OpenMinds

Grid Vision Plan

Optimizing The Grid We Have & Building The Grid We Need

December 2025

Context

Note: slide to be included for select distribution (i.e., when voice-over is unavailable)

- **Vision** — This document outlines a **shared vision to strengthen and expand America's grid** to support future economic growth, security, and innovation
- **Challenge** — How will the U.S. **meet rapid load growth affordably and reliably** to secure American future economic and geopolitical leadership?
- **Plan** — It presents **a practical and actionable plan** to improve grid connectivity, reliability, affordability, and national security, **fast**
- **Action** — It highlights critical bottlenecks and **how OpenMinds' network is mobilizing six specific projects** to accelerate grid transformation

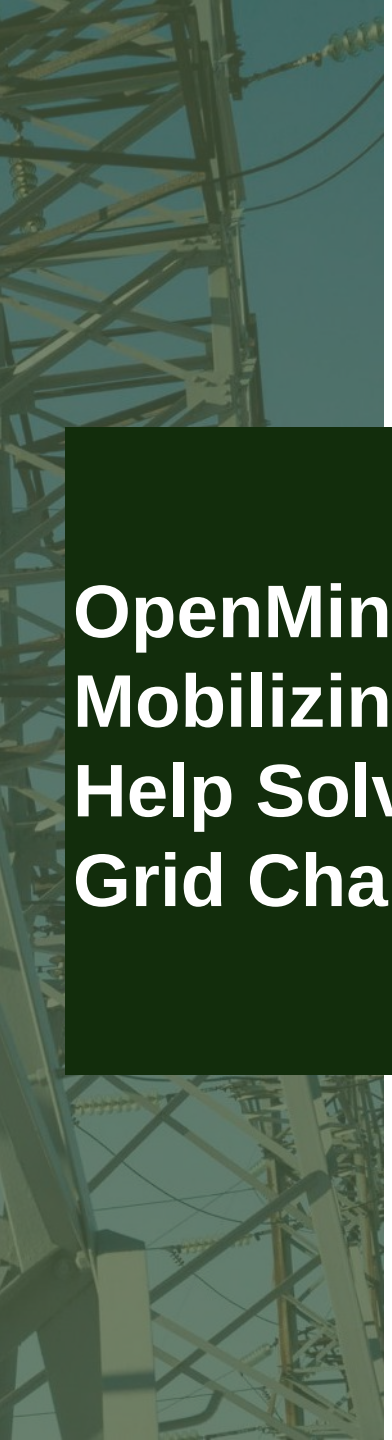
Our Grid Vision

Optimizing the grid we have **today,** while…

Building the grid we need for **tomorrow**

Delivering affordable, abundant, and reliable power

Driving American prosperity and AI leadership



OpenMinds Is Mobilizing to Help Solve Our Grid Challenge

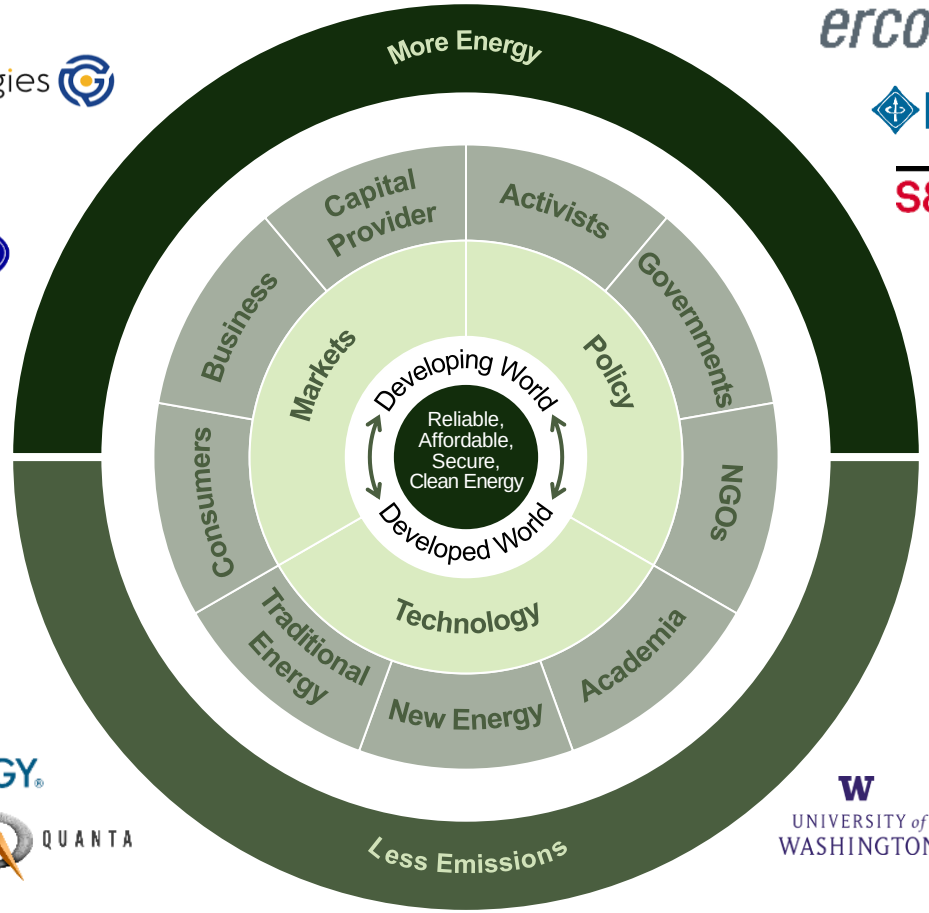
We're leaders from **Energy, Transmission, Hyperscalers, and Investment**

We bring **expertise and urgency**

We are driving practical, actionable solutions to **make the grid stronger, smarter, and cheaper – fast**

We are **helping catalyze national action** through a series of specific projects to remove bottlenecks in critical areas

OpenMinds Is a Network of Leaders Who Will Help to Execute The Grid Vision Plan



OpenMinds

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Our U.S. Grid Challenges

2

Optimizing Today’s Grid

3

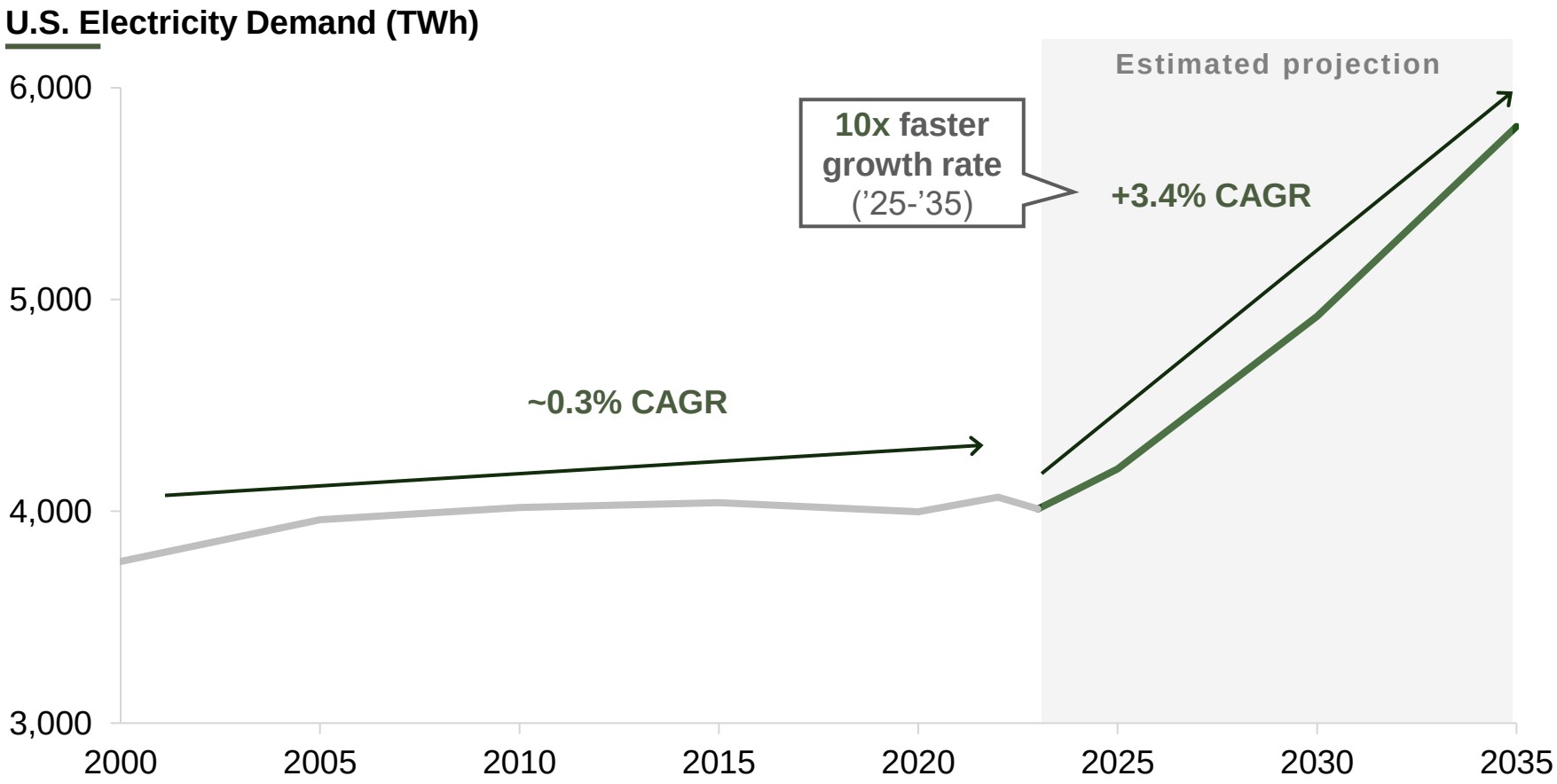
Building Tomorrow's Grid

4

OpenMinds’ Catalyzing Projects

OpenMinds

Electricity Demand Growth Rate Is Up 10X!



