



Supply Chain Speed & Scale

ESIG Plenary Panel

March 19, 2025


scottmadden
MANAGEMENT CONSULTANTS

Goal for Today's Plenary Panel

The predominate question
is...



...what must be true to
achieve an infrastructure
mobilization of this
magnitude?

Engage today's audience
on what it will take to build
the grid that we are
imagining. This means
providing information on
the utility value chain (Gx,
Tx, and Dx) in addition to
the impact to customers
and communities.



Utility Speed & Scale

Speed & Scale: Supply Chain vs. The Energy Transition



Speed:

Projected market conditions caused by the energy transition and infrastructure mobilization are changing faster than utility supply chains.



Scale:

The size and complexity of the energy transition and infrastructure mobilization far exceeds the investment in the supply chain function in utilities.



How can utility supply chains keep pace with the speed and scale of this infrastructure mobilization?





Speed of Change: ScottMadden Energy Industry Update (EIU)

2022 This Energy Industry Update examined how the combination of ambitious decarbonization targets, rising natural gas prices, policy mandates, and geopolitical events are combining to put pressure on the energy industry. This report examined the impact of multiple and sometimes conflicting pressures—between decarbonization aspirations and system reliability and flexibility, between demand for new energy resources and the complexity of integrating them into the grid, and between investment needs and affordability.

1. Fossil fuel switching
2. Capital Markets and Capital Needs
3. Utility Decarbonization Portfolios
4. Interconnection Queue Reform

2024 The energy transition remains much discussed in the energy and utilities industry. For some, this transition is not moving at the pace and linearity they would prefer. But some ambitions are meeting the reality of the time and cost of making dramatic changes to an energy system. The theme of this issue is "The Distance," which reflects time and effort

1. to get new non-emitting energy technologies to commercialization (long-duration storage, next-generation geothermal),
2. to improve regional transmission planning and get transmission projects under way (FERC orders),
3. to reconfigure (if feasible) power generation or to preserve resources as long as possible for reliability (EPA greenhouse gas regulations), and
4. to implement effective programs for affordability (low-income energy affordability).



How can utility supply chains keep pace with the speed and scale of this infrastructure mobilization?





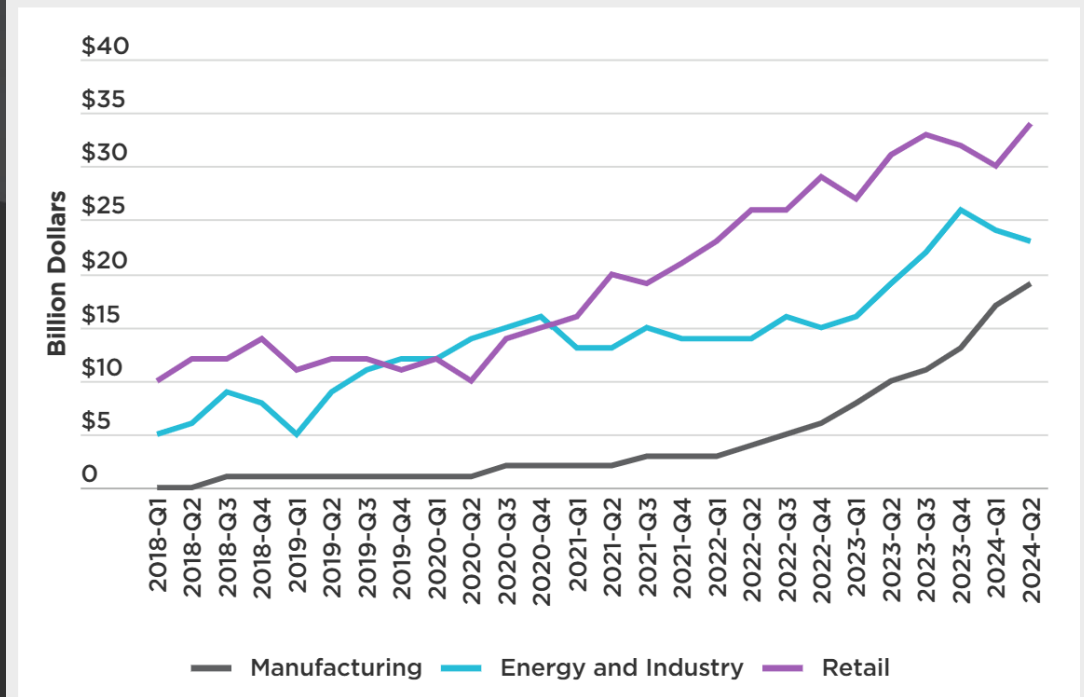
Scale: Utility Supply Chain OpEx Typically Grows Between 0% - 3%

