

Tuesday, September 26, 2023

Ongoing Energy Supply Chain Constraints and the Federal Response

PIERCE ATWOOD 

USG/Industry Collaboration on Supply Chain Challenges and Opportunities in the Power Sector

Gene Rodrigues, Department of Energy

Transformers and Energy Sector Supply Chain Issues

Joe Donovan, Pierce Atwood LLP &

Transformer Manufacturing
Association of America

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Transformer Manufacturing Association of America

- Member-formed trade association **founded in 2021**
- **Represents the domestic transformer manufacturing sector** including manufacturers and supply chain vendors
- Members directly **employ almost 5,000** engineers, production line operators, sales and repair staff and other employees
 - › Indirectly employ close to 20,000
- Members manufacture thousands of transformers in the US of all sizes and designs using a sophisticated international supply line
- There is much to grow as only ~20% of the transformers sold in the US are produced domestically

Why the transformer demand constraint?

- At present, the TMAA members are at full capacity with three shifts per day, 7 days a week
- Each **transformer is specifically designed and engineered** for the specific utility and often for the specific substation or point of interconnect
 - › Difficult for utilities to have deep reserve of transformers for certain sized units
- **Hangover from Covid** with suppressed demand, impacted component delivery and curtailed housing projects
 - › Our **underlying raw and other components are taking longer for delivery** and costing more, both of which are passed through
 - Shortages of insulation and insulated paper, copper, windings, GOES, bushings, etc.
- **Labor** shortages for trained engineers and skilled production line workers
- **Aging infrastructure** in need of replacement
 - › average age of distribution transformer is roughly half their expected life, and it is worse for the larger power transformers
- **Energy transition** puts further pressure on demand

What to Expect Going Forward

No indications that demand will subside in near future

- ~1300 power transformers sold in US in 2020 anticipated to double by 2027
- Demand for LPS expected to increase by ~25% by 2027
- Recent **DOE report concluded that the supply of new transformers must “multiply dramatically”** if the nation’s grid is to fill up with new wind and solar generation and EV charging
- **Transformer supply is a national security issue** — even without the added pressure of a clean energy transition
 - › Executive Orders, DOE and Commerce reports recognize

Policy Options

A Marshall Plan for domestic transformer production:

- **The only long-term answer is to increase domestic production capacity for all transformer sizes and components** such as GOES, copper, insulation paper, bushings, windings, core processing, etc.
- **Remove any tariffs or quotas on GOES and other critical components** that are not currently available at volume in the US
 - › **Particularly for components that were processed in a friendly jurisdiction** like Canada, Mexico, UK or EU;
- encourage the entry of **new domestic finished GOES producers**;
 - › help **incent the current domestic steel producers to invest in their facilities**;
- **coordinate a nimble federal response** from various agencies impacting the ability to build new manufacturing, including EPA and other permitting agencies;
- **strictly enforce the Buy American Act** with realistic minimums for domestic content given the realities of the current supply chain; and
- support **development of nationwide workforce development** training to encourage young engineers and line operators to join the transformer manufacturers.

Potential Tools – DOE Loan Program

DOE Loan Programs (Sections 1703 and 1706)

Defense Production Act

- › June 2022 proclamation designating transformers and grid components as essential to national defense
- › No appropriations contained in FY23 budget at DOE for transformers
- › Ongoing discussions at DOE and Hill

Antidumping and Countervailing Duties

- › Focus on Large Power Transformers, but issues throughout sector

Resources

- <https://www.energy.gov/policy/securing-americas-clean-energy-supply-chain>
- <https://www.energy.gov/mesc/office-manufacturing-and-energy-supply-chains>
- [Stronger Supply Chain Links to a Clean Energy Future | News | NREL](#)
- [BlueGreen Alliance | Map and Analysis: Building a Strong Manufacturing Base for Clean Energy in the US](#)

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AMERICAN
PUBLIC
POWER
ASSOCIATION

Powering Strong Communities

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September 26, 2023

How are Public Power Utilities Different?