Note: Estimates for quantity of generation needed by power source use EIA's 2024 average capacity factors of 92.3% for nuclear, 59.9% for combined-cycle natural gas, and 23.4% for solar
Source: EIA Monthly Energy Review data, OpenMinds P50 model, DOE, EIA, SEIA

This is the equivalent of:

220
1 GW nuclear reactors

Or…

430
800 MW natural gas plants

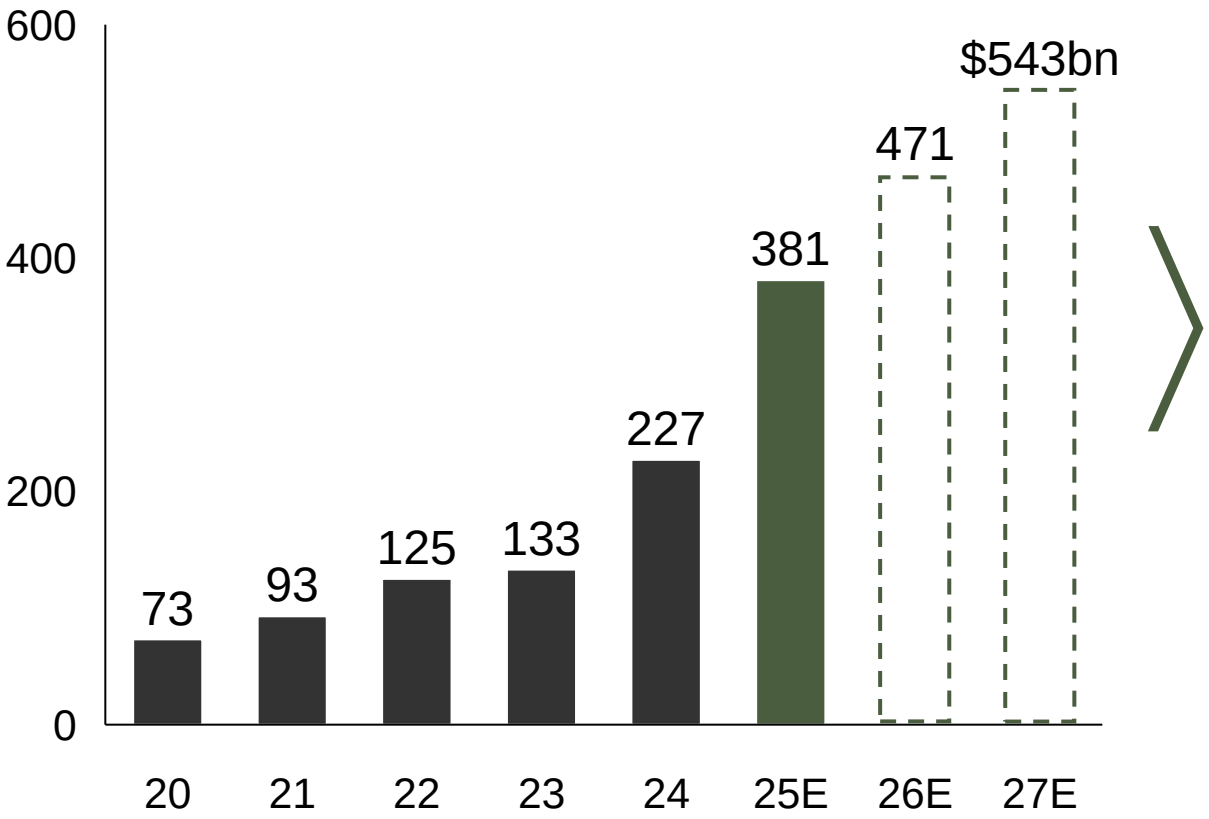
Or…

9000
100 MW solar farms

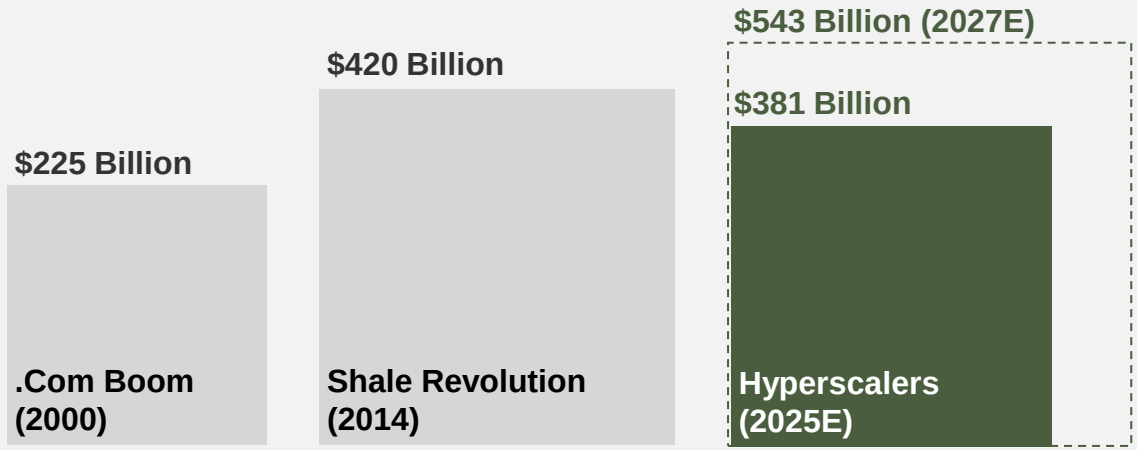
The grid uses diverse fuel resources – it doesn't care where electrons come from

AI Investments Are Likely to Become the Highest CapEx Boom This Millennium

Hyperscaler CapEx Commitments ($bn)



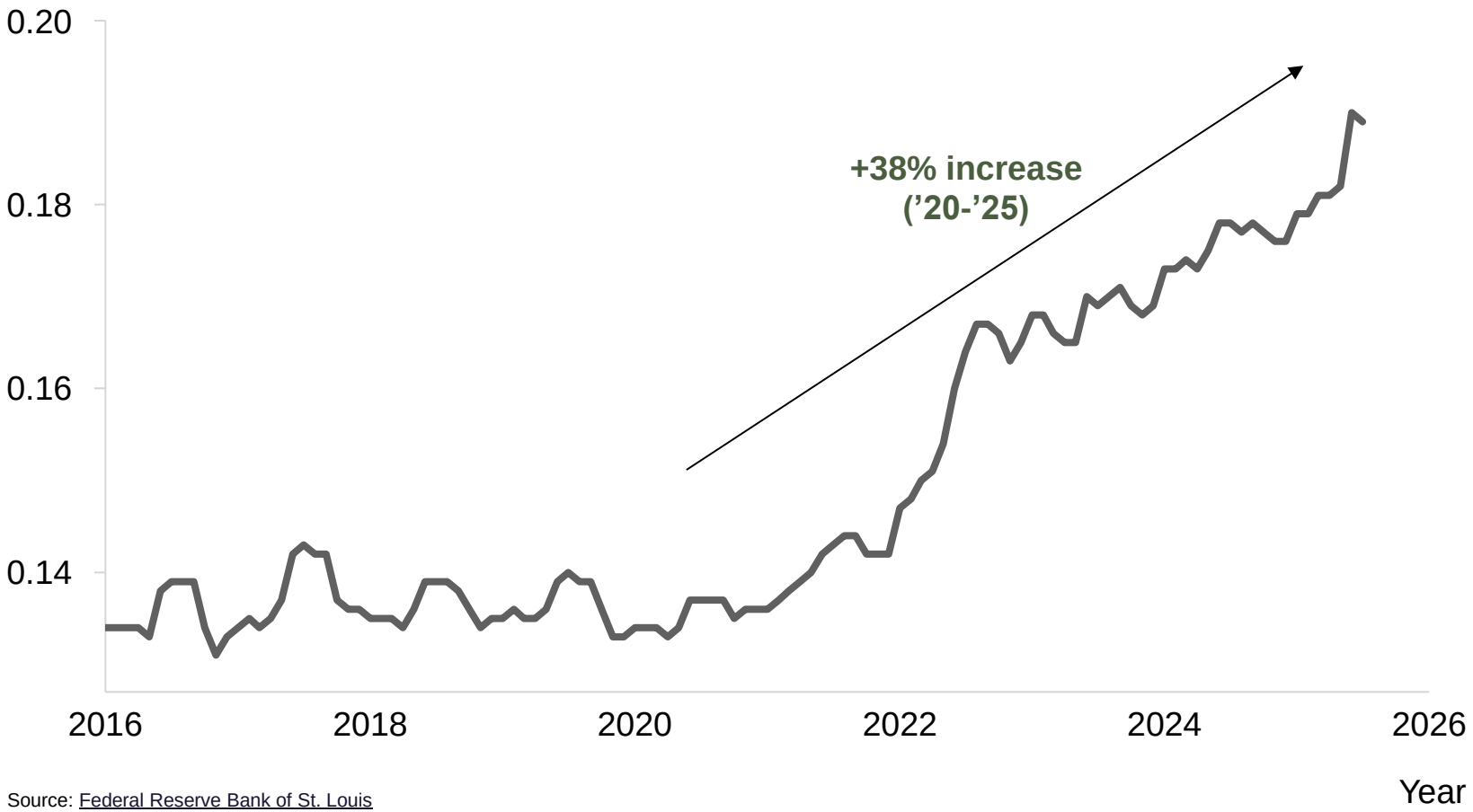
12-Month CapEx, Peak Or Current Year ($bn current)



Note: “Top U.S. hyperscalers” includes Alphabet, Meta, Amazon, Microsoft, and Oracle; the .Com Boom capex figure encompasses capex from listed telecoms, and the Shale Revolution figure encompasses NA onshore E&P, 12-month capex numbers are adjusted for inflation as of 2025
Source: Individual company financial disclosures; Goldman Sachs, S&P Global, FRBSF, Federal Reserve Bank of Richmond; Halcyon

Electricity Costs Are Rising Steeply With Significant Affordability Impacts for Americans

U.S. Cities Average Electricity Price (US$/KWh)



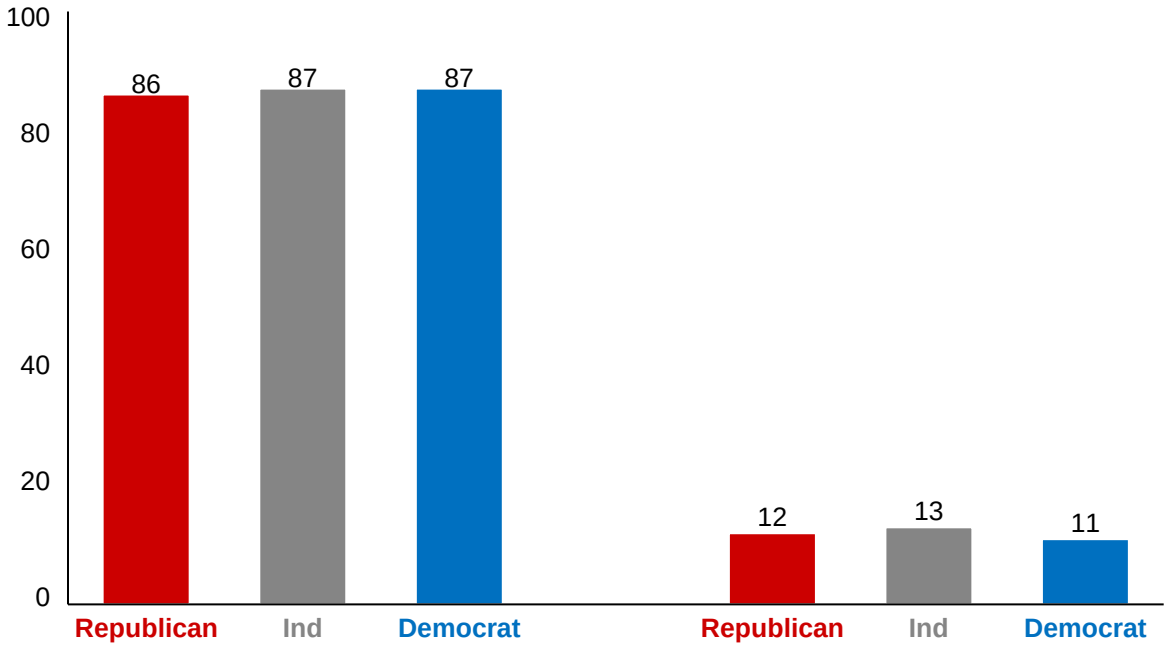
Source: Federal Reserve Bank of St. Louis