Clean energy investments can be organized into the following categories:

1. Manufacturing: Investment in the construction or expansion of factories that manufacture clean energy, clean vehicle, building electrification, or carbon management technology.
2. Energy and Industry: Investment in new or existing facilities to produce clean energy, capture carbon dioxide emissions, or decarbonize industrial activity.
3. Retail: Investment by individual households and businesses purchasing or installing clean electricity generation and storage, clean vehicles, or building electrification technology.

Clean energy investments in all three categories have increased significantly since the passage of the Infrastructure Investment and Jobs Act (November 2021) and Inflation Reduction Act (August 2022).

Figure 6.1: Quarterly U.S. Clean Energy Investment (\$ Billions)



Source: Rhodium Group and MIT Center for Energy and Environmental Policy Research (CEEPR)



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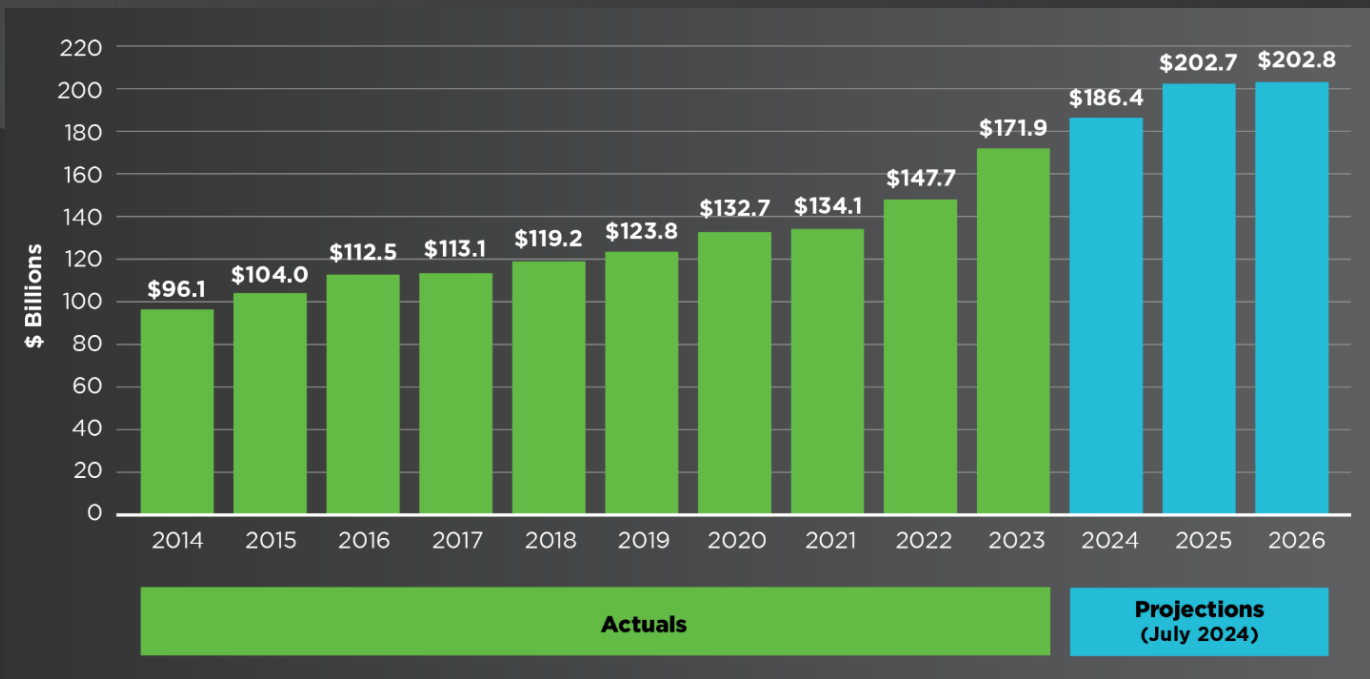