Public Power



Rural Cooperatives

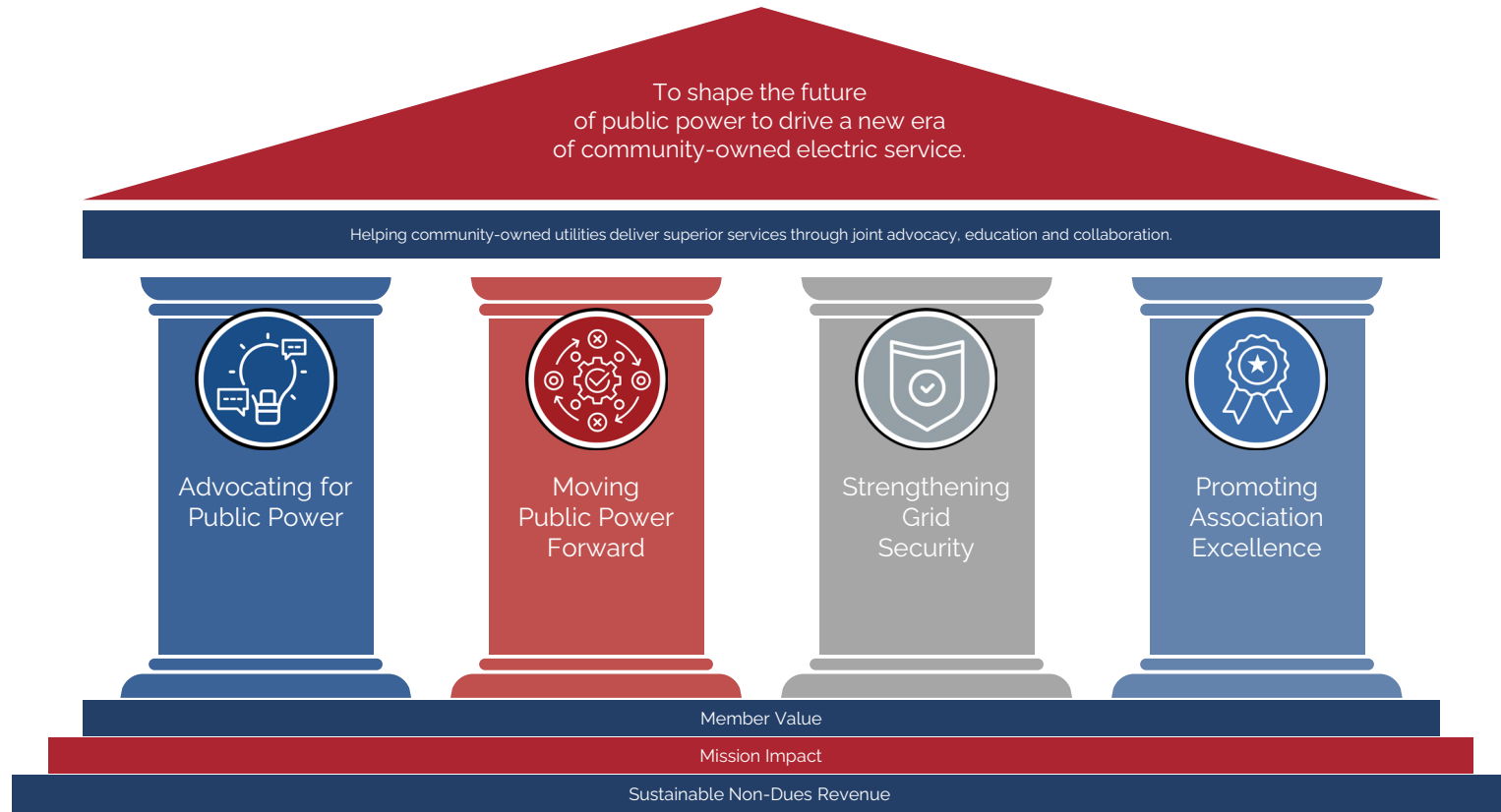


**Investor-Owned
Utilities**

MODEL	Publicly owned, not for profit	Privately owned, not for profit	Publicly owned, for profit
ACCOUNTABLE TO	Community	Members	Shareholders
SHARE OF UTILITIES	60%	20%	6%
SHARE OF CUSTOMERS	14%	13%	68%
SHARE OF GENERATION	10%	5%	37%

American Public Power Association

- ~1,500 utility members
- 99 of top 100 public power utilities (by revenue) are members



Supply Chain Constraints

➤ Lack of supply of essential electrical components

- 80% of utilities reported that distribution transformer inventories are lower today than in 2018
- Median transformer stock at 75% of 2018 levels
- Some utilities reported having only 10-15% of numbers of transformers than four years ago

Equipment	2018 Median Quoted Delivery Time	2022 Median Quoted Delivery Time
Transformers	3 months	12 months
Bare wires	1 month	5 months
Primary cable	2 months	6 months
Meters	2 months	6 months

Supply Chain Constraints—Impacts

- Triggering of force majeure clauses
- Homebuilding and electrification projects delayed/abandoned
- Increased requests for mutual aid/decreased ability to respond to mutual aid requests
- Potential decrease in reliability

Defense Production Act—What does it do?