Key Drivers

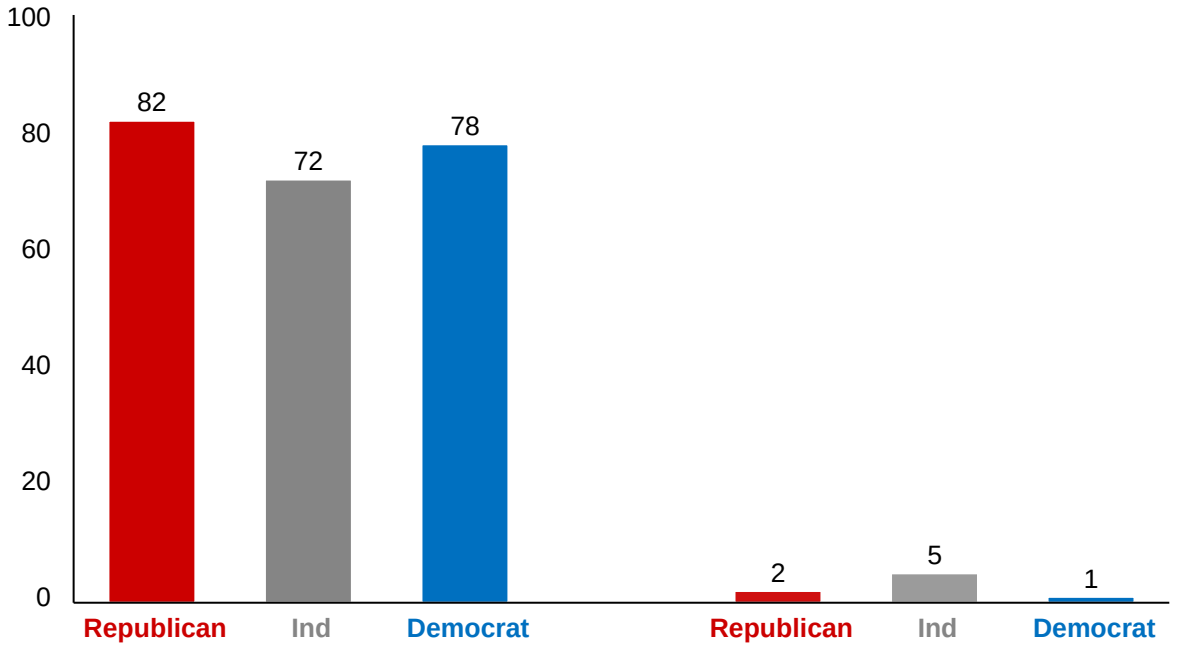
- Upgrading **aging and building new infrastructure**
- **Rising inflation** exacerbated by supply chain constraints
- **Extreme weather** impacts

Americans Are Concerned about Costs & Support Grid Investment

How concerned are you about the affordability of your utility bills and rising energy costs? (%)

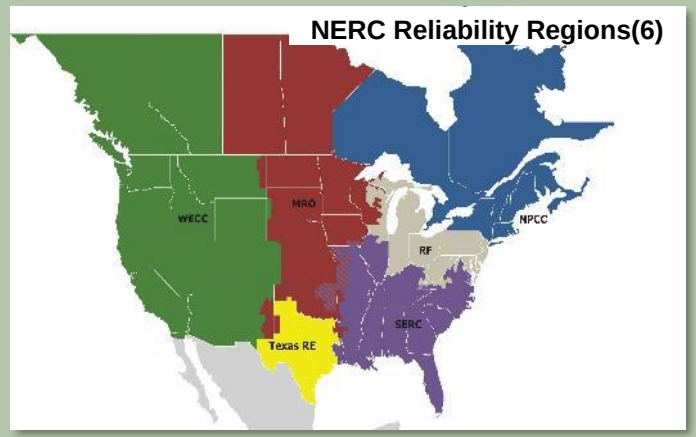


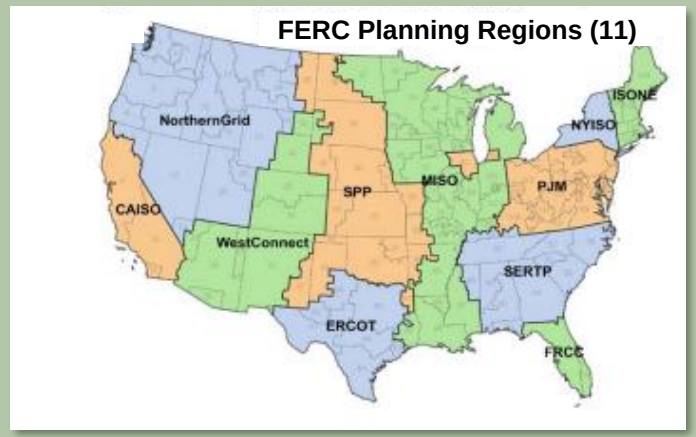
Do you support making investments in America's "electricity transmission grid" to improve reliability, reduce costs, unlock economic growth in communities, and meet power needs? (%)

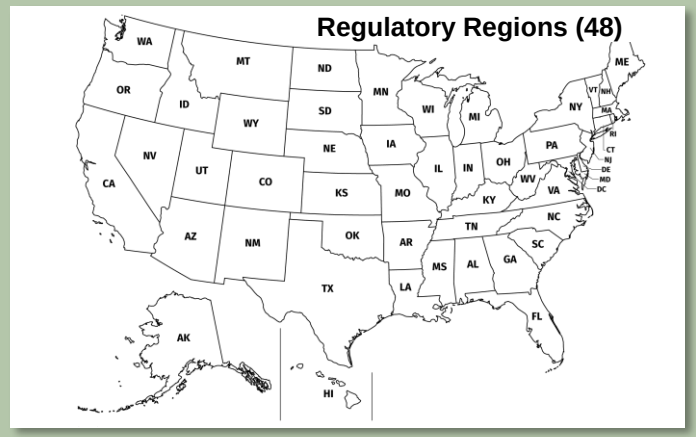


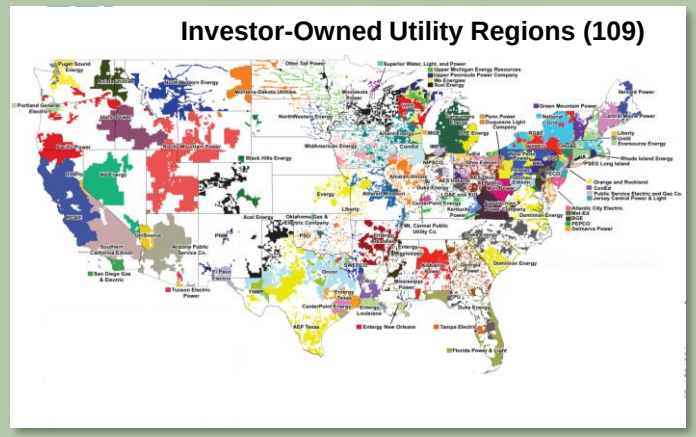
Source: Cygnal, August 2025: Survey of likely general election voters in MISO & PJM regions

Our Outdated, Disconnected, And Complex Grid Is an Obstacle to Growth









Today's **grid is over 70 years old**

Planning, permitting, and building the grid happens across **3,000+ utilities, authorities, and RTOs**

This **slows down decision making by *years***

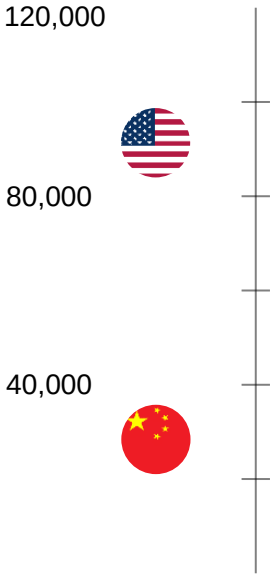
Note: *ERCOT is not regulated by FERC
Sources: NREL; US DOE; US EIA; GridInfo; The National Rural Electric Cooperative Association; NERC

China Is Playing to Win

The U.S. has a stronger competitive position

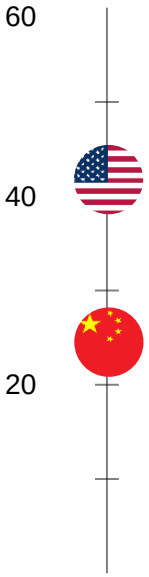
GDP per capita

2025 ($, PPP)



Data center footprint

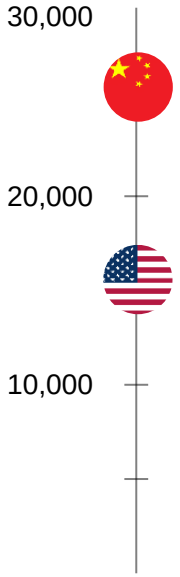
2024 (GW)



But China is gaining ground…

AI patents filed

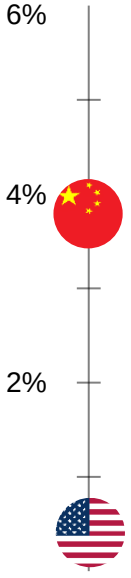
2023 (#)



...and is materially accelerating affordable electricity as the backbone for future growth

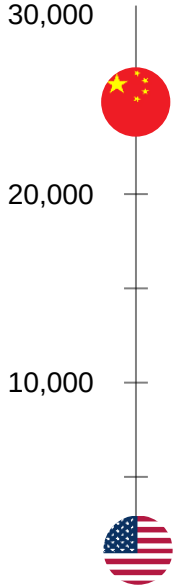
Electrification growth rate, p.a.

