NEMA

2025 GUIDE TO THE ELECTROINDUSTRY

Make it Electric

2025 By the Numbers

The electroindustry's economic impact, job creation, and national footprint

NEMA represents over 300 electrical equipment manufacturers that make safe, reliable, and efficient products and technologies that power, connect, and light our world. Together, our members contribute a full 1% of U.S. GDP and directly provide over 580,000 American jobs, adding more than $330 billion to the U.S. economy.

$428B
U.S. Electroindustry Market Size

$334B
U.S. Electroindustry Total Economic Impact

$185B
Invested across the U.S. since 2018

$325B
Electroindustry output

For every job created by the U.S. electroindustry...

3 more are generated elsewhere in the economy...

totaling almost

2.2 Million U.S. Jobs

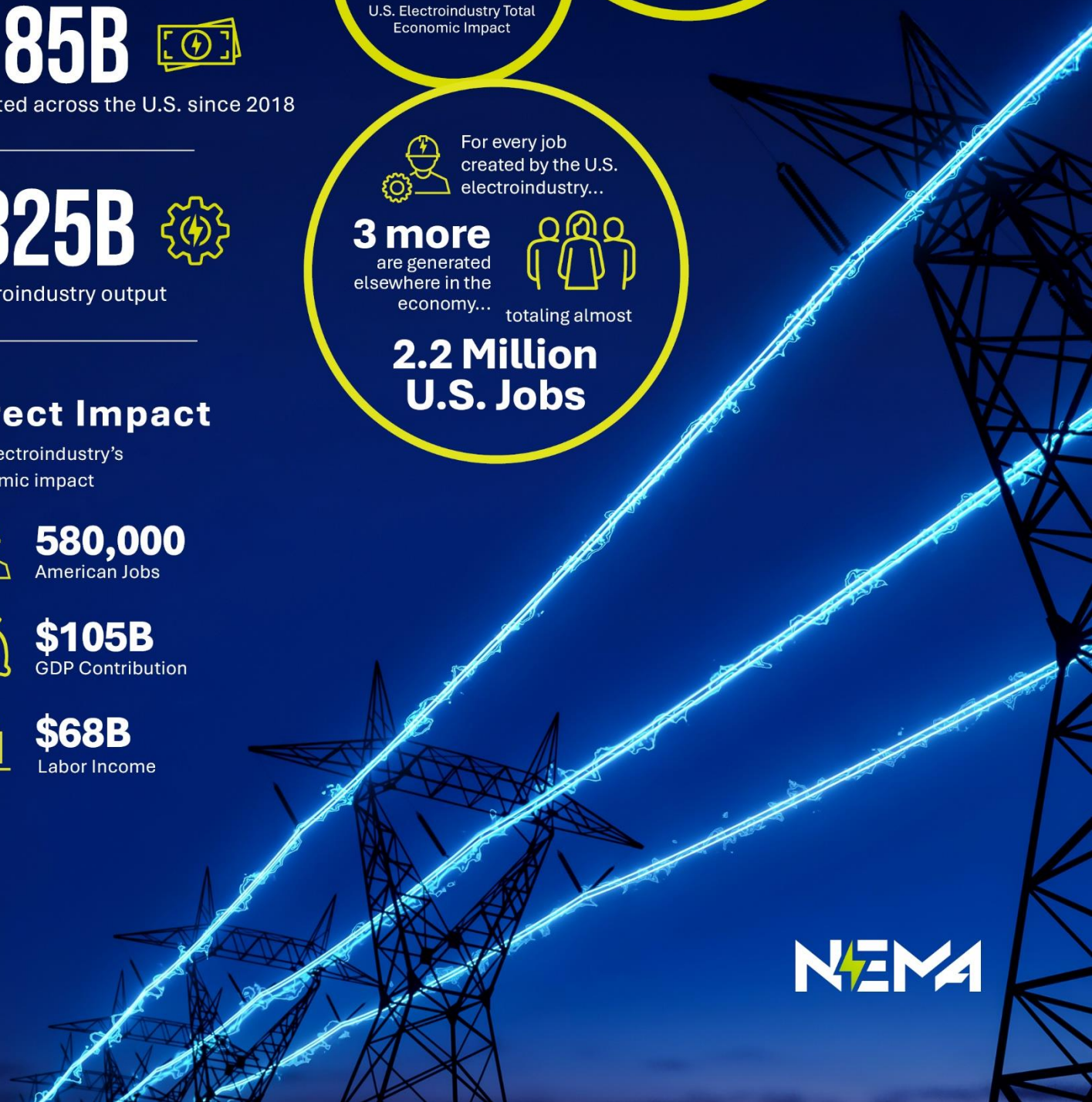
Direct Impact

The electroindustry's economic impact

580,000
American Jobs

$105B
GDP Contribution

$68B
Labor Income



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Abstract

The Guide to the Electroindustry offers a detailed analysis of the U.S. electroindustry, providing various measures that help to gauge the vitality of individual sectors and segments. This publication highlights the U.S. electroindustry's integral role in the economy.

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Table of Contents

Executive Summary 8

Introduction 11

Chapter 1: What is the Electroindustry? 12

Chapter 2: Electroindustry Economic Impact 19

Chapter 3: Electroindustry Output 22

I. Output by Sector 22

II. Output by State 24

Chapter 4: Electroindustry Employment & Labor Income 25

I. Employment & Labor Income by Sector 25

II. Employment & Labor Income by State 27

Chapter 5: Electroindustry Global Trade 30

I. Trade by Sector 31

II. Trade by Country 36

III. Trade by Region 39

Chapter 6: Electroindustry Market Size Trends 43

Chapter 7: Powering Tomorrow 46

I. Projecting Power Demand 46

II. Energizing Applications 49

III. Building Domestic Capacity 51

Chapter 8: Grid Reliability 54

