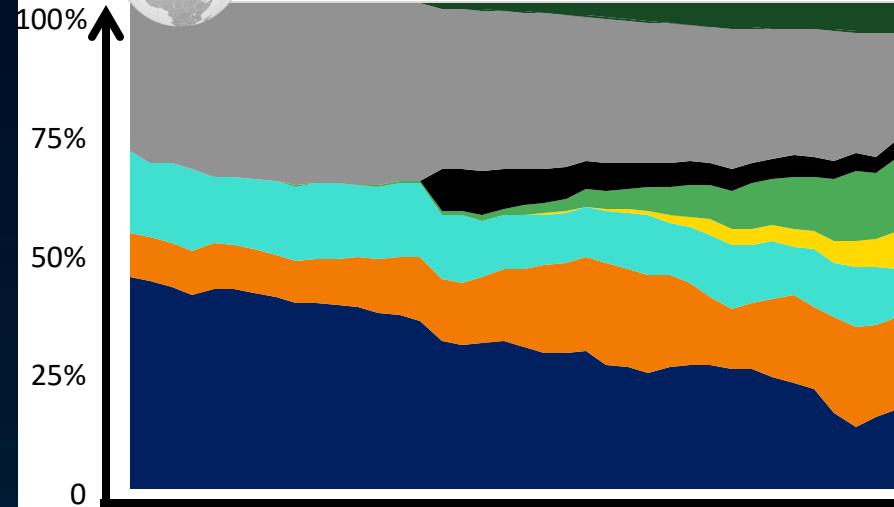




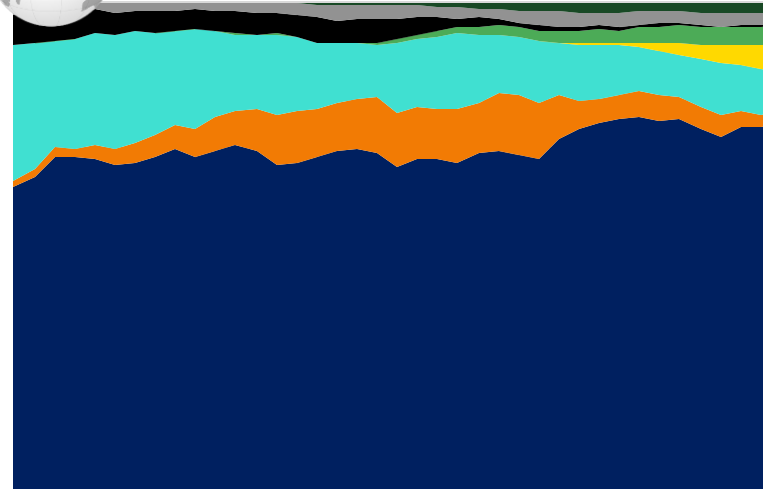
% Electricity by Source (1985 – 2023)