2004-2024 (%)



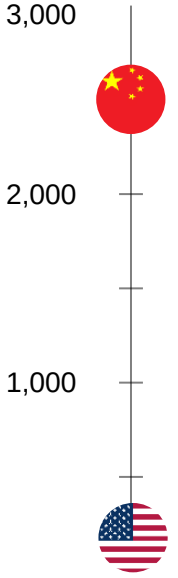
Transmission line distance built per year

2013-2023 (mi)



HVDC lines built per year

2015-2025 (mi)

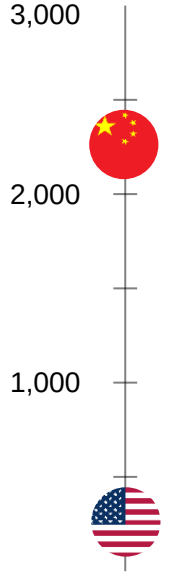


Average time to permit Tx project

2024-2025 (years)

Generation capacity added & interconnected

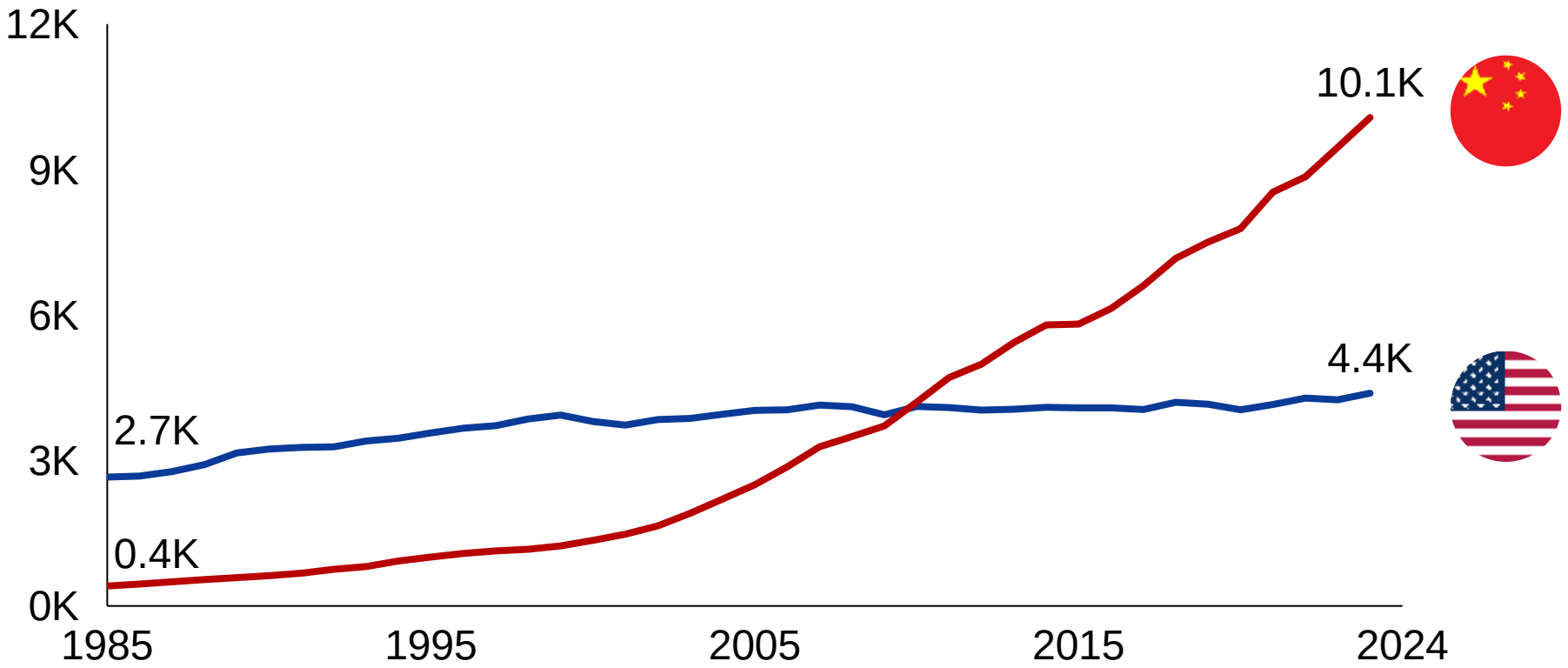
2015-2025 (GW)



Notes: Charts show the top 8 countries per category; the unlabeled top slice is the smallest of those eight and not the rest of the world
Sources: Crunchbase, CB Insights, BP, Global Data, Dealogic, EFAMA, BIS, World Bank

China Has Significantly Outperformed the U.S. in Both Electricity Growth And Absolute Generation since 2010

China vs U.S. Electricity Generation (TWh),1985-2024



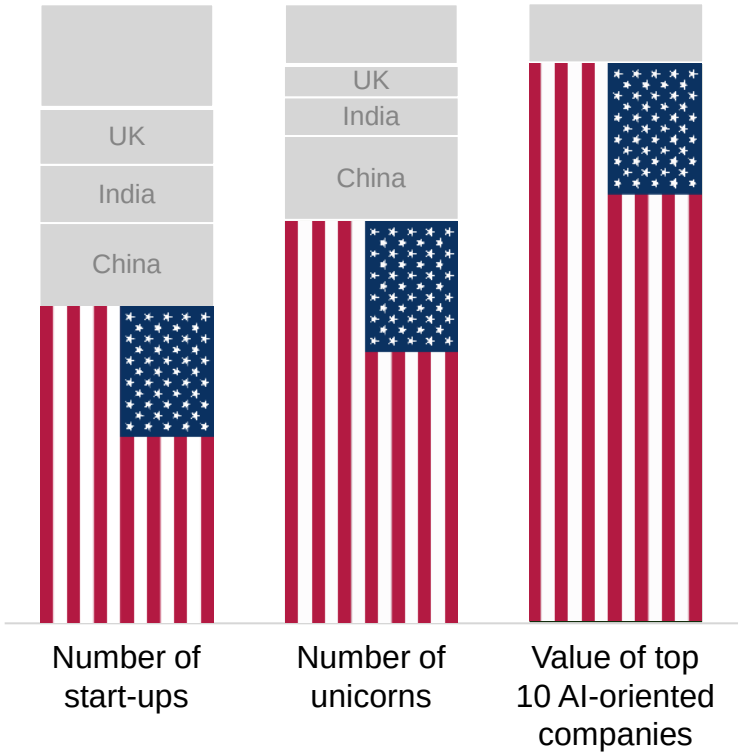
CAGR ('00-'24)	
China	8.7%
U.S.	0.6%

Since 2000, China's growth rate has exceeded the U.S. by ~15x annually

Source: Our World in Data

But the U.S. Has What It Takes to Win

WORLD-LEADING INNOVATION

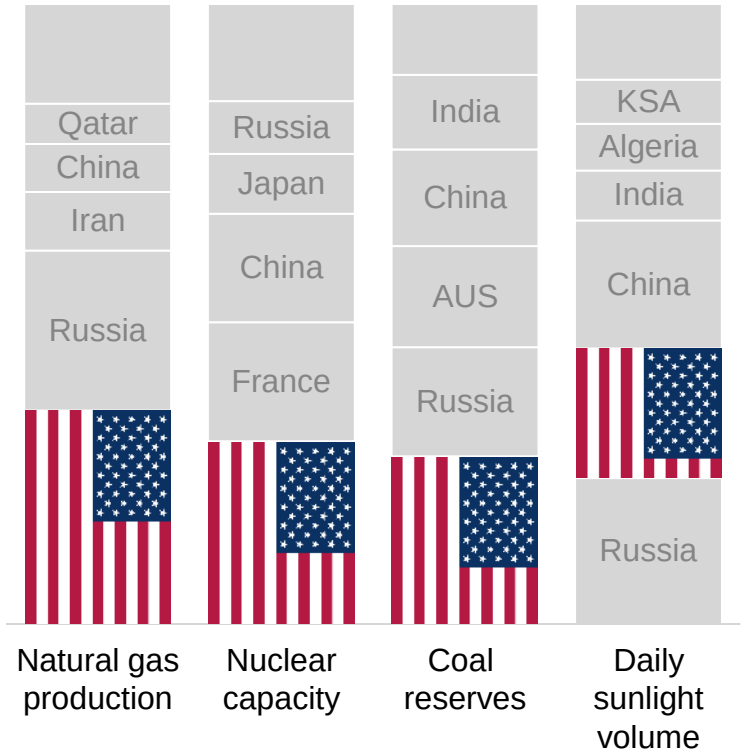


Number of start-ups

Number of unicorns

Value of top 10 AI-oriented companies

ENERGY ABUNDANCE



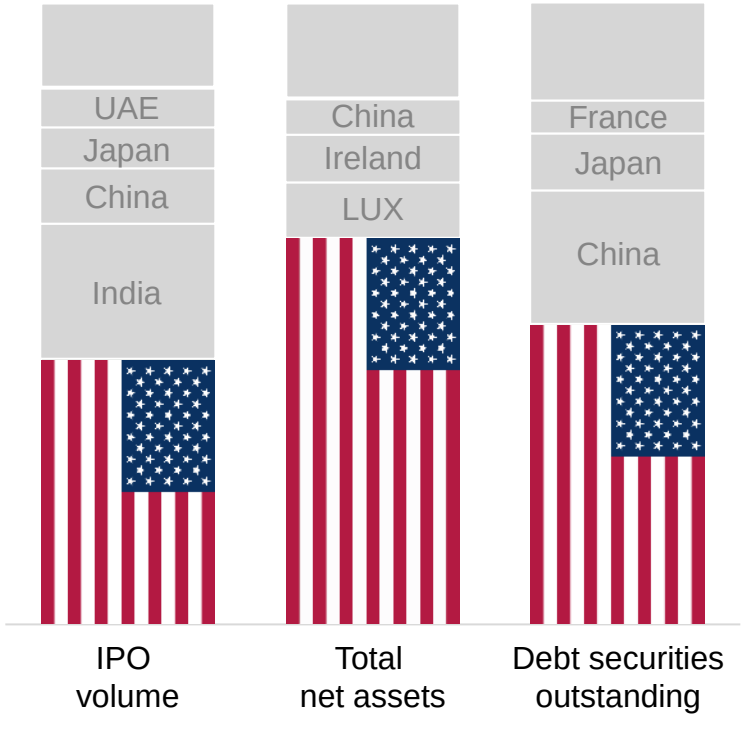
Natural gas production

Nuclear capacity

Coal reserves

Daily sunlight volume

STRONG CAPITAL MARKETS



IPO volume

Total net assets

Debt securities outstanding

Notes: Charts show the top 8 countries per category; the unlabeled top slice is the smallest of those eight and not the rest of the world
Sources: Crunchbase, CB Insights, BP, Global Data, Dealogic, EFAMA, BIS, World Bank