I. Reliability Risks 54

II. Grid-Enhancing Technologies 54

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Conclusion **60**

References **61**

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List of Tables

Table 2.A: Electroindustry Economic Impact, 2023 19

Table 2.B: GDP Contribution by Sector, 2023 20

Table 3.A: Output by Sector, 2023 22

Table 3.B: Output by State, 2023 24

Table 4.A: Employment & Labor Income by Sector, 2023 25

Table 4.B: Employment & Labor Income by State, 2023 27

Table 5.A: Exports by Sector, 2019-2024 ($ billions) 31

Table 5.B: Imports by Sector, 2019-2024 ($ billions) 33

Table 5.C: Trade Balance by Sector, 2019-2024 ($ billions) 34

Table 5.D: Exports – Top 5 Countries, 2024 ($ millions) 36

Table 5.E: Imports – Top 5 Countries, 2024 ($ millions) 37

Table 5.F: Exports by Region, 2024 ($ millions) 39

Table 5.G: Imports by Region, 2024 ($ millions) 41

Table 6.A: Electroindustry Market Size by Sector, 2019-2023 ($ billions) 43

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List of Figures

Figure 6.1: Electroindustry Market Size, 2019-2023 ($ Bil.) 45

Figure 7.1: U.S. Net Electricity Consumption Projections by Sector, 2024-2050 47

Figure 7.2: Projected U.S. Data Center Electricity Consumption, 2024-2035 47

Figure 7.3: Data Centers Share of U.S. Power Demand, 2023-2030 48

Figure 7.4: Projected U.S. EV Electricity Consumption, 2024-2035 48

Figure 7.5: EV Share of U.S. Electricity Demand, 2023-2050 49

Figure 7.6: Electrical Equipment in AI Data Centers 50

Figure 7.7: Electrical Equipment in Manufacturing 50

Figure 7.8: Electroindustry Investment by State 51

Figure 7.9: Computer/Electronic/Electrical Manufacturing Construction 52

Figure 7.10: Electrical Structures Share of Manufacturing Construction 53

Figure 8.1: Flexibility Solution Analysis, 2025-2035 55

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Executive Summary

The electroindustry's economic impact continues to grow, driven by AI adoption and electrification trends