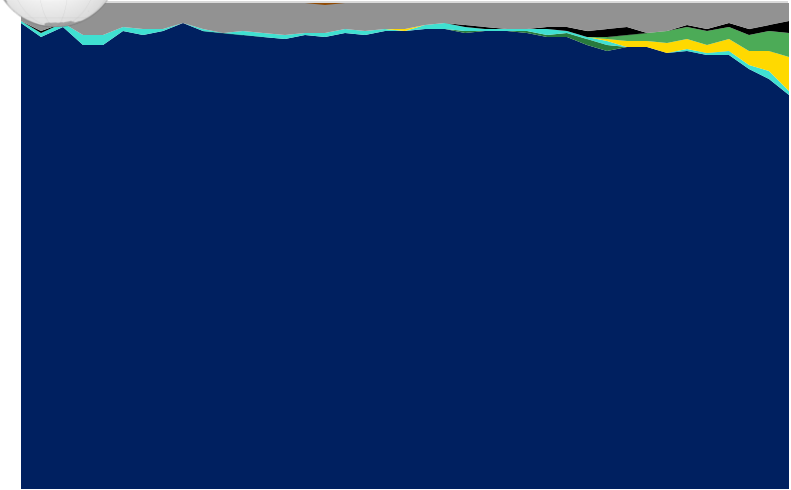
European Union



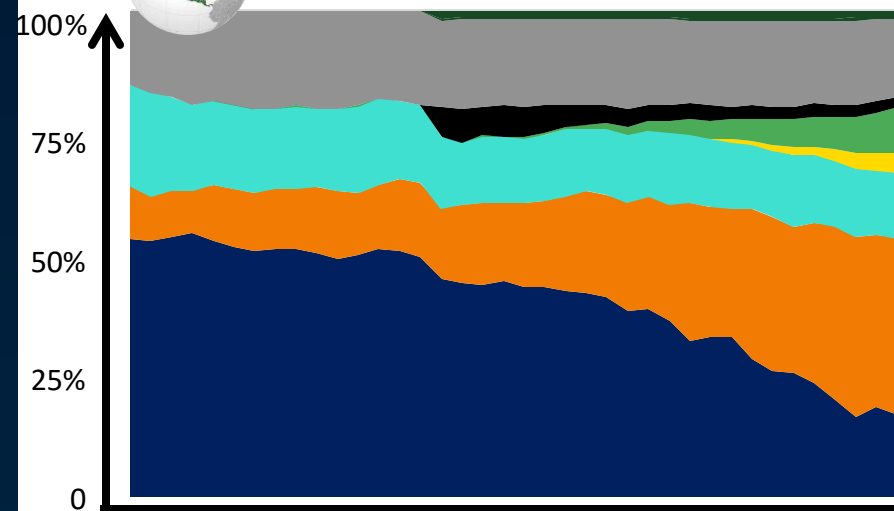
India



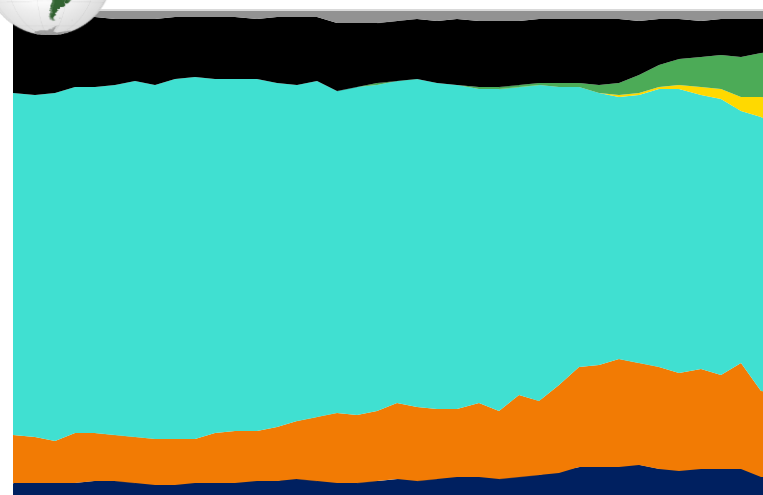
South Africa



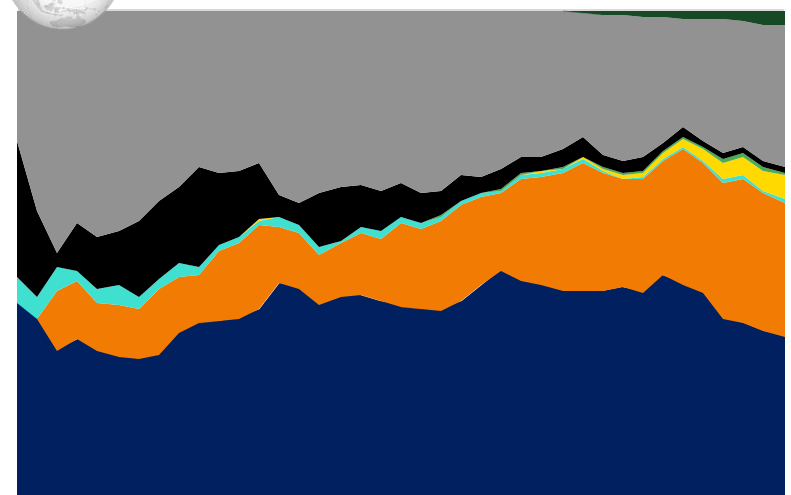
North America



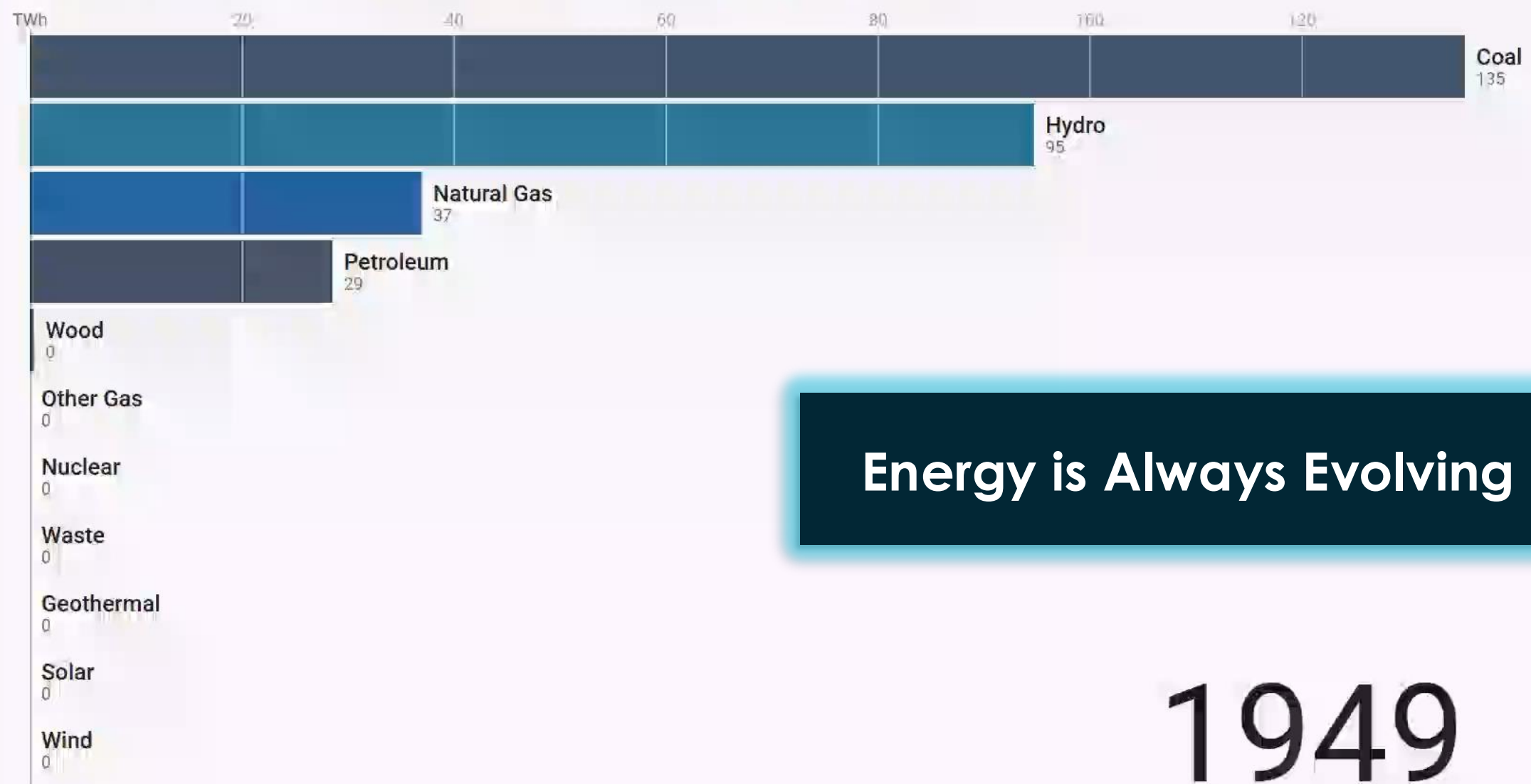
South & Central America



South Korea



Annual U.S. Net Electricity Generation (TWh) by Fuel Source, 1949-2024



Energy is Always Evolving

1949

Data source: U.S. Energy Information Administration (<https://www.eia.gov/electricity/data.php>) annual net electricity generation by type of energy source from all sectors (Table 7.2.A). "Hydro" represents conventional hydroelectric, excluding pumped storage. "Solar" includes utility-scale photovoltaic (PV), utility-scale solar thermal, and estimated small-scale PV (Table 1.1.A). Values are rounded to the nearest terawatt-hour (TWh) for each year indicated.

Lots of Uncertainty

Government Policies

Artificial Intelligence

Public Perception

Market Signals

Consumer Sentiment

Regulations

Company Risks

Technology Commercialization

2020

2021

2022

2023

2024

2025

2026

2027

2028

2029

2030

New US Policies and Approaches in 2025

- ⚠ Jan 20: National Energy Emergency
- 🛢 Jan 20: Unleashing American Energy
- 🏔 Jan 20: Alaska Resource Potential
- 🌊 Jan 20: Offshore Wind Leasing Halt
- 🛡 Apr 8: Protecting from State Overreach
- 🏭 Apr 8: Regulatory Relief for Stationary Sources
- 🔌 Apr 8: Grid Reliability and Security
- 📊 Apr 8: Zero-Based Regulatory Budgeting
- 📢 May 22: Emergency Order by Energy Secretary
- ☢ May 23: Reinvigorating the Nuclear Industrial Base
- ♻ Jun 11: EPA Repeal of Power Plant Rules
- 📄 Jul 4: One Big Beautiful Bill Act
- 🏠 Jul 7: Ending Foreign Energy Subsidies

2020

2021

2022

2023

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2025

2026

2027

2028

2029

2030

Challenging the 'Norms'



Resource Adequacy Report
Evaluating the Reliability and Security of the United States Electric Grid

July 2025

[DOE Resource Adequacy Report](#)



A Critical Review of Impacts of Greenhouse Gas Emissions on the U.S. Climate

Climate Working Group
United States Department of Energy
July 23, 2025

[DOE Impacts of GHG Report](#)

2020

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2020

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Reliable and Affordable

Inflation-Adjusted Annual Growth
2019-2024



While electricity prices increased 26.7% nominally from 2019-2024, the inflation-adjusted increase was only 0.6% annually - making electricity one of the most price-stable essentials during this inflationary period.

2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030

Times are a'changing...

Energy will continue to evolve...

Electric Sector can be THE key enabler...

Past is not a prelude to the Future if we don't think and act differently...

2020

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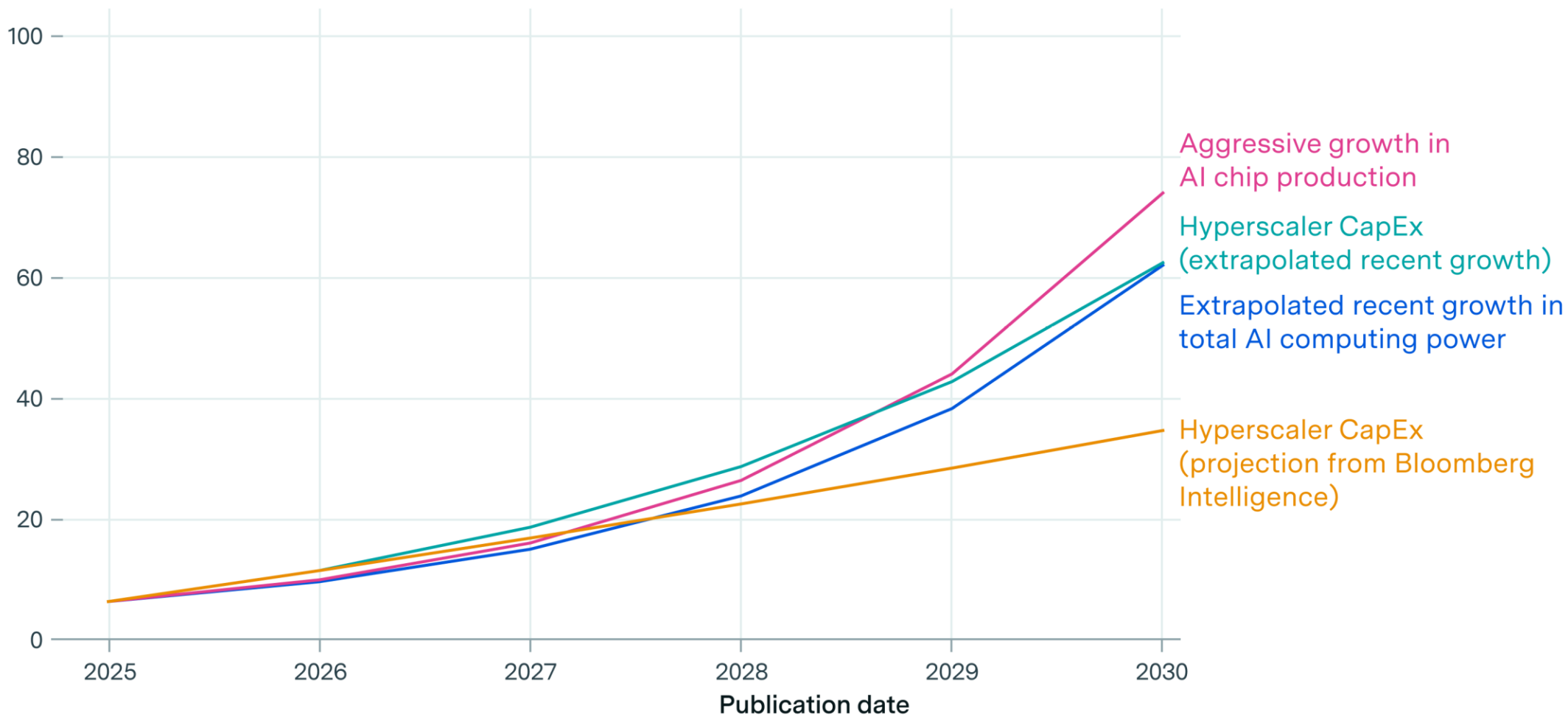


Data Center Demand

~35 – 75GW of new US demand by 2030

Forecasted total capacity of U.S. AI data centers

Power capacity (GW)



From 15-Year to 5-Year AI Chip Refresh Cycles

Chip Power Density is Skyrocketing

Next-Gen Upgrade Could **Double** Data Center Power Needs

~35 – 75GW → 70 – 150 GW???