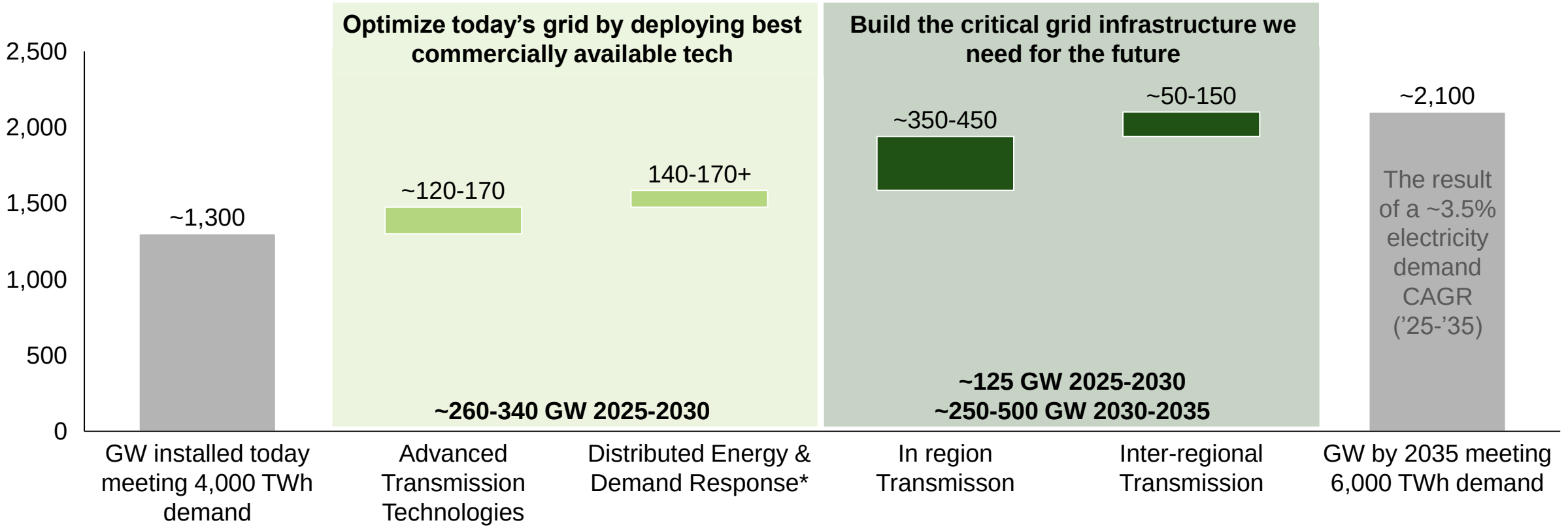
Challenges Facing the U.S. Grid

Aging / Inadequate Infrastructure	Lack of Grid Connectivity	Outdated Technology	Accelerating Demand Growth
Increasing reliability risks	Inhibiting access to lower cost	Limiting line efficiency	Amplifying grid congestion

Action Is Needed Today to Achieve 800+ Incremental GW by 2035 through Optimizing Today's Grid And Building Tomorrow's Grid

DIRECTIONAL

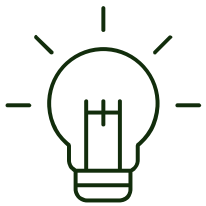
Estimated Required Additional Installed Capacity by Grid Action, 2035 (GW)



Note: *Value based on commercial and industrial estimates, excluding residential opportunity; DER and DR 2035 GW estimates interpolated from 2050 estimates which are extrapolated from 2023-2027 CAGR, only incremental GW
Sources: Wood Mackenzie DER Outlook 2023, NREL National Transmission Planning Study 2024, Brattle Group 2024, Energy Information Administration

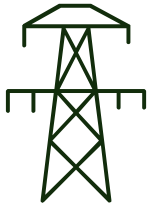
OpenMinds

Grid Vision Is the Clear And Actionable Plan to Deliver:



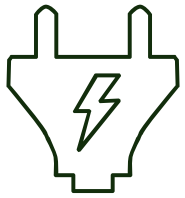
More electricity, faster, to **power U.S. prosperity & growth**

Lower costs for homeowners and small businesses



More reliable, modern infrastructure that **reduces outages and improves efficiency**

More **security against cyber threats**



Connected grid system for **all available domestic energy** sources

Greater resilience to the human and economic impacts of severe weather events

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Our U.S. Grid Challenges

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Optimizing Today’s Grid

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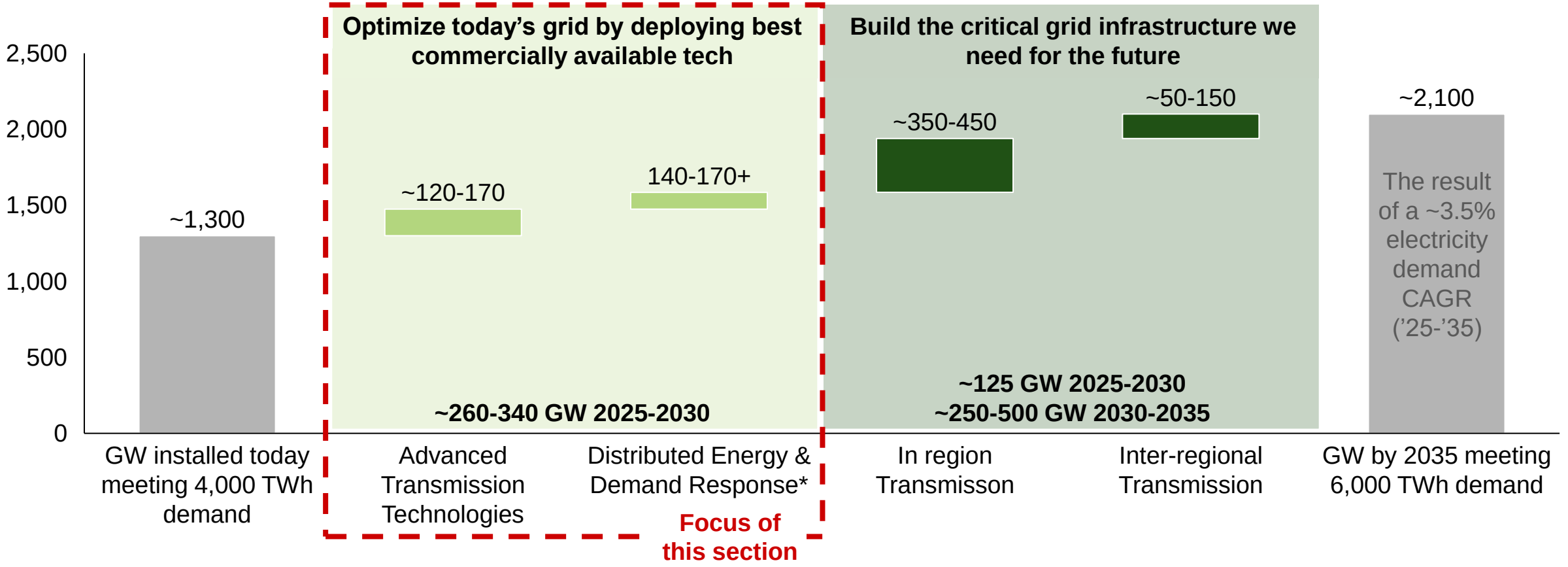
OpenMinds’ Catalyzing Projects

OpenMinds

Immediate Action to Optimize Today's Grid Can Unlock ~300 GW in the Next 5 Years

DIRECTIONAL

Estimated Required Additional Installed Capacity by Grid Action, 2035 (GW)



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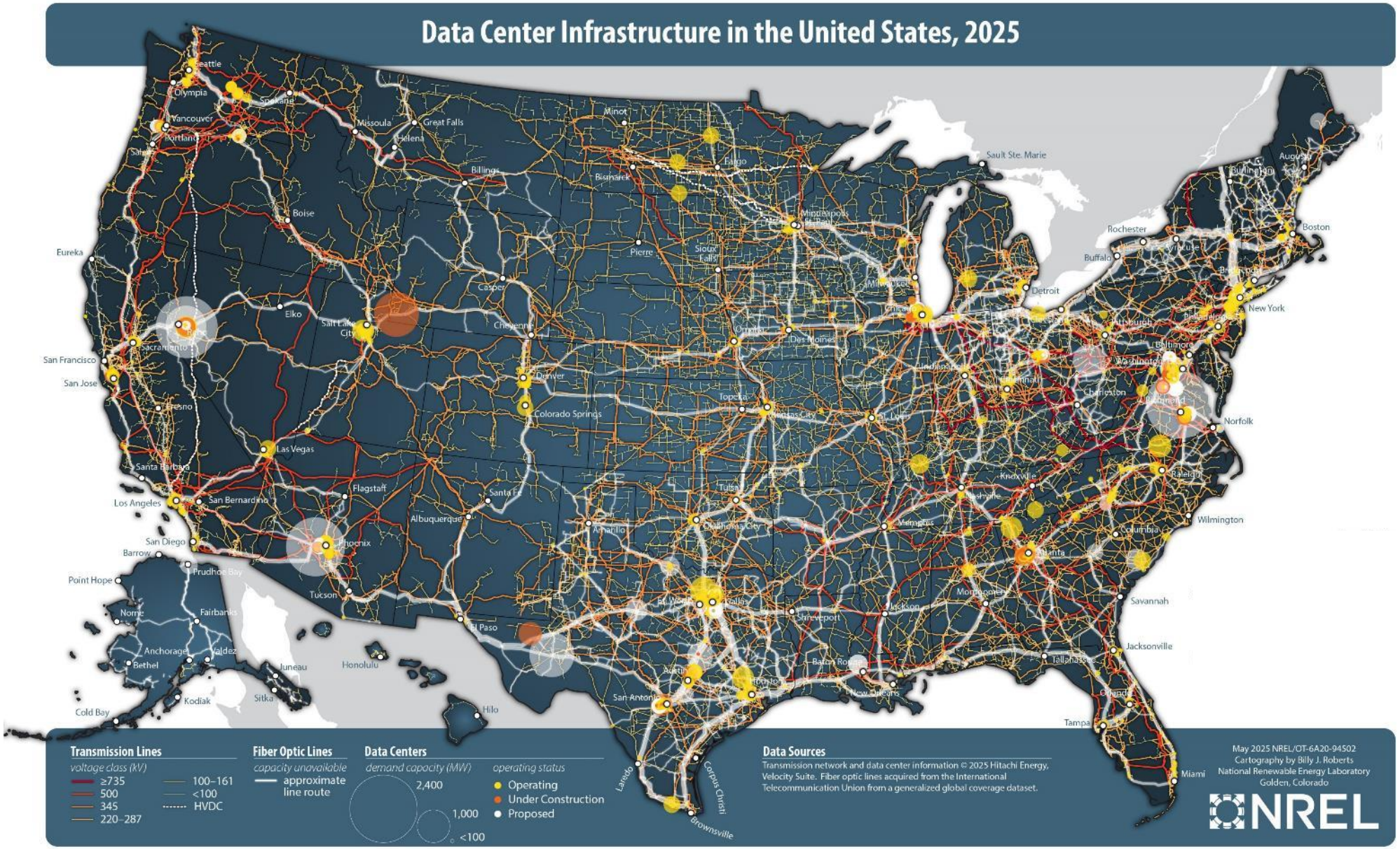
Sources: Wood Mackenzie DER Outlook 2023, NREL National Transmission Planning Study 2024, Brattle Group 2024, Energy Information Administration

Rapid Data Center Growth Drives the Urgency to Unlock Near-Term Capacity



Source: NLR Data Center Map

The Near-Term ‘Optimize’ Measures Include Key Advanced Transmission Technologies And Demand Flexibility Levers