Scale: Utility Supply Chain OpEx Typically Grows Between 0% - 3%

Capital spending by U.S. investor-owned electric utilities has steadily increased over the past decade, a trend expected to continue. Actual capital expenditures rose from \$96.1 billion in 2014 to \$171.9 billion in 2023, marking a 78.9% increase over 10 years. Projections for the next three to five years indicate further growth as many utilities announce significant spending plans to support load growth from data centers and artificial intelligence, modernize the electric grid, add generation capacity, and enhance resiliency and reliability through new or upgraded infrastructure.

As of September 2024, 72 electric and 71 gas rate cases were pending across 41 states and the District of Columbia. Nearly all reflect substantial increases in requested capital expenditures. The aggregate net rate increase proposed in these cases totals \$21.1 billion, excluding adjustments for later steps in multiyear rate plans.

Capital Spend for Electric IOUs



Source: ScottMadden Capital Deployment Playbook



How can utility supply chains keep pace with the speed and scale of this infrastructure mobilization?





Utility Supply Chain Speed & Scale



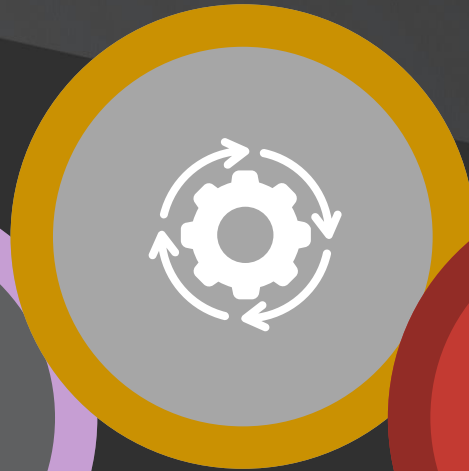
Speed & Scale: Utility Supply Chains Primary Strategies to Meet The Challenge of Infrastructure Mobilization

How can utility supply chains keep pace with the speed and scale of this infrastructure mobilization? The strategies below help supply chain keep pace despite investment in supply chain OpEx being less.

Demand Planning



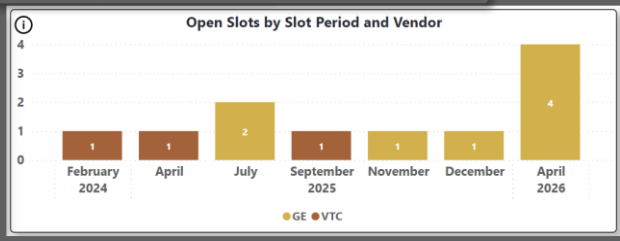
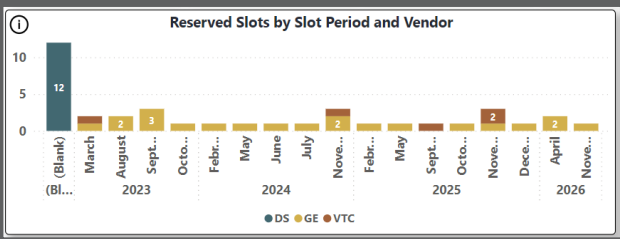
Inventory Optimization



Operating Model



Strategic Alliances



Demand Planning

Specifications For Key Materials

1

Limited tools and technology for demand planning has led to development of bespoke tools that ingest specifications during project planning

2

Step One allows for review of materials for spec rationalization in step Two

3

With confirmed specifications further in advance, supply chain can work with manufacturers to slot material needs in production queues

4

Bespoke demand planning tools provide data visualization to highlight gaps between manufacturer capacity and project milestones