- The electroindustry contributed $334 billion to the U.S. economy in 2023, representing over one percent of Gross Domestic Product (GDP)
    - Battery manufacturing, wiring device manufacturing, and switchgear and switchboard apparatus manufacturing were the sectors with the largest GDP contribution
- The electroindustry directly provided 580,000 jobs and supported labor income of $67.5 billion in 2023
    - For every job created by the electroindustry, 2.8 are generated elsewhere in the economy, totaling 2.2 million jobs
    - Battery manufacturing, relay and industrial control manufacturing, and wiring device manufacturing provided the most electroindustry jobs in 2023
- California, Texas, Pennsylvania, Illinois, and Ohio are the states with the largest number of electroindustry employees
- The U.S. electroindustry market size reached $428.2 billion in 2023, with most sectors recording year-on-year growth
    - Market size expanded by 33.3 percent over the period from 2019 to 2023, with a 5.2 percent increase from 2022 to 2023
    - Battery manufacturing, copper rolling, drawing, extruding, and alloying, and other electronic component manufacturing experienced the fastest growth over the past five years

Despite investing heavily in domestic capacity in recent years, portions of the electroindustry remain globalized, leaving exposure to the complications of tariffs and domestic content requirements

- Based on publicly available sources, the electroindustry has invested over $185 billion in the United States since 2018, with batteries accounting for a significant share

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    - Electroindustry manufacturers have also invested substantially in facilities that produce equipment such as transformers, switchgear, and power electronics, which are critical to grid modernization, industrial growth, and AI data centers
    - Electroindustry investments have been concentrated largely in the Southeast region, led by North Carolina, Georgia, South Carolina, and Tennessee
    - Building on a survey of NEMA members conducted in September 2025, planned domestic capital investment in the electrical manufacturing industry may reach $60 billion over the next five years
- Based on industry NAICS codes and the estimated representation of each, the electroindustry exported $109.1 billion of goods in 2024, and the U.S. imported $211.7 billion of electroindustry goods in 2024, resulting in a trade deficit of $102.5 billion
    - Miscellaneous electrical equipment & components, motors & generators, and battery manufacturing were the top contributors to the electroindustry's export value in 2024
    - Batteries, miscellaneous electrical equipment & components, and motors & generators represented the largest shares of the electroindustry's import value in 2024
    - Mexico, Canada, China, Germany, and the U.K. are the electroindustry's top five export destinations
    - The U.S. imports the most electroindustry goods from Mexico, China, Japan, Germany, and Canada

Rising power demand for the first time in decades marks a pivotal moment for the electroindustry, bringing extraordinary opportunities alongside challenges

- U.S. electricity demand is projected to grow by an average of 2 percent annually through 2050, representing a total increase of nearly 50 percent from current levels
    - Demand growth is likely to be driven by data centers, e-mobility, building electrification, and manufacturing reshoring
        - Through 2035, energy-intensive data centers are expected to lead demand growth, while transportation and industrial electrification are projected to take the lead after 2035

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        - Electroindustry equipment comprises roughly one-third of the total materials spend to build a typical AI data center in the U.S. Likewise, electrical generally accounts for around 10 percent of the total hard input costs for a typical manufacturing plant
    - Electricity's share of final energy consumption is expected to rise through 2050, reaching about 32 percent, up from 21 percent today
- Resurgent electricity demand is likely to test grid reliability as peak demand patterns shift and intermittent generation (e.g., renewables) grows, making flexibility solutions essential with transmission and distribution (T&D) capacity additions needed to meet demand years away
    - Grid-Enhancing Technologies (GETs)—advanced tools that increase the capacity, flexibility, and efficiency of existing T&D infrastructure—can help improve grid reliability by optimizing power usage
    - Priority solutions for the electroindustry over the next 3-5 years include:
        - Reconductoring of transmission lines
        - Coordination of EV charging
        - Deployment of stationary storage
        - Deployment of digital substations
        - Optimization of residential appliance usage
        - Deployment of dynamic line rating technologies
        - Optimization of data center electricity use
        - Continued deployment of advanced metering infrastructure (AMI)
- In addition to technology solutions, critical policy reforms, as well as regulatory and trade certainty, can help to ensure a reliable and affordable energy system
    - All-of-the-above energy policies are recommended as a bridge to clean power
    - Consistency in tax, trade, and supply chain policy are essential for stakeholders to make the necessary investments to fortify the grid and ensure electricity supply keeps pace with demand
    - Permitting reform is vital to accelerating grid growth and securing returns on energy investment
    - Workforce development is also a key policy priority for delivering a reliable grid