	The Key Optimize Measures	5-year GW potential	Ratepayer cost vs. greenfield ($⟶$$$$)
Advanced Transmission Technologies	**Dynamic Line Rating:** Uses real-time weather/operating conditions to determine the maximum safe power capacity of a transmission line, reducing congestion	~20	$
	Advanced Power Flow Control: Modular power devices that actively redirect electricity on T&D lines to ensure lines do not become overloaded	~30	$
	Topology Optimization: Software optimization tool to determine efficient grid configuration and reduce generation dispatch costs	~20	$
	Advanced Reconductoring: Replacing current transmission lines with higher capacity and more efficient conductors	~50-100	$ $
Distributed Energy & Demand Response	**Large Load Demand Response:** Program (incentives and tools) requiring large load customers to reduce nonessential power during peak	~55-65	$ $ $ *Highly depends on incentives required to unlock curtailment*
	Large Load Distributed Fuel Generation: Meeting load on-site with behind-the-meter fuel-based generators	~35-50	
	Distributed Storage (residential and large load): Meeting load on-site with distributed battery storage during peak	~50+	
	Total	~260-340+	

Game Plan for ~300 GW of Optimize Solutions in Next 5 Years

	Key Barriers	Solutions
Advanced Transmission Technologies	Depending on region, incomplete awareness of performance and value improvement potential	Utilities and independent transmission owners to engage in best practice sharing; upskill modelling and execution capabilities, fast
	Technology risk and warranty coverage concerns	Collaboration among tech providers, utilities, and industry associations to further testing/certification and improve risk sharing models
	Historical preference to rate base large CapEx new-build projects rather than invest in system improvement via ATTs	State and federal policy actions to incentivize ATT adoption
Distributed Energy & Demand Response	*Distributed Storage (residential and commercial):* Limited adoption due to a 'who pays' gap: adopting customers bear costs for system-level benefits	*Distributed Storage (residential and commercial):* Utilities, policymakers, and large load customers to develop and deploy financial incentive structures
	Demand Response: Limited guaranteed access to behind-the-meter load management prevents utilities from meeting system reliability requirements	*Demand Response:* Utilities to create and deploy market and program structures that guarantee contractual access to behind-the-meter flexibility

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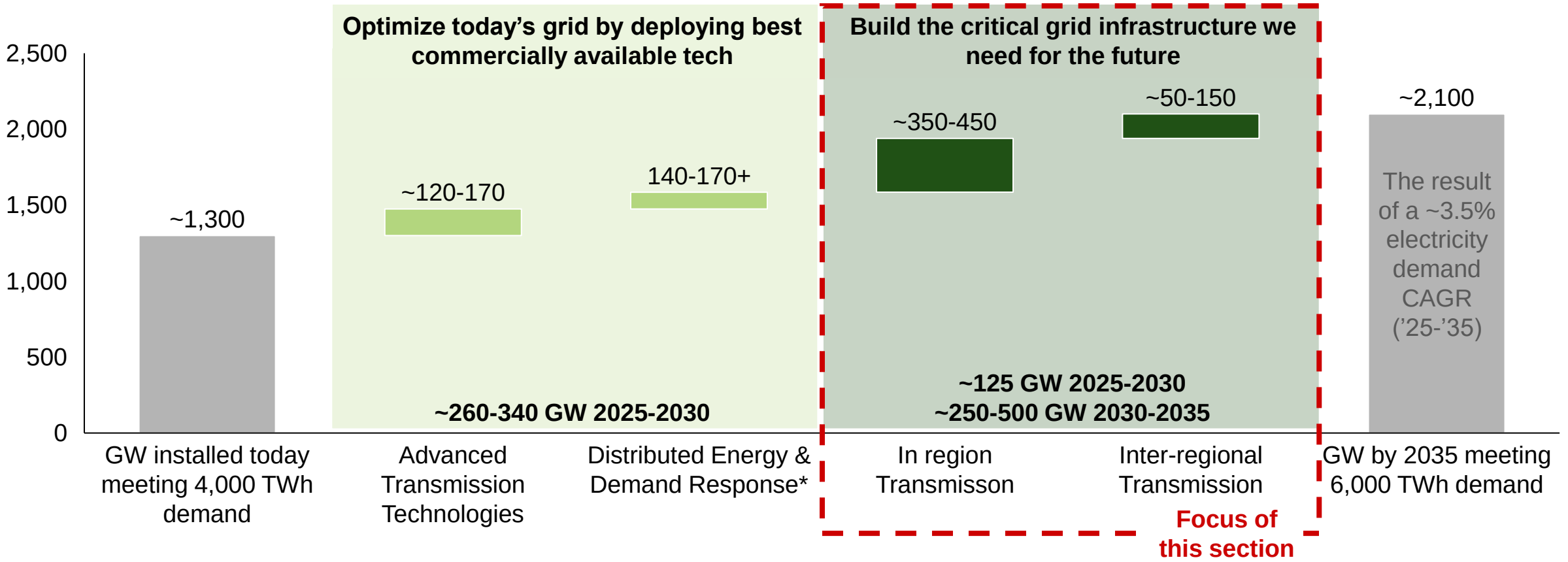
OpenMinds

Urgent Action Must Be Taken Today to Build Future Grid Infrastructure That Can Deliver ~500GW by 2035

DIRECTIONAL

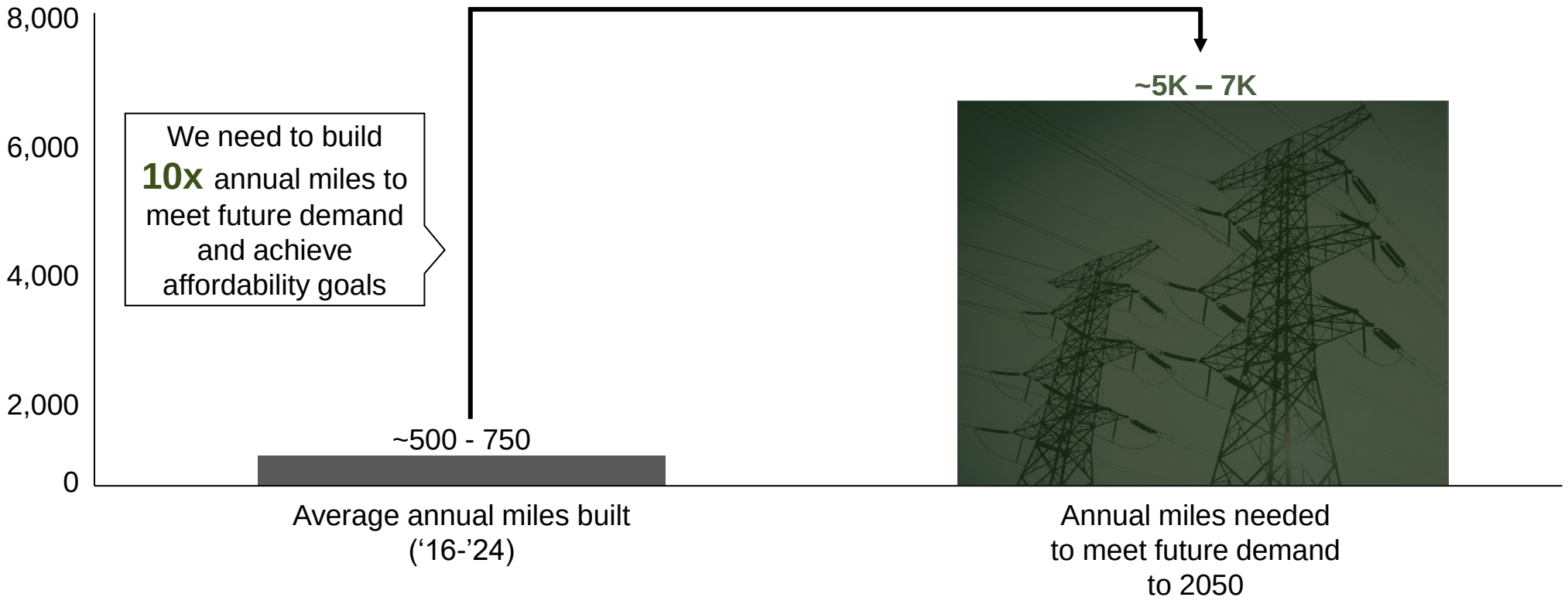
Estimated Required Additional Installed Capacity by Grid Action, 2035 (GW)



Note: *Value based on commercial and industrial estimates, excluding residential opportunity; DER and DR 2035 GW estimates interpolated from 2050 estimates which are extrapolated from 2023-2027 CAGR, only incremental GW
Sources: Wood Mackenzie DER Outlook 2023, NREL National Transmission Planning Study 2024, Brattle Group 2024, Energy Information Administration

We Need to BUILD, BUILD, BUILD

Approximate Miles of High-Voltage Transmission Added to the Grid[1]



Note: 1. The U.S. 2050 transmission miles range reflects Grid Strategies forecasted 5,000 miles/year and NREL's ~7,000 miles/year (1.4x 2020 transmission capacity under current policy scenario); 2. Numbers given are for >=345kV transmission lines
Sources: (1) Grid Strategies (2025), NREL National Transmission Planning Study (2024), PPP Insights, National Energy Administration

Action Needed Today to Unlock ~500 GW of Build Solutions

	Key barriers	Solutions
Planning Timelines	Lengthy, inefficient planning due to fragmented, uncoordinated, and non-standardized processes	Wholesale process redesign to streamline and standardize
		Utilities and RTOs identify right use cases where advanced planning tools will accelerate planning
Cost Allocation	Federal, state, and local opposition because of (perceived) lack of benefits	Regulators to agree on projects to execute, ensure early engagement, and identify incentives
	Lack of standardized cost allocation frameworks to address in region and inter-regional benefits	States within planning regions to agree on standardized cost frameworks (FERC-enforced)
Permitting	Lengthy and fragmented federal, state, and local permitting processes, with high litigation risk	Advance federal permitting reform (e.g., simplify NEPA, shot clocks, override state-level permitting)
		States to streamline state-level permitting processes

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OpenMinds

OpenMinds Is Advancing Six Catalyzing Projects to Optimize And Build the Future Grid

Optimize | Build | Optimize and Build

1

Develop and communicate the integrated **U.S. Grid Vision Plan**

2

Provide **data-driven perspectives to inform Federal and State policy for 'Optimize' and 'Build' solutions**

4

Enable **ATT best practice sharing between utilities** to accelerate adoption

6

Facilitate the **build of a Speed to Power loop** – an innovative, high-value, and large-scale transmission expansion

3

Educate **RTOs/utilities on value and use cases of advanced AI planning tool** to encourage adoption

5

Socialize a prioritized **list of specific, large scale, high value grid interconnections**

To be developed:

Support acceleration of GW-scale **distributed battery storage adoption***

Note: *Still exploring storage project framing with potential partners and what OM can do to catalyze action; to be developed in coming weeks