- The primary source of presidential authorities to expedite and expand the supply of materials and services from the U.S. industrial base needed to promote national defense
- DPA authorities are available to support a variety of activities, including but not limited to:
 - Emergency preparedness
 - Protection or restoration of critical infrastructure
 - Prevent/reduce vulnerability/minimize damage/recover from acts of terrorism
 - Waiving international trade requirements in order to secure a supply chain from a foreign source
 - Requiring installation of certain equipment or other measures at production plants

81ST CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 2759

DEFENSE PRODUCTION ACT OF 1950

JULY 28.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. SPENCE, from the Committee on Banking and Currency, submitted the following

REPORT

[To accompany H. R. 9176]

The Committee on Banking and Currency, to whom was referred the bill (H. R. 9176), to establish a system of priorities and allocations for materials and facilities, authorize the requisitioning thereof, provide financial assistance for expansion of productive capacity and supply, strengthen controls over credit, regulate speculation on commodity exchanges, and by these measures facilitate the production of goods and services necessary for the national security, and for other purposes, having considered the same, report favorably thereon with an amendment, and recommend that the bill as amended to pass.

Defense Production Act—Recent Uses

- **2011**—President Obama invoked it due to growing concerns of espionage from China, making telecommunication companies report on their hardware and software components coming from a foreign source
- **2017**—President Trump invoked the act to secure the supply of an array of products deemed critical for national defense – including microelectronics, aerospace structures, and satellite components
- **2020**—President Trump invoked it to ensure production of ventilators and N95 Respirators.
- **2020**—President Trump invoked it to ensure the opening of plants of production for poultry, eggs, beef and pork during the COVID-19 pandemic
- **2021**—President Biden invoked the act to secure production of COVID-19 vaccinations
- **2021**—President Biden use the act to secure production of fire hoses to mitigate the effects of wildfires around the country.
- **2022**—President Biden signed a determination authorizing use of the act to strengthen the domestic battery capacity, including to direct increases in domestic mining and processing capacity for battery materials
- **2022**—President Biden issued presidential determinations to utilize DPA to accelerate domestic production of five key energy technologies: (1) solar; (2) transformers and electric grid components; (3) heat pumps; (4) insulation; and (5) electrolyzers, fuel cells, and platinum group metals

Workforce Challenges

- Lack of Skilled Workforce
- More Projects/More Investments
- Location, Location, Location
- Staying Competitive
- “Cost of Hiring”
- Potential/Proposed Federal Legislation

How are APPA Members Responding?

- Forming Consortia to Leverage Suppliers
- Developing a Manufacturing Facility for Public Power
- Refurbishing Transformers
- Standardization
- Reforming Bidding Requirements

Questions?

Q&A

Federal Incentives for Clean Manufacturing Investments

Merrill L. Kramer, Pierce Atwood LLP

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IRA Provides Broad Range of Governmental Incentives

- Section §48C Program Targets Different Activities than Most other Credits
 - › Rewards investing in Equipment to Manufacture Energy Property
 - › 30% ITC - \$10 billion available; \$4bn to be invested in energy communities (defined as tract where coal mine or coal-fired generating facility closed after 12/31/99)
- Three Distinct Categories:
 1. Clean Energy Manufacturing or Recycling
 2. Industrial Decarbonization
 3. Critical materials processing, refining and recycling
- Examples of Qualifying Investments:
 1. Projects that re-equip an industrial or manufacturing facility with equipment designed to reduce greenhouse gas emissions by at least 20%
 2. Energy efficiency and reduction in waste from industrial processes
 3. Carbon capture, transport, utilization and storage systems
 4. Other industrial technology designed to reduce GHG, as determined by Treasury.
- Treasury has provided Comprehensive List of Qualifying Projects as part of its Guidance
- Competitive Process – Proposals submitted to DOE for Recommendations to Treasury.
- Round 1 closed in July, 2023.
- Prevailing Wage and Apprenticeship Requirements must be met for 30% ITC.
- Opportunity for Additional Credits down Supply Chain.

IRC §45X Production Tax Credit for Advanced Manufacturing

- Differs from 48C – Targets Manufacture or Production of Renewable Components for solar, wind, inverter, battery and minerals produced in US.
- Taxpayer cannot claim both 48C and 45X tax credit.

Components and Credit Values:	
Solar	
Thin PV cells	4c/watt
Inverters	applicable amount with respect to such inverter
Crystalline PV cell	4c/watt
PV wafer	\$12 per square meter
Solar grade polysilicon	\$3/kg
Solar module assembly	7c/watt
Torque tube and longitudinal purlin	87c/kg
Structural fastener	\$2.28/kg
Central inverter	2.5c/watt
Utility inverter	1.5c/watt
Commercial inverter	2c/watt
Residential inverter	6.5c/watt
Microinverter	11c/watt
Wind	
Blade	2c/watt
Nacelle assembly	5c/watt
Tower	3c/watt
Offshore wind foundation	Fixed 2c/watt and floating 4c/watt
Offshore wind vessel	10% of sales price