Legacy to Future:
40 x Rack Power
Density Growth



Legacy 30kW



Current 300kW



Next Gen 1.2MW



H100
400 W



Blackwell B200
1,000 W

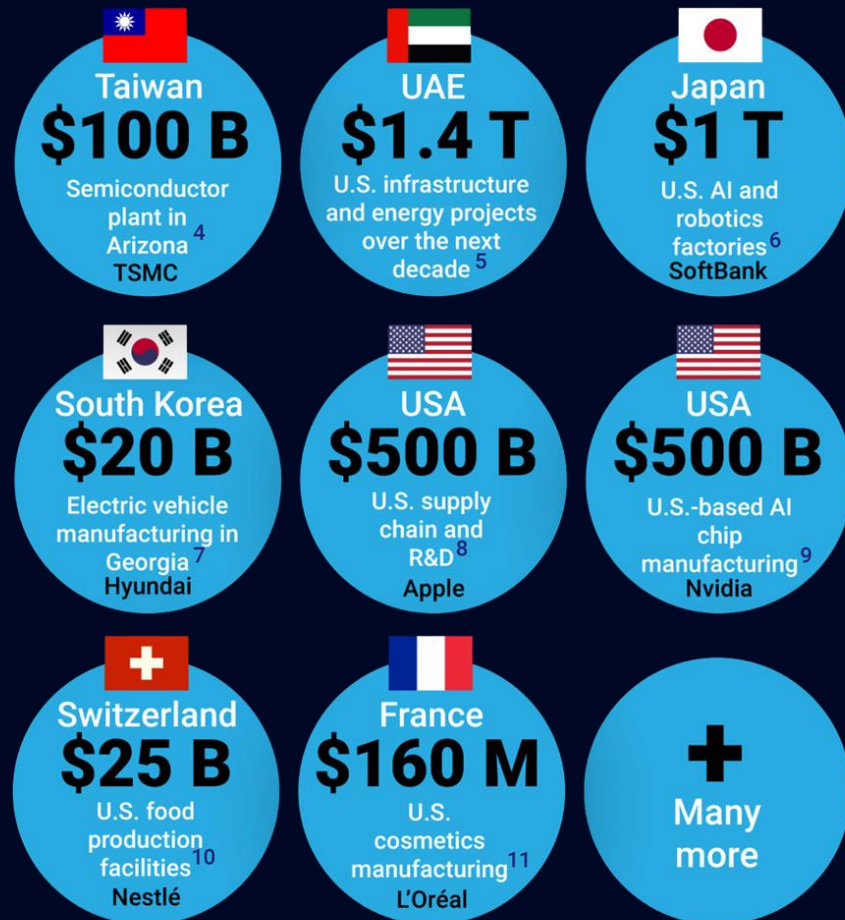


Future Rubin
Chip
1,800 W

"Your revenue is limited if your power is limited." – Jensen Huang

Beyond Data Center Demand: Onshoring

More than 20 industrial investment announcements in 2025



Major Onshoring Announcements



Apple commits \$600 billion U.S. investment over four years

August 7, 2025



GE Appliances invests \$490 million to relocate production to Kentucky

June 26, 2025

**High Onshore Manufacturing adds
~ 50GW Demand with New Industry**

Tech Giants Lock in 20-Year Power Deals

 **Meta**



Clinton
Clean