Grid Action #1: The Grid Vision Plan

***Goal*: Influence nation-wide grid optimization and buildout priorities**

***Barriers*: Lack of prioritization of the Grid as a National Strategic Asset; Absence of a clear roadmap to deliver affordable and reliable load growth**

***Solution*: Targeted distribution of a clear, actionable, and measurable Grid Vision Plan to align, engage, and educate stakeholders**

OM's Role

Develop the Plan through coordinated expert input, synthesized insights, and compelling storytelling to drive **stakeholder alignment and changemaker education**

Implementation Partners

Provide **expert input**, expand network, and **enable more effective Plan circulation**

Results

1) **50+ critical stakeholders in possession** of the GV Plan, who are informed and mobilized to Action

OM Network

Grid Action #2: Federal And State Policy Action

***Goal*:** Shape federal and state policy to support transmission buildout and grid optimization

***Barriers*:** Divergent views; Lack of clear, data-driven roadmap to solve for affordable and reliable growth; untrusted messengers

***Solution*:** Educate key policymakers on key barriers and potential solutions to shape legislative action and EOs

OM's Role

Convene experts, **distill insights into high-impact materials**, identify key policymakers and opportunities, and **educate** to shape policy

Implementation Partners

- **Provide industry insights** to inform data-driven policy
- **Pinpoint key stakeholders** for gathering data/insights and sharing perspectives

OM Network

Results

1) **Increased policymaker understanding** of issues and potential solutions

2) **Policymaker support and action** for transmission buildout and grid optimization

Grid Action #3: Scale Adoption of Advanced AI Planning Tools

***Goal*: Better and faster planning through scale adoption of advanced planning tools by utilities/RTOs**

***Barriers*: Limited awareness of technology and value potential; Structural challenges to adoption at pace**

***Solution*: Host workshop(s) to showcase success stories and future-oriented solutions to tackle today's barriers to encourage AI adoption**

OM's Role

Identify and package success stories from end-users and tech vendors, **facilitate RTO/utility meeting, showcase findings, and encourage partnerships** to implement technology

+

Implementation Partners

Identify and **solicit end-users,** help develop **success stories,** jointly develop **POV on AI tools, facilitate workshop,** and assist in **identification of viable adopters**

Microsoft

Results

1) **1+ RTO/utility commitments** to deploy AI planning tools

2) **Increased awareness and understanding of tools** and willingness to deploy them

3) Accelerated planning timelines; **unlocked critical grid capacity**

Grid Action #4: Scale ATT Adoption

***Goal*: Accelerate deployment of ATTs across utilities**

***Barriers*: Utility-perceived technology risk, limited awareness of performance/value and best practices, and insufficient financial incentives**

***Solution*: Convene key stakeholders to share success stories and best practices, increasing utility buy-in**

OM's Role

Identify front-runners and potentially receptive utilities, organize success stories/best practices, **facilitate workshop** including barrier/solutions discussion, and **assess workshop impact**

Implementation Partners

Help identify right utilities, **provide data for and support deployment success stories** and best practices, and help **facilitate workshop/dinner**

OM Network

Results

1) **1+ utilities commit to deployment** of new ATT pilots after working session

2) Utilities report **clearer understanding of deployment value**

Grid Action #5: Critical Interconnects

***Goal*: Accelerate buildout of high value, large-scale transmission projects**

***Barriers*: Federal, state, and local opposition due to (perceived) lack of benefits**

***Solution*: Produce a Critical Interconnects Overview with a visual tool to align stakeholders on high value priority projects**

OM's Role

Share Critical Interconnects Overview with an added visual tool (map) and **identify stakeholders who can spearhead high impact projects**

Implementation Partners

Provide policy and market context to identify Critical Interconnects:

Targeting projects that deliver significant GW unlock, are 'shovel ready' and deliver ratepayer affordability benefits

Results

1) Visual tool highlighting **high-value interconnects**

2) Key stakeholder **commitments to advance high priority projects**

3) **Clear action pathways** to implement the Critical Interconnects Overview

Grid Action #6: The Speed to Power Loop

***Goal*: Accelerate deployment of essential transmission infrastructure**

***Barriers*: Slow and fragmented processes across planning, permitting, and cost allocation**

***Solution*: Facilitate the build of a new innovative, high-value, large-scale transmission backbone**

OM's Role

Facilitate engagement with key stakeholders and **support strategic decision-making**

Implementation Partners

Build Speed to Power loop with best planning, permitting, and cost allocation practices, aligning with other stakeholders for **expedited buildout**

Select group of Utilities/IPP/RTO partners

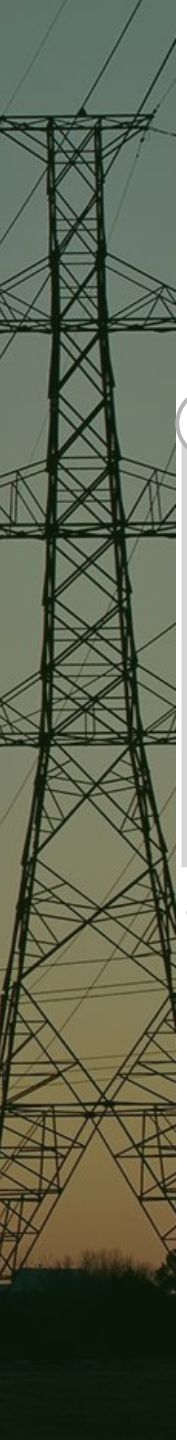
Results

1) Announcement and eventual completion of a **high-value**, large-scale **transmission backbone**

2) Data center **engagement in planning process/project design**

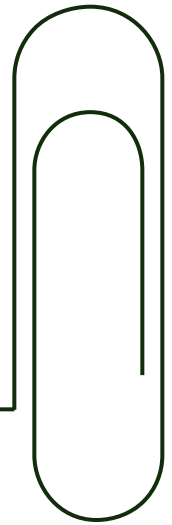
3) Utility commitment to implement **best technologies** (e.g., ATTs)

Grid Vision Workplan



1	2	3	4	5	6	7	8
				We are here			
Performing Desktop Research	**Conducting Expert Interviews**	**Framing a Draft Plan**	**Define Actions at Impact Summit**	**Implement Actions with Key Partners**	**Targeted Regional Impact Meetings**	**OM '26 Event at Stanford**	**Implementing with Partners & Measuring Progress**
May-Jul '25	*Jun-Sep '25*	*Jul-Sep '25*	*Sep 25-28, '25*	*Sep '25-Dec '25*	*Jan '26-Mar '26*	*April '26*	
✓	✓	✓	✓				
• *Reviewed 50+ whitepapers and reports*	• *50+ expert interviews conducted*	• *Strong draft of the problem statement, change needed, and key barriers*	• *50 participants – leading experts on policy, technology & markets* • *Prepare Action Implementation Plans from working group discussions*	• *Assemble committed team and refine implementation plans for action* • *Tactical engagement with key stakeholders*	• *Communicate Grid Vision Plan to build stakeholder commitments* • *Advance specific Grid Vision actions in key regions across the U.S.*	• *Update and mobilize the broader OpenMinds community in support of Grid Vision* • *Align on future Grid Vision priorities*	• *Continue to implement Grid Vision Actions* • *Track Grid Vision progress across metrics - GW unlocked and $ abated*

APPENDIX



The AI Revolution and Advanced Manufacturing Are Fueling U.S. Growth

AI REVOLUTION

Google DeepMind claims 'historic' AI breakthrough in problem solving

Nvidia/OpenAI Deal: Chipmaker Investing 100 Billion In ChatGPT Maker

AI will add $19.9 trillion to global economy by 2030, IDC predicts

OpenAI launches 'deep research' tool that it says can match research analyst

The AI Gold Rush: Why 2025's $359 Billion Capital Spending Spree Signals a Generational Investment Opportunity

The U.S. Must Win the AI Race

MANUFACTURING

A Reshoring Renaissance Is Underway

TSMC to invest $100B in US manufacturing

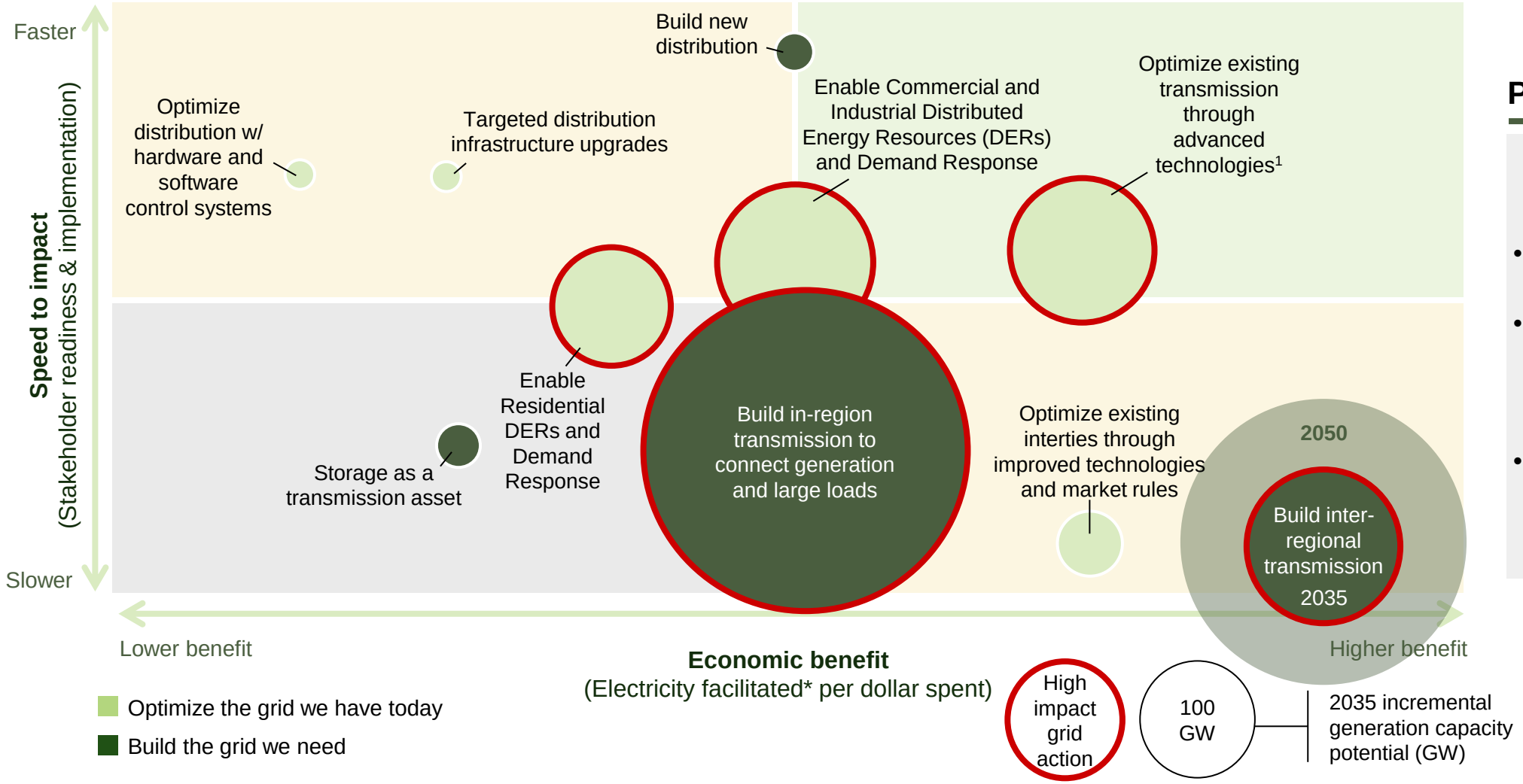
Manufacturing in America – Contributing to Our Economy, Employment, and Innovation