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Introduction

Electroindustry manufacturers produce equipment and systems that manage electricity flow from the point of generation, through transmission and distribution, to end-uses such as factory automation, lighting, and building climate systems. The industry serves key markets such as manufacturing, utilities, mining, and construction. It also supplies consumer-oriented products like lighting sources and fixtures, primary batteries, and home safety devices including arc fault circuit interrupters, ground fault circuit interrupters, and fire alarms. Every day, Americans rely on electroindustry products that power digital connectivity and smart technologies, provide well-lit and temperature-controlled spaces, and enable safer and more automated manufacturing. The electroindustry is essential to American life and commerce.

The electroindustry stands at the epicenter of a generational shift in the electrical system, marked by rising electricity demand for the first time in decades—even as energy use grows more efficient—driven by the rise of power-hungry AI data centers as well as the spread of technologies such as electric vehicles and heat pumps. At the same time, the grid is being reshaped by the growing prevalence of renewables, energy storage, and distributed generation, all while facing mounting strain from natural disasters on aging infrastructure. Despite an ever-shifting policy landscape, electroindustry manufacturers are investing heavily in domestic manufacturing to ensure critical grid components are available to meet rising electricity demand and support energy efficiency and grid-hardening efforts.

As the push for American energy dominance advances, manufacturers, utilities, and policymakers are collaborating to drive innovation, accelerate grid modernization, and enhance reliability. Despite growing domestic investment, the electroindustry's supply chain remains globalized, and policies such as tariffs and domestic content requirements have introduced significant complexities. Policy and regulatory certainty will be critical to delivering a more flexible and resilient grid. Key priorities include permitting reform, stable tax and supply chain policy, consistent trade policy that supports competitiveness, and the development of a skilled workforce. Ultimately, a unified approach will be key to transforming today's grid into a future-ready backbone for American growth and energy leadership.

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Chapter 1: What is the Electroindustry?

The electroindustry is divided into sectors based on North American Industry Classification System (NAICS) codes that reasonably delineate the industry. NAICS codes are managed collaboratively by Mexico, Canada, and the U.S. and are the standard used by federal statistical agencies to classify business establishments for data collection purposes. Coverage factors were applied to each sector based on available data and industry scope. The electroindustry sectors are described below.

- **Residential electric lighting fixture manufacturing** *(NAICS = 335131)*
    - Comprises establishments primarily engaged in manufacturing fixed or portable residential electric lighting fixtures and lamp shades of metal, paper, or textiles. Residential electric lighting fixtures include those for use both inside and outside the residence.
    - E.g., residential chandeliers and desk lamps
- **Commercial, industrial, and institutional electric lighting fixture manufacturing** *(NAICS = 335132)*
    - Comprises establishments primarily engaged in manufacturing commercial, industrial, and institutional electric lighting fixtures.
    - E.g., commercial, industrial, and institutional ceiling lighting fixtures and luminous panels

Note: In data tables found in chapters 2, 3, and 4, 'residential electric lighting fixture manufacturing' and 'commercial, industrial, and institutional electric lighting fixture manufacturing' are consolidated under the category 'lighting fixture manufacturing'.