Slots

Project ID Lookup: CB - Briar Patch

Manufacturer Lookup:

Item Lookup:

Purchase Order Lookup:

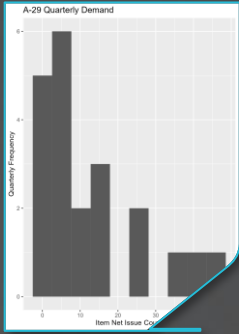
Add New Slot Record

Delete Slot Record

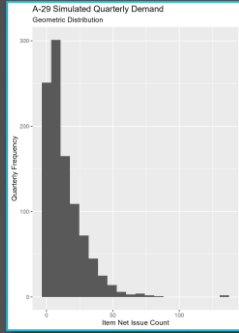
Equipment	MFG	SLOT PERIOD	ITEM ID	PROJECT ID	MR NUM	MR NEED BY	PO NUM/LINE	PROJ SHIP	PO DEL DAT	PRICE	PO VENDI	VENDOR	PART #
Transformer(s)	GE	3/1/2023	Transformer(s) - TT88061: 230/25/50/-	P25534 - Jackson Creek	No MR	No MR	383400-1		08/26/22	\$4,805	239311	GE GRID	SCT/TT88061
Transformer(s)	VTC	3/1/2023	Transformer(s) - TT88053125: 115/25/-/-	Truettlen Co. Ind.	No MR	No MR		3/15/2023					TT88053125
Transformer(s)	GE	8/1/2023	Transformer(s) - TT88054125: 115/25/25/-	P98677 - Jimps	No MR	No MR							TT88054125
Transformer(s)	GE	8/1/2023	Transformer(s) - TT88053125: 115/25/-/-	P89705 - Cherokee Water	52971	09/04/23							TT88053125
Transformer(s)	GE	9/1/2023	Transformer(s) - TT88054125: 115/25/25/-	P89705 - Cherokee Water	52971	09/04/23							TT88054125
Transformer(s)	GE	9/1/2023	Transformer(s) - TT88061: 230/25/50/-	P79417 - Roy Parks Road	54513	10/15/23							TT88061
Transformer(s)	GE	9/1/2023	Transformer(s) - TT88059: 115/25/50/-	P79452 - Belfast	55937	01/01/24							TT88059
Transformer(s)	GE	10/1/2023	Transformer(s) - TT88055312: 115/12/-/-	P98698 - Kubota Drive	No MR	No MR							TT88055312
Transformer(s)	GE	2/1/2024	Transformer(s) - TT88054125: 115/25/25/-	CB1596 - Louisiana Pacific - Center	56478	02/15/24							TT88054125
Transformer(s)	VTC	2/1/2024	Transformer(s) - TT88054125: 115/25/25/-		No MR	No MR		2/15/2024					TT88054125
Transformer(s)	GE	5/1/2024	Transformer(s) - TT88054125: 115/25/25/-	CB1144 - Spring Bluff	56868	05/01/24							TT88054125
Transformer(s)	GE	6/1/2024	Transformer(s) - TT88053125: 115/25/-/-	P79427 - Harmony Road	No MR	No MR							TT88053125
Transformer(s)	GE	7/1/2024	Transformer(s) - TT88054112: 115/12/-/-	P79437 - Woodard Road	No MR	No MR							TT88054112
Transformer(s)	GE	11/1/2024	Transformer(s) - TT88059: 115/25/50/-	P98704 - Amljack	No MR	No MR		11/4/2024					TT88059
Transformer(s)	GE	11/1/2024	Transformer(s) - TT88060225: 230/25/25/-	P7 - Hard Labor Creek Reservoir	No MR	No MR		11/15/2024					TT88060225
Transformer(s)	VTC	11/1/2024	Transformer(s) - TT88054125: 115/25/25/-	P79442 - Lone Oak Road	No MR	No MR		11/22/2024					TT88054125
Transformer(s)	GE	2/1/2025	Transformer(s) - TT88054125: 115/25/25/-	Pine Inn	No MR	No MR		1/27/2025					TT88054125
Transformer(s)	VTC	4/1/2025	Transformer(s) - TT88054125: 115/25/25/-		No MR	No MR		4/24/2026					TT88054125
Transformer(s)	GE	5/1/2025	Transformer(s) - TT88054125: 115/25/25/-	P96 - South Glennville	No MR	No MR		5/16/2025					TT88054125