2025'S Manufacturing Revolution: How AI And Reshoring Are Redefining American Industry

U.S. Manufacturing Growth Is Boosting Schneider Electric

Infrastructure 2025: Capitalizing on Reshoring

Grid Actions Meet Load Growth, Affordably, Reliably, And Fast



DIRECTIONAL

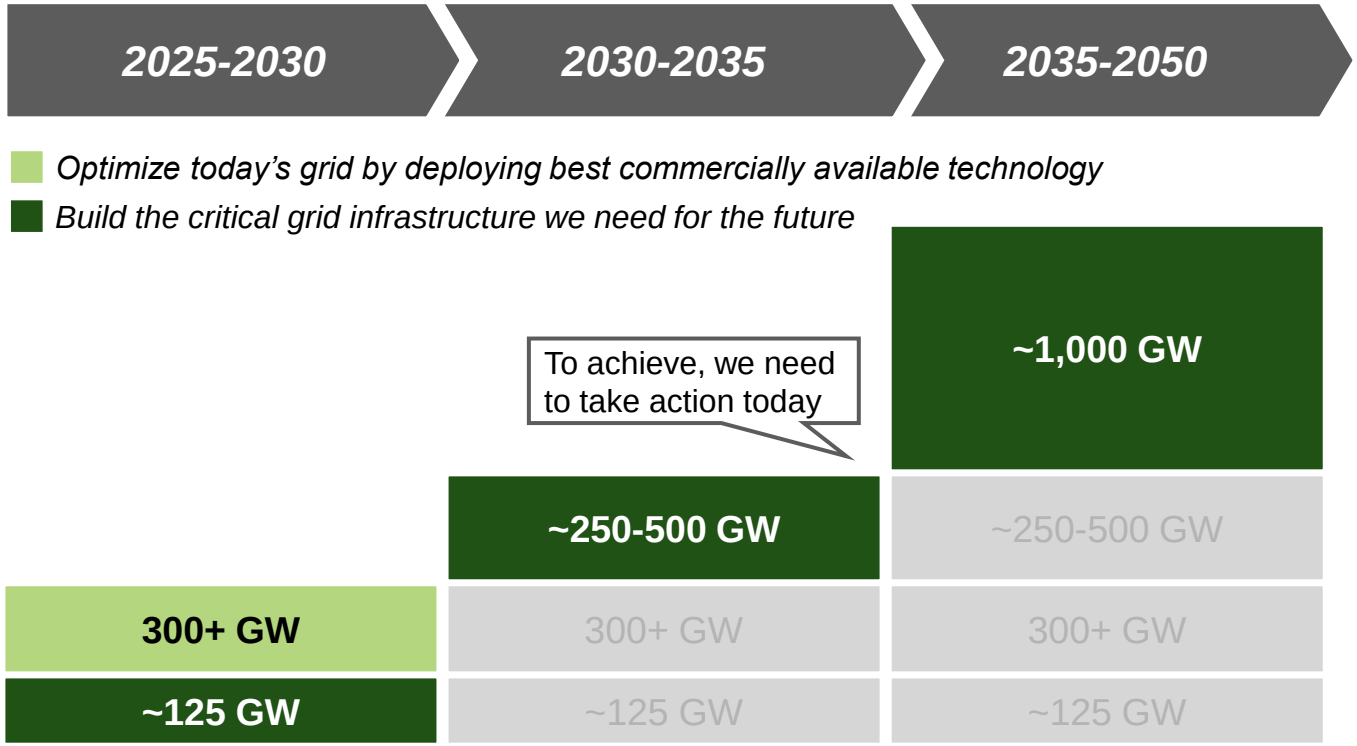
Prioritized by:

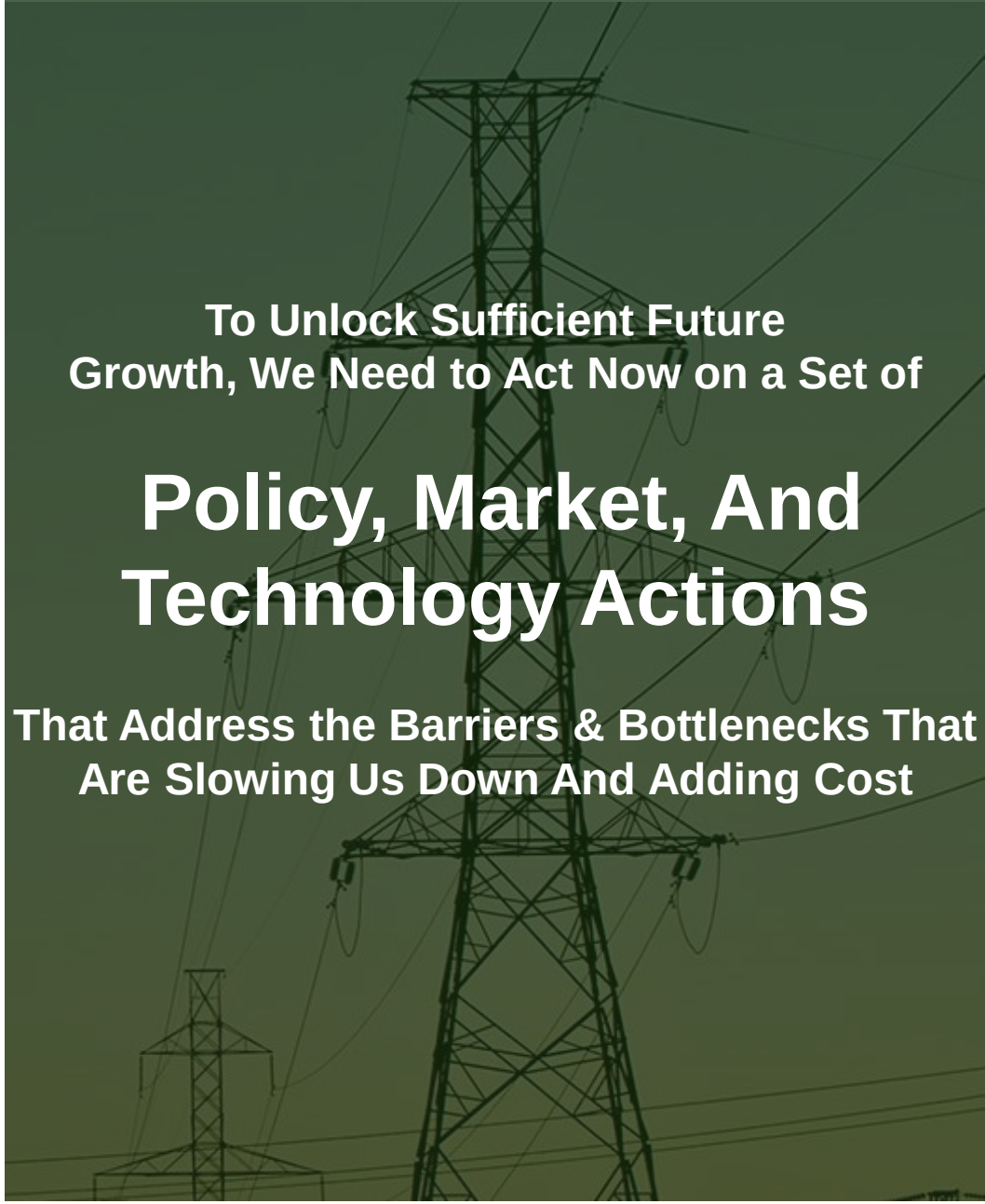
- Potential to **unlock GW**
- Potential **impact to drive affordability** via system economics
- Need for **acceleration**

Note: 'In-region transmission' refers to developing new bulk supply and connecting large loads within a single planning region; shaded region indicates future potential; *both through incremental generation and loss avoidance; 'Optimizing transmission through advanced technologies' refers to grid-enhancing technologies and advanced conductors; 'Build the grid we need' actions are not mutually exclusive with 'optimize the grid we have' actions; [1]bubble size is extrapolated from 2023 potential to 2035 potential.
Sources: Rystad, Wood Mackenzie, NREL National Transmission Planning Study, Brattle Group, DOE, S&P, Bloom Energy

The Path Forward

Estimated Required Additional Installed Capacity (GW)





Sources: Grid Strategies; Wood Mackenzie DER Outlook 2023, NREL National Transmission Planning Study 2024, Brattle Group 2024, Energy Information Administration

ATTs And Large Load Distributed Energy & Demand Response Can Potentially Unlock ~260-340+GW in the Next 5 Years

/DIRECTIONAL

Cost vs greenfield build
$$$$ Equal cost $ Significantly lower cost

	Technology		5-year deployment potential (GW)	Ratepayer cost ($⟶$$$$)	Deployment timeframe[1]
Advanced Transmission Technologies	Grid Enhancing Technologies	Dynamic line rating (DLR)	~20 GW	$	*3-6 months*
		Advanced power flow control (APFC)	~30 GW	$	*<15 months*
		Topology optimization	~20 GW	$	*3-6 months*
	Advanced reconductoring		~50-100 GW	$ $	*12-36 months*
Demand Response & Distributed Energy Resources	Demand Response (incl. data center curtailment)		~55-65 GW	$ $ $ *Highly depends on incentives required to unlock curtailment*	*Over next 5 years as GW potential scales with growth*
	Distributed Fuel Generation		~35-50 GW		
	Distributed Storage		~50+ GW[2]		
Total			**~260-340+ GW**		

Assuming future technology innovations materialize

Note: 1. From planning to finalized implementation; 2. An example of an innovation is an HVAC battery storage solution by Carrier which could, at full implementation in U.S. residential homes, offer 100 GW across the U.S. Based on the ratio of commercial to residential Carrier HVAC units in the U.S. by tonnage, this innovation alone would yield roughly 50 GW in demand flexibility; 3. Generation investment and operational costs borne by customer, not ratepayer; Sources: DOE; Brattle; WATT Coalition; Ampacimon ISO-NE; AES; Sumitomo Electric; Clarum Advisors; ESIG; Brattle; MIT; Lazard; Grid Strategies; WoodMac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