Energy Center

1.121 MW 20 years

 **Microsoft**



**Three
Mile Island**

837 MW 20 years

 **amazon**



Talen
Energy
Susquehanna

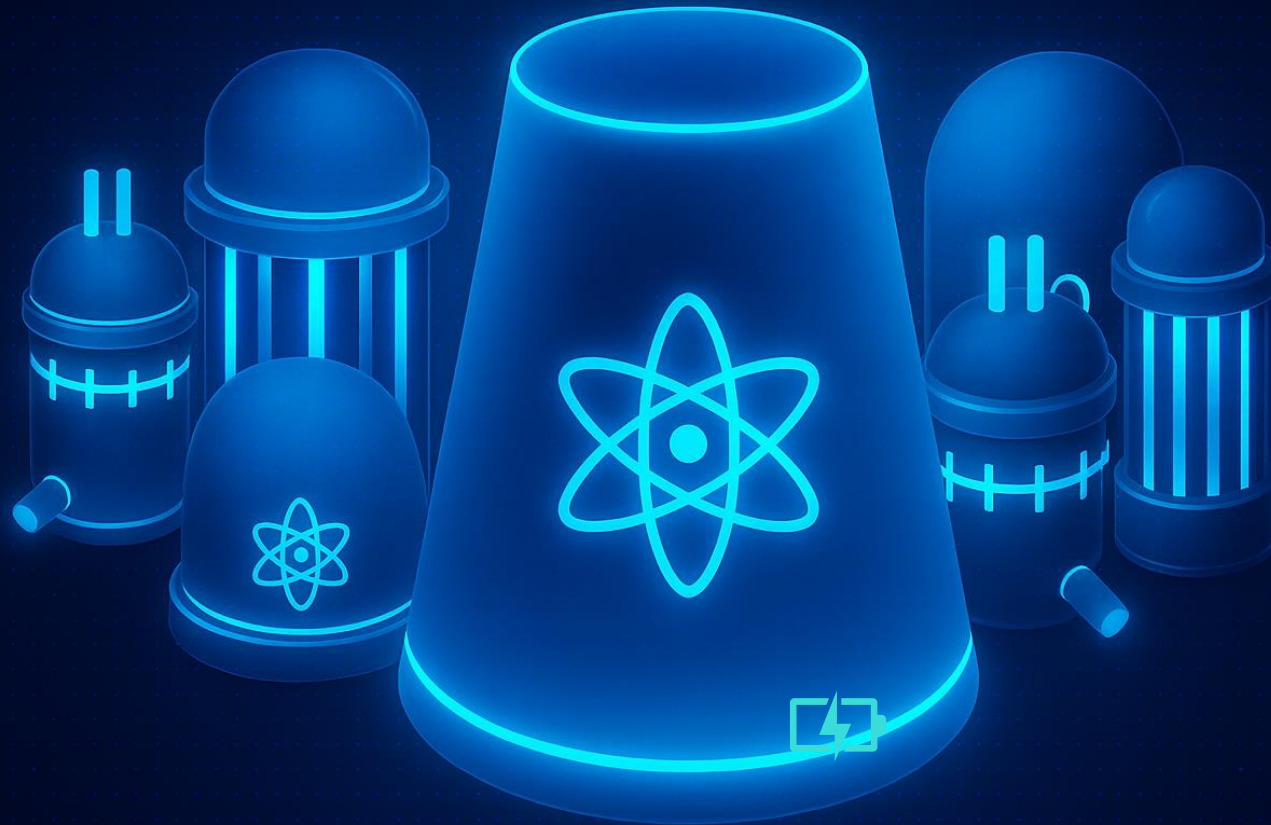
960 MW 20 years

 **Google**

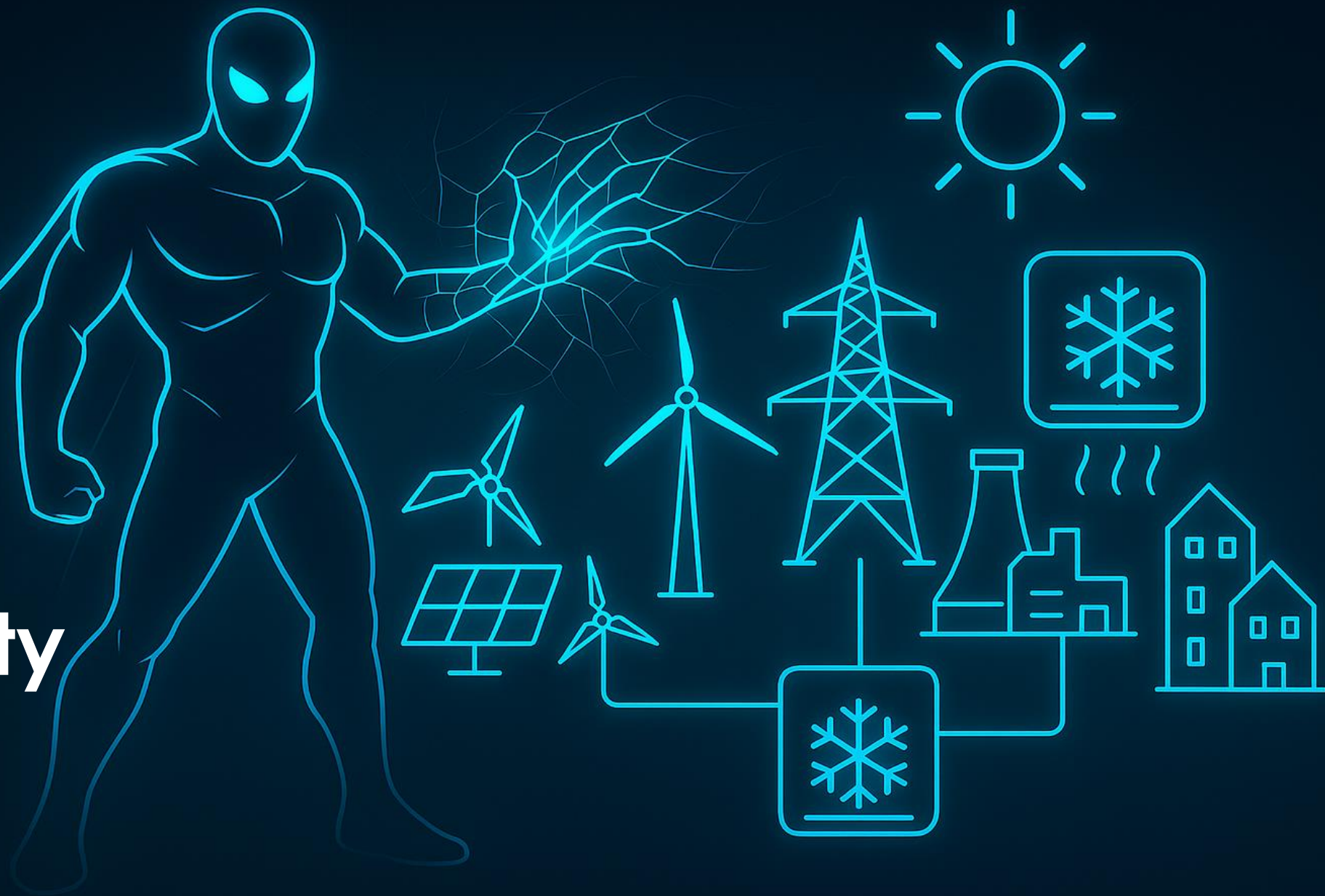


**Kairos
Power**
SMR Fleet

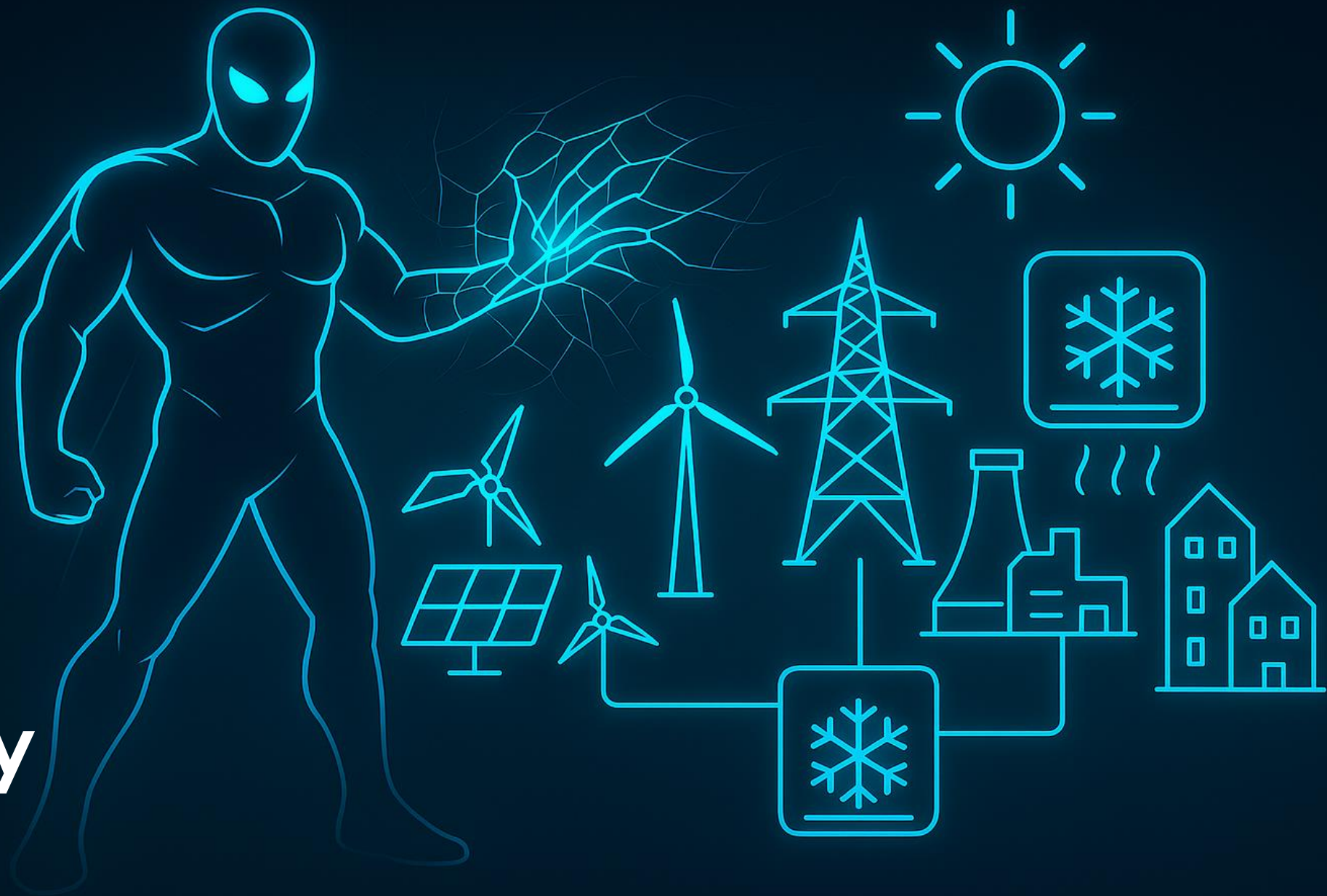
TBD 20 years

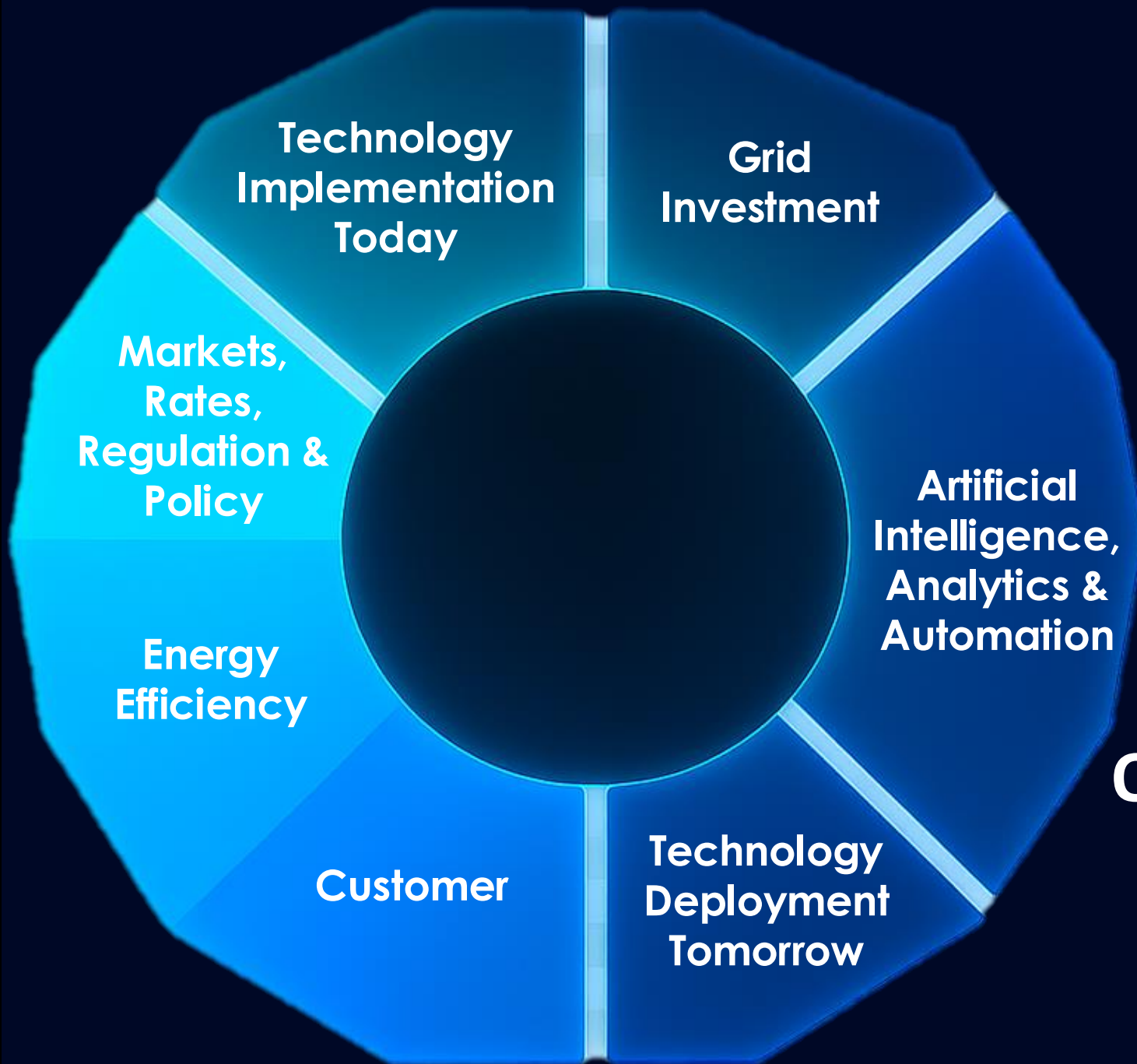


With
great
POWER
comes
great
responsibility



With
great
**POWER
DEMAND**
comes
great
opportunity





No Single Answer

Many Critical Pathways
to Enable an
AFFORDABLE, RELIABLE
Energy Evolution

Optionality is Not an Option

–

It is a Requirement

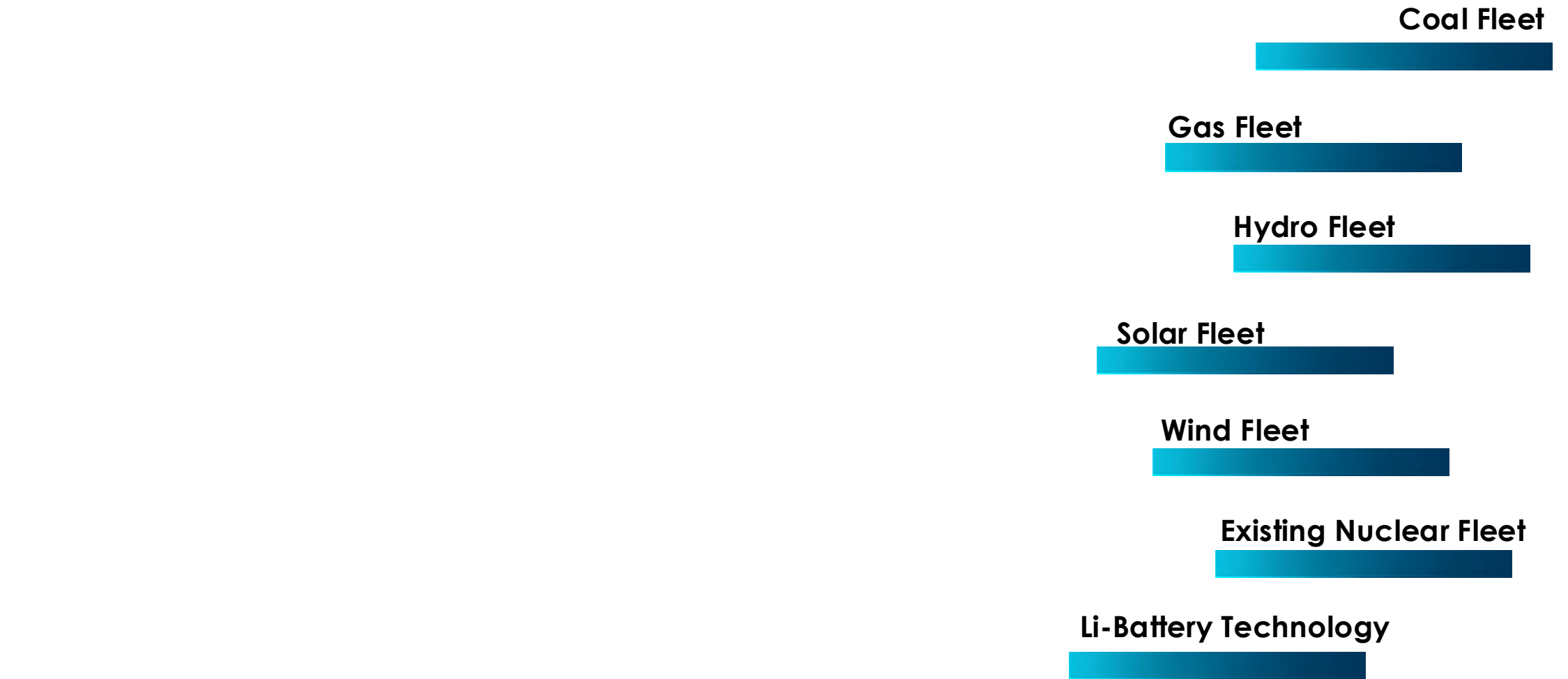
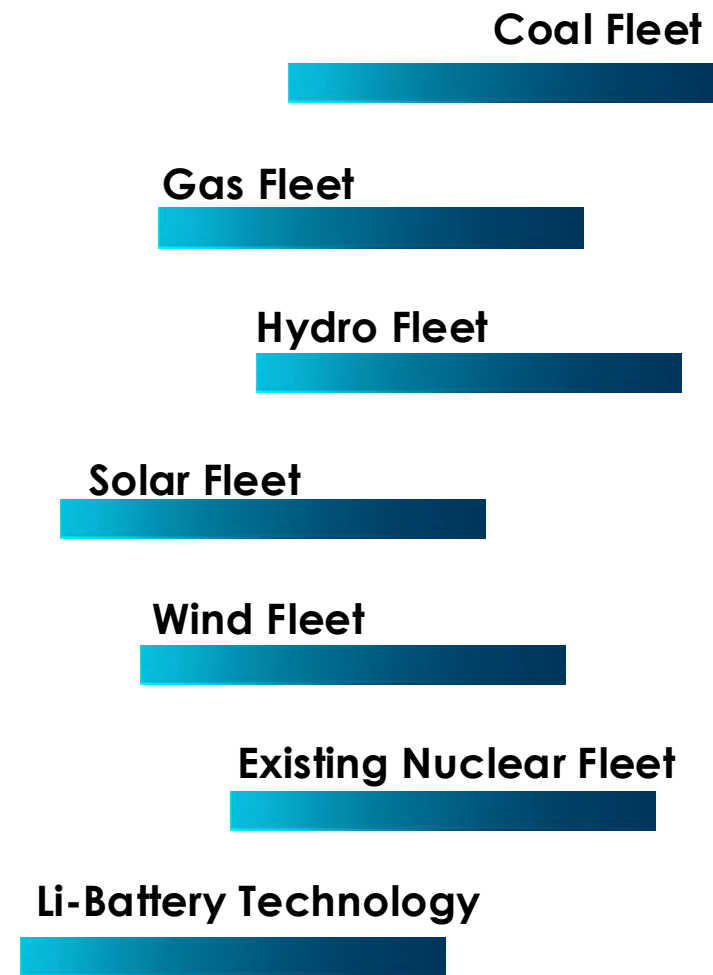