Actual historical quarterly demand



Simulated quarterly demand



Inventory Optimization

Statistical Modeling That Matches Item Behavior in Utility Materials Management

1

Review each individual catalog item's usage distribution

2

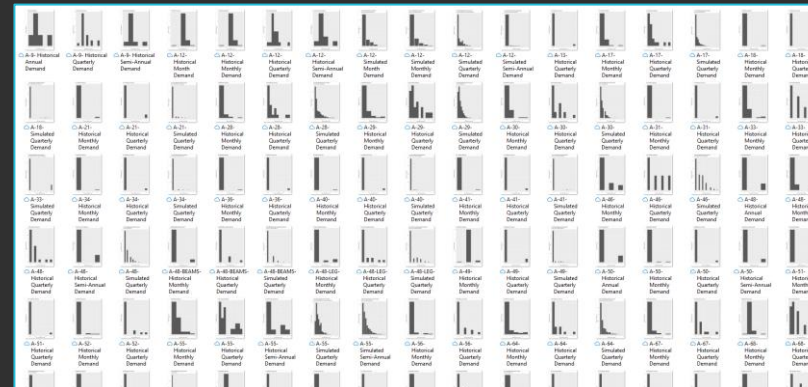
Review 20+ statistical distribution models to choose the best-fit distribution for each catalog item

3

Categorize items so that the percentage of the selected distribution matches the service level desired (lower percentage for consumables, higher percentage for critical items)

4

Develop data visualization tools to manage items at risk or whose usage changes



Sample view of distribution assignments

COEs own and direct two primary specialized activities:

- ✓ Programs
- ✓ Planning and Analysis

✓ Examples of Programs:

- Strategic Procurement
- Contract Management
- Supplier Relationship Management (SRM)
- Risk Management
- Supplier Diversity

✓ Examples of Planning and Analysis:

- Demand Management
- Reporting & Analytics
- Spend Analysis
- Market Analysis



Operating Model

COEs and Category Management Buildout

1

Expansion of self-service portals with virtual agents and chat bots for transactional work

2

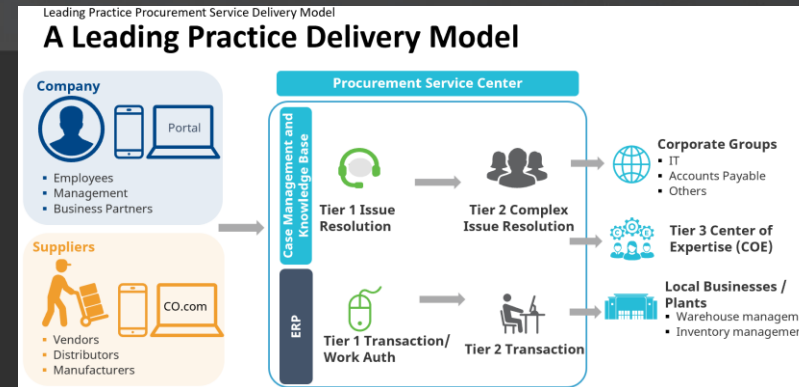
Expansion of COEs aligned with infrastructure mobilization such as risk management and analytics

3

Incorporation of category managers into capital planning process to bring market and supplier analyses to planning and decision making

4

Incorporating demand planning inputs into category plans





Strategic Alliances

Strengthening Collaborative Relationships

- 1** Establish internal teams and prioritize potential alliance relationships using several analyses of performance, markets, suppliers, and spend
- 2** Conduct alignment workshops to develop objectives, outcomes, value-drivers for all, and high impact opportunities
- 3** Assign roles and develop action plans with measurable success outcomes
- 4** Conduct challenge sessions and establish governance