DOE Incentive Programs

- Loans/Loan Guarantees
- Grants
- Rebates

DOE Loan Program

Section 1703 Loan Guarantee Program - \$412 billion

- **Transmission Projects - \$2 billion**
 - › To build new transmission lines or modify existing lines that have designated by DOE as necessary in the national interest
 - › In addition to \$5 billion in loan guarantees for HVDC systems, transmission to connect offshore wind and facilities along rail and highway routes
- **Advanced Technology Vehicle Manufacturing - \$3 billion**
 - › To finance new factories to make low-emission vehicles and components.
- **Tribal Energy Projects- \$20 billion**
 - › Available to Indian tribes or "tribal energy development organizations" to provide electricity on Indian land.
- **Title XVII Clean Energy Projects - \$40 billion**
 - › For commercial-scale deployments of new or significantly improved technology or systems
 - › Advanced fossil, advanced nuclear, renewable energy, energy efficiency and distributed energy projects in the United States
 - › Expanded to cover projects that increase the domestic supply of critical minerals
- **Defense Production Act - \$500 million (closed)**

DOE Loan Program (*cont.*)

Section 1706 Energy Infrastructure Reinvestment Program - \$250 billion

- Targets Three Types of Projects
 - › Retooling or replacing energy infrastructure that has ceased operations. To qualify, any fossil-fuel power plant must "avoid, reduce, utilize, or sequester air pollutants and GHG's
 - › Enabling operating energy infrastructure to "avoid, reduce, utilize or sequester air pollutants or GHG's
 - › Projects to remediate environmental damage associated with existing energy infrastructure

Up to 30 years generally for 80-100% of loan amount

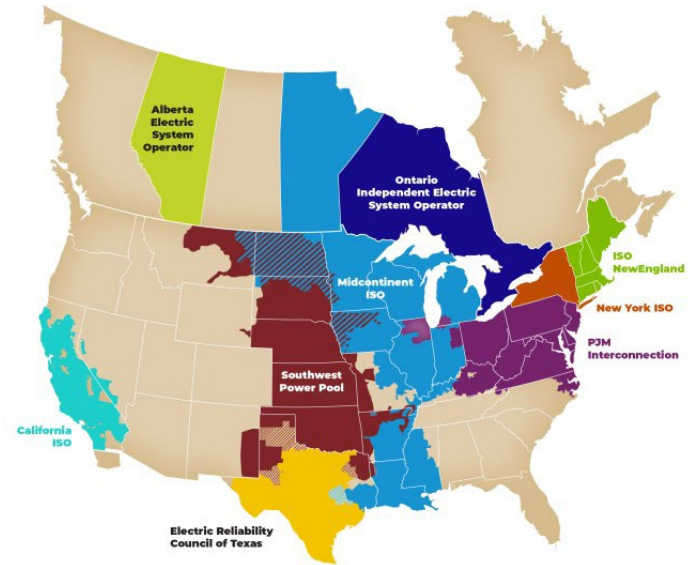
DOE Grant and Rebate Programs

Wide Variety of Financial Incentives

- **Reducing Factory Emissions - \$5.8 billion**
 - › Available for energy-intensive industrial or manufacturing plants
 - › Retrofits, upgrades and operational improvements and related engineering studies
- **Manufacturing Advanced Technology Vehicles - \$2 billion**
 - › Hybrid, plug-in electric hybrid, plug-in electric drive, and hydrogen fuel cell vehicles and components
 - › Priority for refurbishment or retooling of manufacturing facilities that have ceased operation
- **Energy Efficient Transformers**
 - › Rebates for replacing older transformers with more efficient transformers
 - › Equal to \$2 x reduction in losses, e.g., if replacement transformer reduces losses by 500 watts, rebate = \$2 x 500, or \$1,000
 - › Up to \$25,000 per applicant
- **Adopting Updated Building Energy Codes - \$1 billion**
- **Diesel Emission Reductions - \$60 million**
 - › For businesses reducing emissions from diesel vehicles used for goods movements; targeting low- and disadvantaged communities
- **Siting of Interstate Electricity Transmission Lines - \$760 million**
 - › For siting authorities to carry out proceedings to facilitate permitting and construction of new and upgraded transmission projects consistent with community priorities
- **Interregional and Offshore Wind Electricity Transmission Planning, Modeling and Analysis - \$100 million**
 - › For conducting transmission planning, modeling, and analysis of interregional and offshore wind transmission

Different markets offer their own Programs and Incentives

North American clean energy market incentives and programs vary significantly by geography, with certain areas offering more lucrative abilities to value stack through local incentives.



CALIFORNIA
Public Utilities Commission



Image Source: <https://isorto.org/>



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