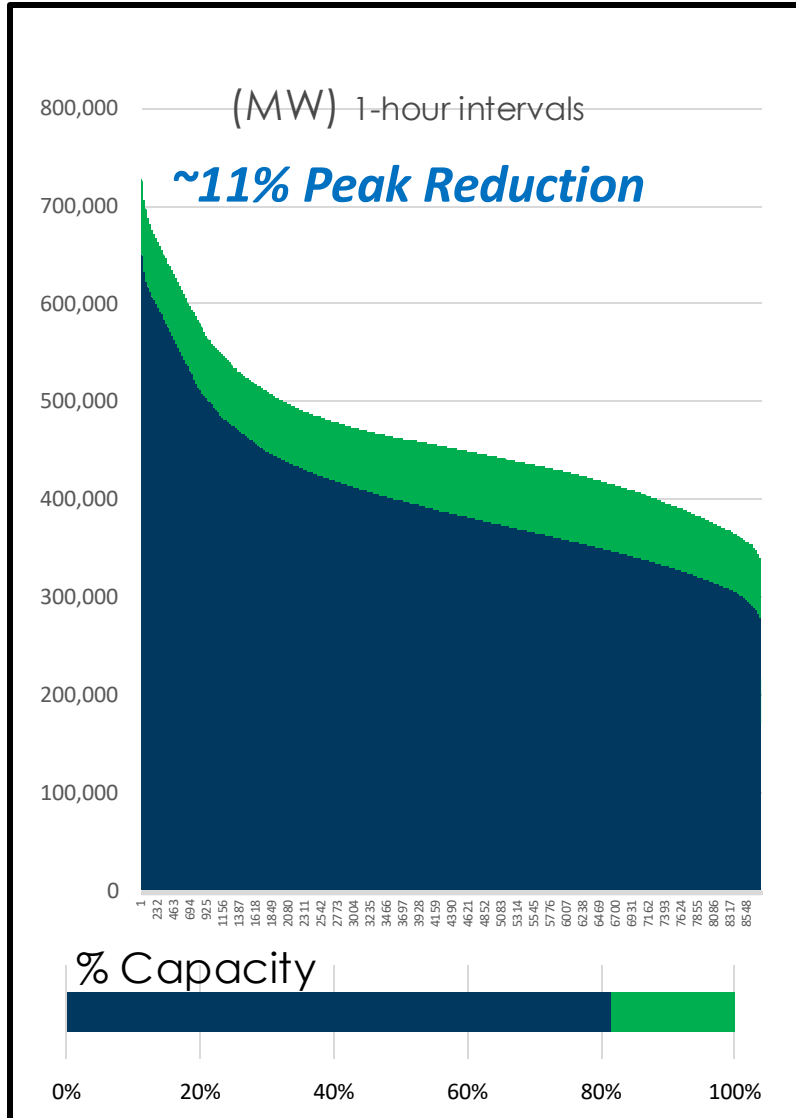
Table 2.0 EXISTING ENERGY SUPPLY OPTIONS									
	Coal	Natural Gas	Biomass	Conventional Nuclear	Hydro	Onshore Wind	Solar PV	Concentrating Solar	Geothermal
Construction Cost (\$/kW)									
Electricity Cost (\$/MWh)									
Capacity Factor									
Ramping Capability									
Availability									
Land Use									
Water Requirements									
GHG Emissions									
Other Air Emissions									
Waste Products									
Ease of Permitting									
End-of-Life Considerations									



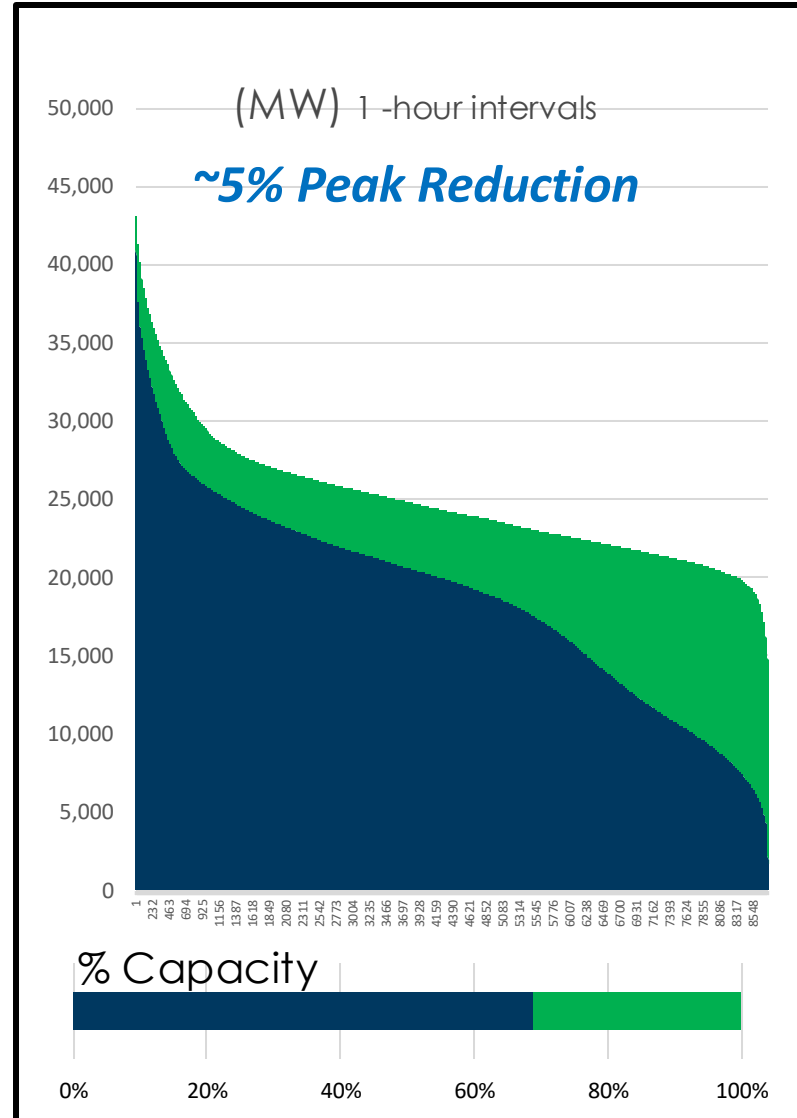
Resource performance varies based on seasons, localized climate, age and operational profile.