- **Electric lamp bulb and other lighting equipment manufacturing** *(NAICS = 335139)*
    - Comprises establishments primarily engaged in manufacturing electric light bulbs, tubes, and parts (except glass blanks for electric light bulbs and light emitting diodes (LEDs)), electric lighting fixtures (except residential, commercial, industrial, institutional, and vehicular electric lighting fixtures), and nonelectric lighting equipment.
    - E.g., LEDs, lanterns, flashlights

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- **Power, distribution, and specialty transformer manufacturing** *(NAICS = 335311)*
    - Comprises establishments primarily engaged in manufacturing power, distribution, and specialty transformers (except electronic components). Industrial-type and consumer-type transformers in this industry vary (e.g., step up or step down) voltage but do not convert alternating to direct or direct to alternating current.
    - E.g., power transformers, distribution transformers, autotransformers
- **Motor and generator manufacturing** *(NAICS = 335312)*
    - Comprises establishments primarily engaged in manufacturing electric motors (except internal combustion engine starting motors), power generators (except battery charging alternators for internal combustion engines), and motor generator sets (except turbine generator set units). This industry includes establishments rewinding armatures on a factory basis.
    - E.g., integral horsepower motors, fractional horsepower motors, generators and sets, armatures, rotors, phase converters
- **Switchgear and switchboard apparatus manufacturing** *(NAICS = 335313)*
    - Comprises establishments primarily engaged in manufacturing switchgear and switchboard apparatus.
    - E.g., power circuit breakers, control panels, fuses, power switching equipment
- **Relay and industrial control manufacturing** *(NAICS = 335314)*
    - Comprises establishments primarily engaged in manufacturing relays, motor starters and controllers, and other industrial controls and control accessories.
    - E.g., control circuit relays, motor control centers, rheostats, solenoid switches
- **Battery manufacturing** *(NAICS = 335910)*
    - Comprises establishments primarily engaged in manufacturing primary and storage batteries.
    - E.g., lithium storage batteries, rechargeable battery packs, alkaline cell batteries, flashlight batteries
- **Other communication and energy wire manufacturing** *(NAICS = 335929)*

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    - Comprises establishments primarily engaged in manufacturing insulated wire and cable of nonferrous metals from purchased wire.
    - E.g., nonferrous coaxial cable, nonferrous communications wire and cable
- **Current-carrying wiring device manufacturing** *(NAICS = 335931)*
    - Comprises establishments primarily engaged in manufacturing current-carrying wiring devices.
    - E.g., bus bars, ground fault circuit interrupters, lightning arrestors and coils
- **Noncurrent-carrying wiring device manufacturing** *(NAICS = 335932)*
    - Comprises establishments primarily engaged in manufacturing noncurrent-carrying wiring devices.
    - E.g., conduits and fittings, face plates (i.e., outlet or switch covers)

Note: In data tables found in chapters 2, 3, and 4, 'current-carrying wiring device manufacturing' and 'noncurrent-carrying wiring device manufacturing' are consolidated under the category 'wiring device manufacturing'.

- **Carbon and graphite product manufacturing** *(NAICS = 335991)*
    - Comprises establishments primarily engaged in manufacturing carbon, graphite, and metal-graphite brushes and brush stock; carbon or graphite electrodes for thermal and electrolytic uses; carbon and graphite fibers; and other carbon, graphite, and metal-graphite products.
    - E.g., carbon or graphite fibers, carbon or graphite electrodes
- **All other miscellaneous electrical equipment and component manufacturing** *(NAICS = 335999)*
    - Comprises establishments primarily engaged in manufacturing industrial and commercial electric apparatus and other equipment (except lighting equipment, household appliances, transformers, motors, generators, switchgear, relays, industrial controls, batteries, communication and energy wire and cable, wiring devices, and carbon and graphite products). This industry includes power converters (i.e., AC to DC and DC to AC), power supplies, surge suppressors, and similar equipment for industrial-type and consumer-type equipment.