Fundamental Shift in System Operation

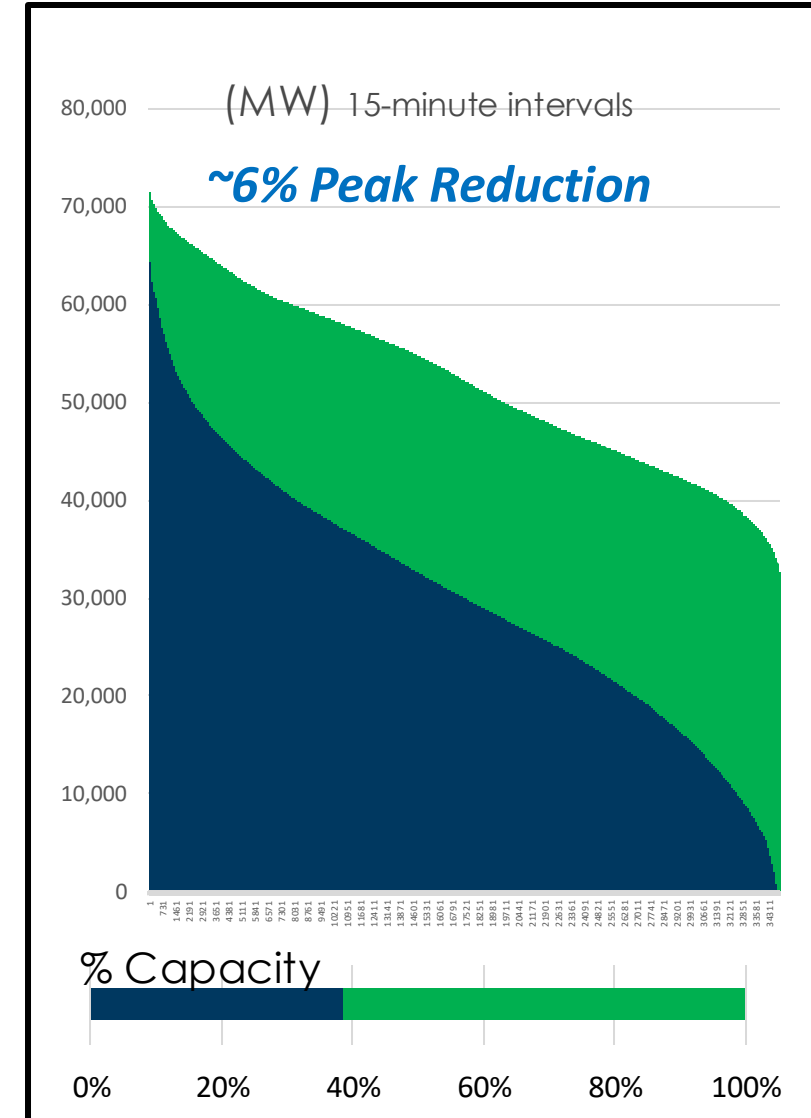
US Lower 48



CAISO



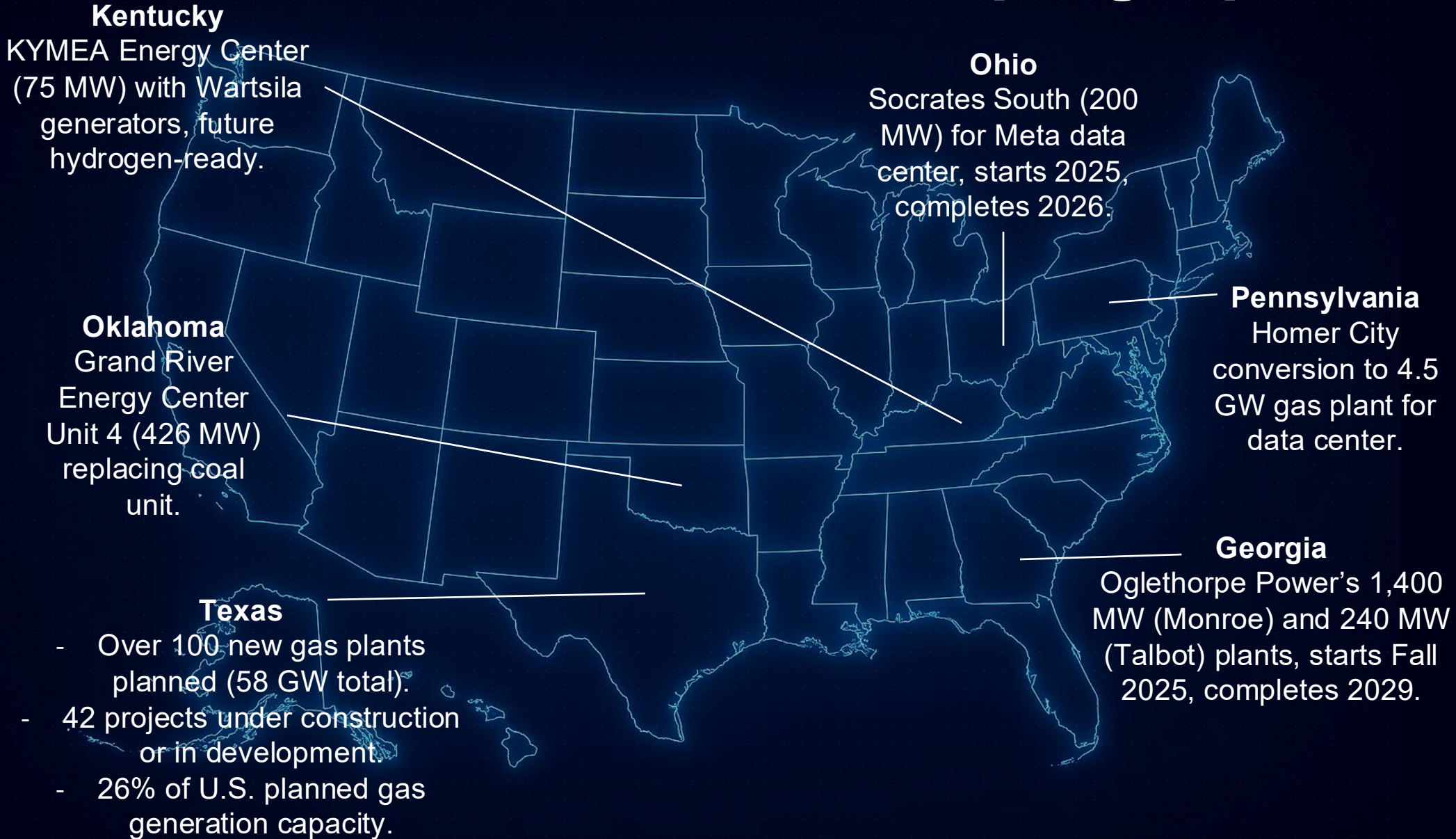
Germany



More Megawatts



Gas Build Ramping Up



...As are the
Challenges



Supply Chain



Workforce

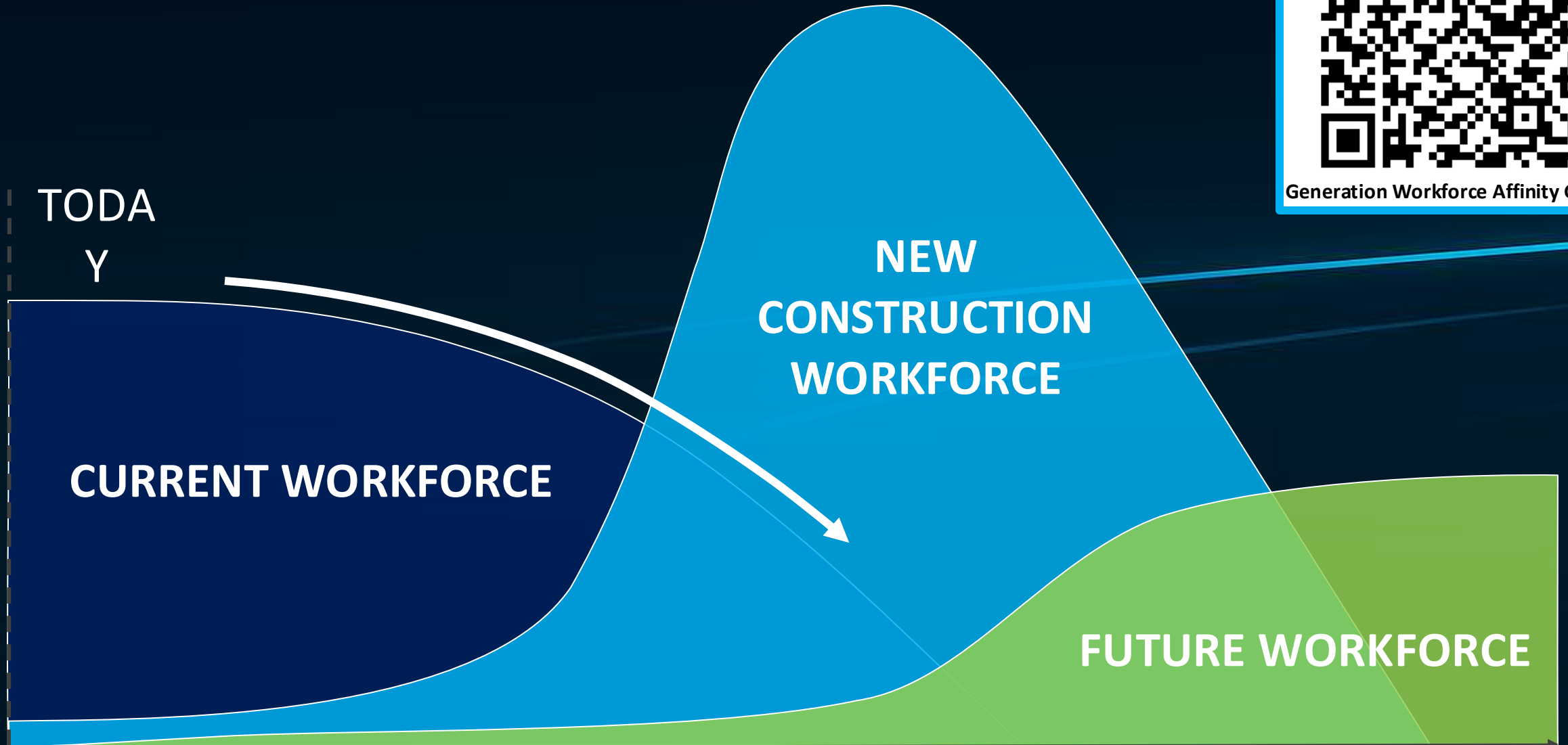


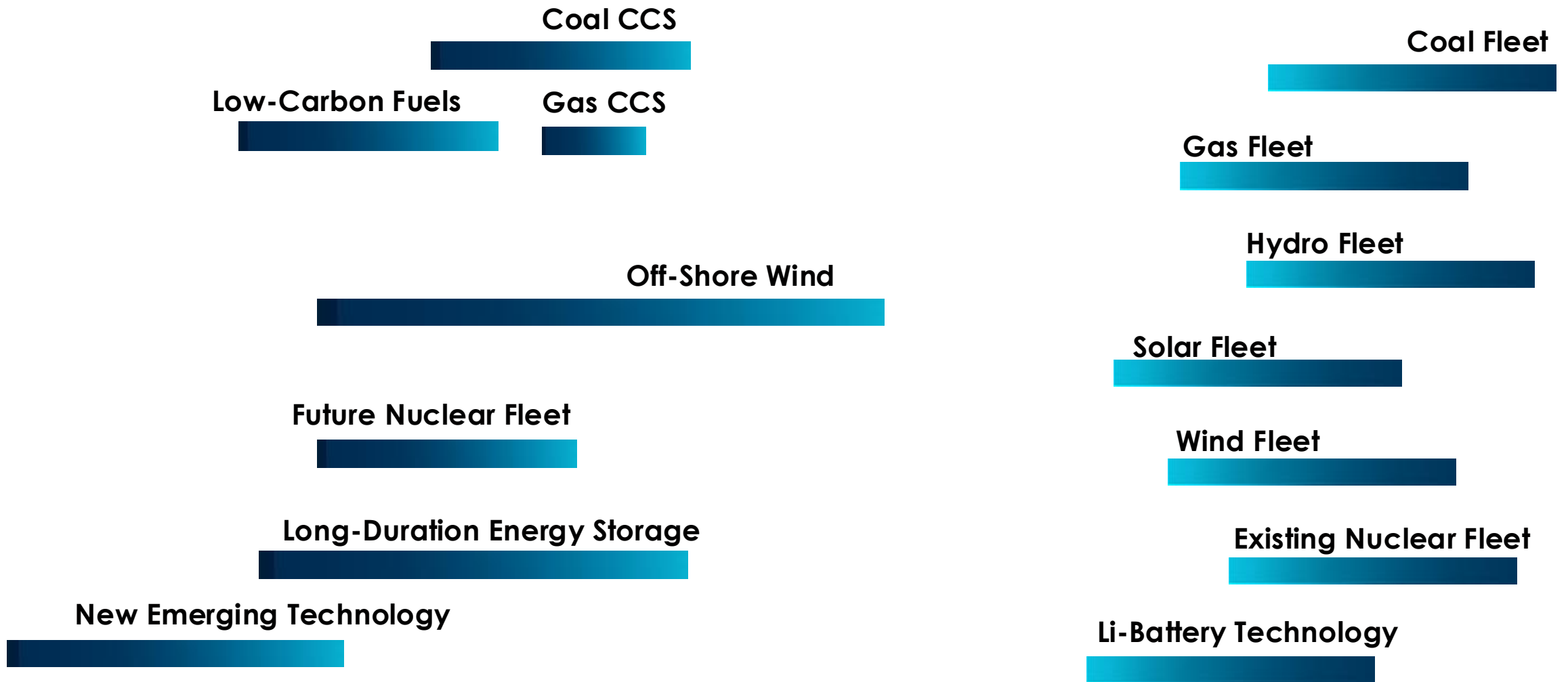
Alternate Fuels

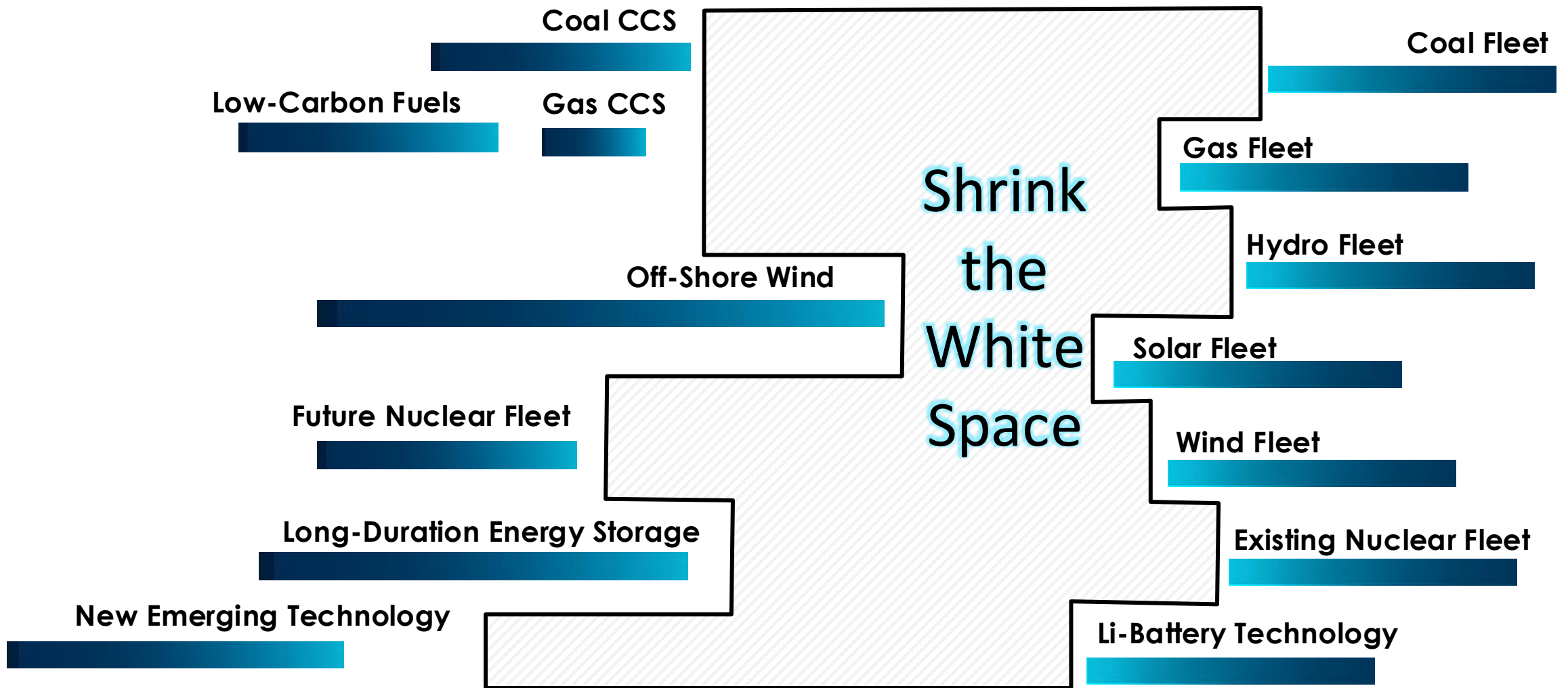