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    - E.g., inverters, rectifiers, solid-state battery chargers
- **Copper rolling, drawing, extruding and alloying** *(NAICS = 331420)*
    - Comprises establishments primarily engaged in one or more of the following: (1) recovering copper or copper alloys from scraps; (2) alloying purchased copper; (3) rolling, drawing, or extruding shapes (e.g., bar, plate, sheet, strip, tube, wire) from purchased copper; and (4) recovering copper or copper alloys from scrap and rolling, drawing, or extruding shapes (e.g., bar, plate, sheet, strip, tube, wire).
    - E.g., copper wire, copper plates, copper bars
- **Speed changer, industrial high-speed drive, and gear manufacturing** *(NAICS = 333612)*
    - Comprises establishments primarily engaged in manufacturing gears, speed changers, and industrial high-speed drives (except hydrostatic).
    - E.g., power transmission gears, power transmission speed changers
- **Welding and soldering equipment manufacturing** *(NAICS = 333992)*
    - Comprises establishments primarily engaged in manufacturing welding and soldering equipment and accessories (except transformers), such as arc, resistance, gas, plasma, laser, electron beam, and ultrasonic welding equipment; welding electrodes; coated or cored welding wire; and soldering equipment (except handheld).
    - E.g., arc-welding equipment
- **Other communications equipment manufacturing** *(NAICS = 334290)*
    - Comprises establishments primarily engaged in manufacturing communications equipment (except telephone apparatus, radio and television broadcast equipment, and wireless communications equipment).
    - E.g., car alarm manufacturing, traffic signals, smoke detectors
- **Automatic environmental control manufacturing** *(NAICS = 334512)*
    - Comprises establishments primarily engaged in manufacturing automatic controls and regulators for applications, such as heating, air-conditioning, refrigeration and appliances.

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    - E.g., electric space heater controls, humidistats, thermocouples
- **Electricity and signal testing instruments manufacturing** *(NAICS = 334515)*
    - Comprises establishments primarily engaged in manufacturing instruments for measuring and testing the characteristics of electricity and electrical signals.
    - E.g., circuit and continuity testers, voltmeters, ohm meters, wattmeters, and multimeters
- **Electromedical and electrotherapeutic apparatus manufacturing** *(NAICS = 334510)*
    - Comprises establishments primarily engaged in manufacturing electromedical and electrotherapeutic apparatus.
    - E.g., magnetic resonance imaging equipment, medical ultrasound equipment, pacemakers, hearing aids, electrocardiographs, and electromedical endoscopic equipment
- **Irradiation apparatus manufacturing** *(NAICS = 334517)*
    - Comprises establishments primarily engaged in manufacturing irradiation apparatus and tubes for applications, such as medical diagnostic, medical therapeutic, industrial, research and scientific evaluation. Irradiation can take the form of beta-rays, gamma-rays, X-rays, or other ionizing radiation.
    - E.g., X-ray apparatus, CAT scanners
- **Pharmaceutical preparation manufacturing** *(NAICS = 325412)*
    - Comprises establishments primarily engaged in manufacturing in-vivo diagnostic substances and pharmaceutical preparations (except biological) intended for internal and external consumption in dose forms, such as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions.
    - E.g., nuclear medicine (e.g., radioactive isotopes) preparations manufacturing
- **Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing** *(NAICS = 334416)*
    - Comprises establishments primarily engaged in one or more of the following: (1) manufacturing electronic fixed and variable capacitors and condensers; (2) manufacturing electronic resistors, such as fixed and variable resistors, resistor

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networks, thermistors, and varistors; and (3) manufacturing electronic inductors, such as coils and transformers.
    - E.g., capacitors, resistors
- **Electronic Connector Manufacturing** *(NAICS = 334417)*
    - This U.S. industry comprises establishments primarily engaged in manufacturing electronic connectors, such as coaxial, cylindrical, rack and panel, pin and sleeve, printed circuit and fiber optic.
    - E.g., rack and panel connectors, fiber optic connectors
- **Fiber Optic Cable Manufacturing** *(NAICS = 335921)*
    - This U.S. industry comprises establishments primarily engaged in manufacturing insulated fiber optic cable from purchased fiber optic strand.
    - E.g., fiber optic cables
- **Motor Vehicle Electrical and Electronic Equipment Manufacturing** *(NAICS = 336320)*
    - This industry comprises establishments primarily engaged in manufacturing and/or rebuilding electrical and electronic equipment for motor vehicles and internal combustion engines. The products made can be used for all types of transportation equipment (i.e., aircraft, automobiles, trucks, trains, ships) or stationary internal combustion engine applications.
    - E.g., EV battery charging equipment, automotive lighting fixtures
- **Other Aluminum Rolling, Drawing, and Extruding** *(NAICS = 331318)*
    - This U.S. industry comprises establishments primarily engaged in (1) rolling, drawing, or extruding shapes (except flat rolled sheet, plate, foil, and welded tube) from purchased aluminum and/or (2) recovering aluminum from scrap and rolling, drawing, or extruding shapes (except flat rolled sheet, plate, foil, and welded tube) in integrated mills.
    - E.g., aluminum wire
- **Other Electronic Component Manufacturing** *(NAICS = 334419)*
    - This U.S. industry comprises establishments primarily engaged in manufacturing electronic components (except bare printed circuit boards; semiconductors and related devices; electronic capacitors; electronic

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resistors; coils, transformers and other inductors; connectors; and loaded printed circuit boards).
    - E.g., electrical product interfaces
- **Other Fabricated Wire Product Manufacturing** *(NAICS = 332618)*
    - This U.S. industry comprises establishments primarily engaged in manufacturing fabricated wire products (except springs) made from purchased wire.
    - E.g., Wire mesh cable trays
- **Steel Wire Drawing** *(NAICS = 331222)*
    - This U.S. industry comprises establishments primarily engaged in drawing wire from purchased steel.
    - E.g., armored cables
- **Telephone Apparatus Manufacturing** *(NAICS = 334210)*
    - This industry comprises establishments primarily engaged in manufacturing wire telephone and data communications equipment. These products may be stand-alone or board-level components of a larger system. Examples of products made by these establishments are central office switching equipment, cordless and wire telephones (except cellular), PBX equipment, telephone answering machines, LAN modems, multi-user modems, and other data communications equipment, such as bridges, routers, and gateways.
    - E.g., gateways, bridges, routers
- **Turbine and Turbine Generator Set Units Manufacturing** *(NAICS = 333611)*
    - This U.S. industry comprises establishments primarily engaged in manufacturing turbines (except aircraft); and complete turbine generator set units, such as steam, hydraulic, gas, and wind.
    - E.g., wind turbines

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Chapter 2: Electroindustry Economic Impact

The economic impact attributable to the U.S. electroindustry is based on data generated using the IMPLAN model—an economic model that relates different types of economic activity to one another through the industrial supply chain, the labor market, consumer expenditures, tax revenues, and public expenditures. The IMPLAN model accounts for industry-related direct impacts, indirect impacts (i.e., impacts stemming from supply chain relationships between industrial sectors), and induced impacts (i.e., impacts resulting from industry employees spending income in the economy). The electroindustry contributes one percent of U.S. Gross Domestic Product (GDP), directly providing over 580,000 skilled American jobs. Tables 2.A and 2.B below cover the electroindustry's total economic impact and direct GDP contributions by sector, respectively.

- *Labor Income*: Defined by IMPLAN as the sum of employee compensation (wages & benefits) and proprietor income. The electroindustry directly provided $67.5 billion in labor income in 2023 and contributed $129.9 billion through indirect and induced effects.
- *Value-added*: Defined by the Bureau of Economic Analysis (BEA) as the market value an industry adds in production. Direct value-added registered $105.3 billion in 2023 and indirect and induced value-added aggregated to $228.5 billion.
- The electroindustry's total impact on employment, labor income, and value-added was 2.2 million jobs, $197.4 billion, and $333.8 billion, respectively, in 2023.