Long Term Workforce Evolution



Generation Workforce Affinity Group

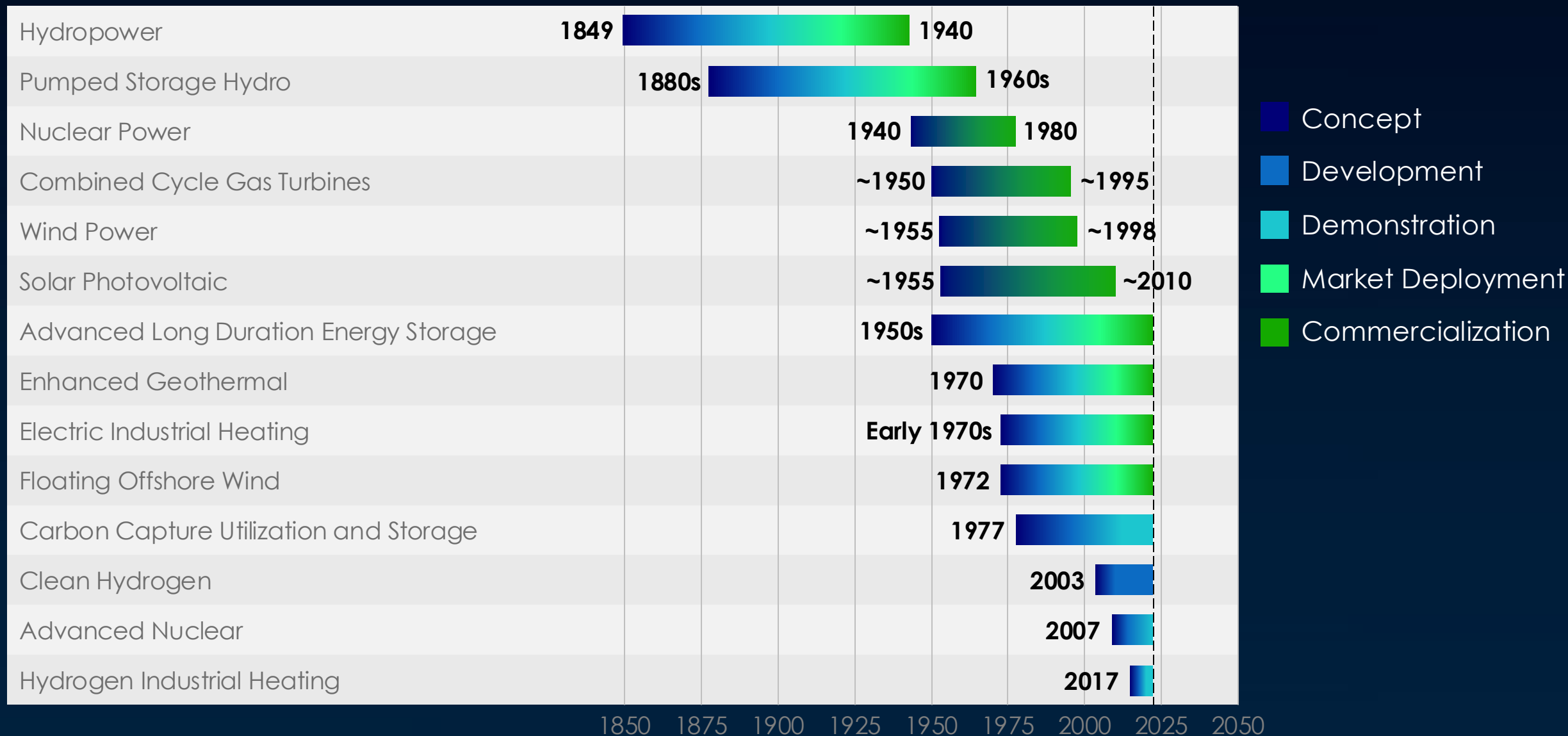






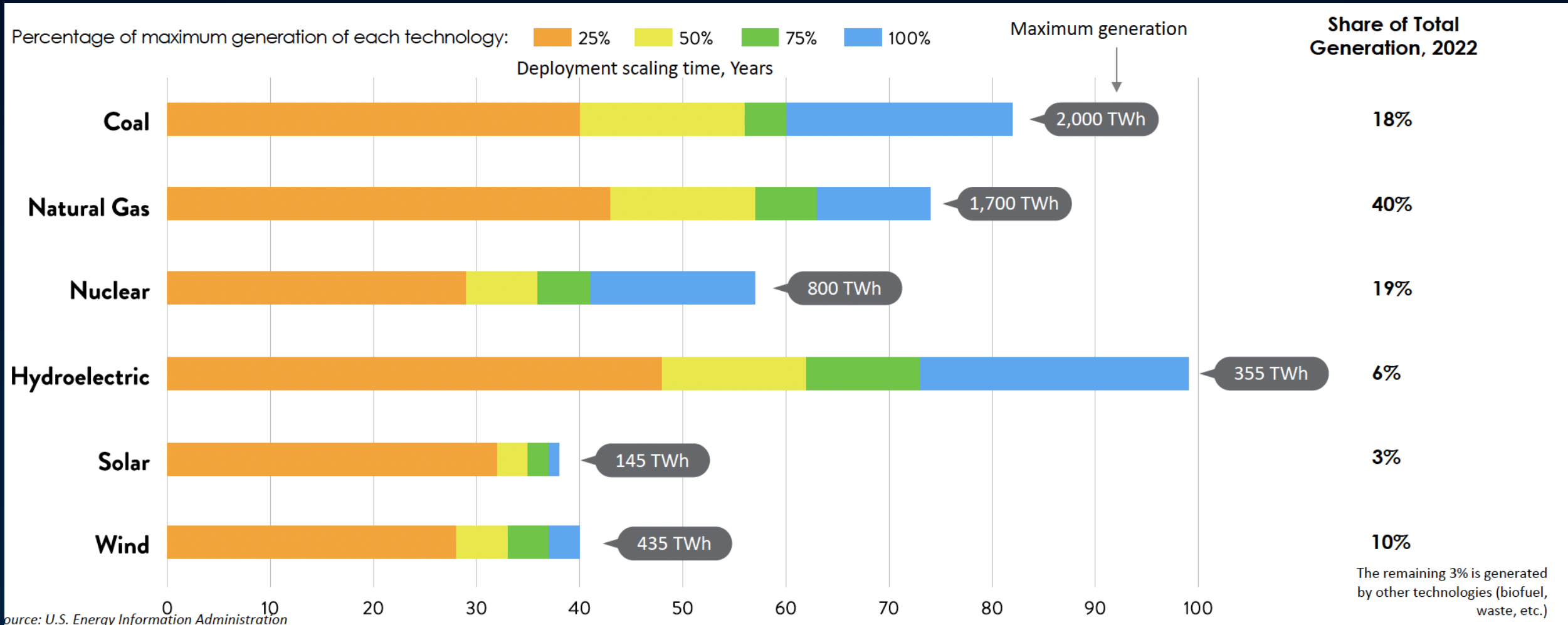
TECHNOLOGY

Decades of Effort *From concept to commercialization*



TECHNOLOGY

Decades of Effort
From commercialization to scale



Urgent Need to Accelerate Emerging Technologies



The New Nuclear Journey

Advanced Reactor Activity

Operational | Under Construction | Planned | Proposed

386

total

34

operating

78

under construction

132

planned

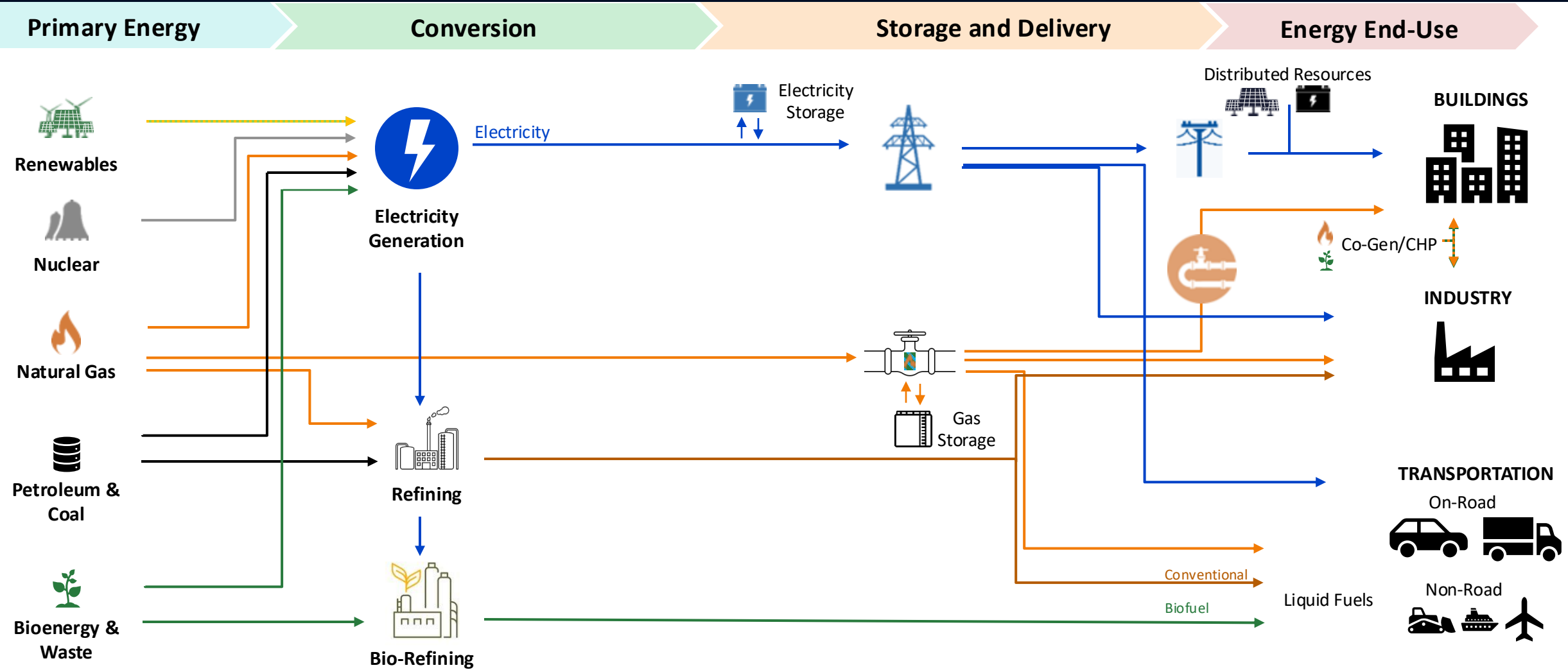
142

proposed

89 reactors unsited

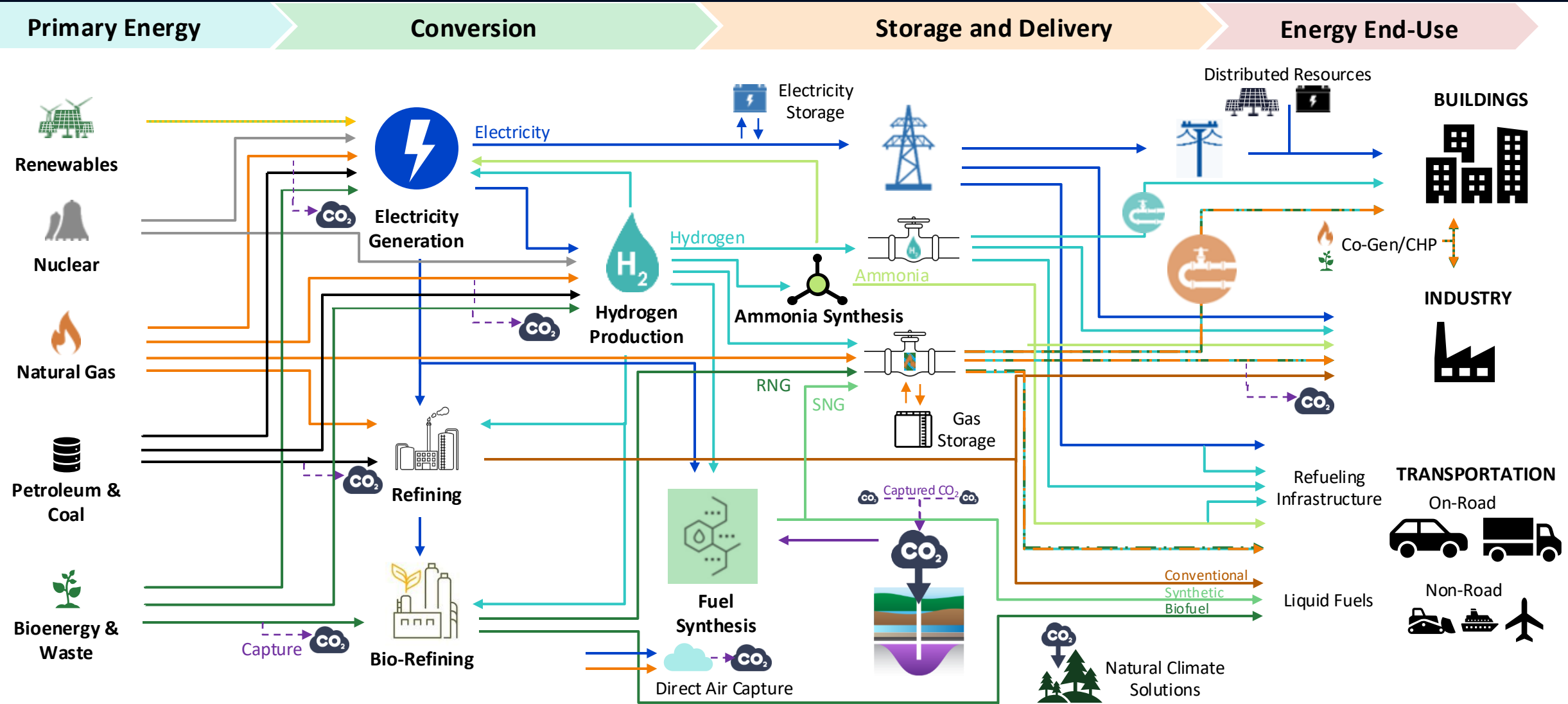
ENERGY ECONOMY

From Simple
expanding efficient electrification



ENERGY ECONOMY

To Complex
enabling sector coupling





TOGETHER...SHAPING THE FUTURE OF ENERGY®

Q & A