Table 2.A: Electroindustry Economic Impact, 2023

Measure	Direct National Impact	Indirect National Impact	Induced National Impact	Total National Impact
Employment	580,000	769,000	849,000	2,198,000
Labor Income ($ billions)	67.5	71.7	58.1	197.4
Contribution to GDP ($ billions)	105.3	120.9	107.6	333.8

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Table 2.B: GDP Contribution by Sector, 2023

Sector	GDP Contribution ($ billions)
Battery manufacturing	8.54
Wiring device manufacturing	8.38
Switchgear and switchboard apparatus manufacturing	7.46
Relay and industrial control manufacturing	7.43
Copper rolling, drawing, extruding, and alloying manufacturing	7.10
Motor and generator manufacturing	5.90
All other miscellaneous electrical equipment and component manufacturing	5.59
Lighting fixture manufacturing	5.26
Power, distribution, and specialty transformer manufacturing	5.13
Electricity and signal testing instruments manufacturing	4.94
Irradiation apparatus manufacturing	4.09
Other communications equipment manufacturing	3.75
Electromedical and electrotherapeutic apparatus manufacturing	3.23
Electronic connector manufacturing	3.22
Welding and soldering equipment manufacturing	2.97
Other communication and energy wire manufacturing	2.66
Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing	2.47
Carbon and graphite product manufacturing	2.06
Capacitor, resistor, coil, transformer, and other inductor manufacturing	2.01
Fiber optic cable manufacturing	2.00
Automatic environmental control manufacturing	1.92
Other electronic component manufacturing	1.63
Speed changer, industrial high-speed drive, and gear manufacturing	1.61
Motor vehicle electrical and electronic equipment manufacturing	1.50

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Sector	GDP Contribution ($ billions)
Electric lamp bulb and part manufacturing	1.03
Turbine and turbine generator set units manufacturing	0.90
Telephone apparatus manufacturing	0.90
Steel wire drawing	0.81
Other aluminum rolling, drawing, and extruding	0.38
Other fabricated wire product manufacturing	0.25
Pharmaceutical preparation manufacturing	0.15
Total	**105.28**

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Chapter 3: Electroindustry Output

Electroindustry output data are derived from the IMPLAN model described above. IMPLAN output equals the value of industry production, equivalent to sales plus net inventory change, measured in producer prices. Tables 3.A and 3.B below break down electroindustry output by sector and state, respectively.

- Electroindustry output totaled $325.4 billion in 2023.
- Copper rolling, drawing, extruding and alloying, battery manufacturing, and switchgear and switchboard apparatus manufacturing led electroindustry output in 2023, constituting 16.7%, 7.6%, and 6.6% of total output, respectively.
- California, Texas, and Pennsylvania led electroindustry output in 2023, accounting for 10.5%, 7.8%, and 6.0% of total output, respectively.

I. Output by Sector

Table 3.A: Output by Sector, 2023

Sector	Output ($ billions)
Copper rolling, drawing, extruding, and alloying manufacturing	54.30
Battery manufacturing	24.62
Switchgear and switchboard apparatus manufacturing	21.58
Wiring device manufacturing	20.97
Motor and generator manufacturing	19.30
Relay and industrial control manufacturing	18.24
All other miscellaneous electrical equipment and component manufacturing	14.32
Lighting fixture manufacturing	14.09
Irradiation apparatus manufacturing	12.78
Power, distribution, and specialty transformer manufacturing	11.99

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Sector	Output ($ billions)
Electricity and signal testing instruments manufacturing	11.24
Other communications equipment manufacturing	9.73
Other communication and energy wire manufacturing	9.67
Electronic connector manufacturing	8.64
Electromedical and electrotherapeutic apparatus manufacturing	8.58
Welding and soldering equipment manufacturing	8.25
Fiber optic cable manufacturing	7.77
Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing	7.30
Motor vehicle electrical and electronic equipment manufacturing	6.50
Carbon and graphite product manufacturing	5.08
Capacitor, resistor, coil, transformer, and other inductor manufacturing	4.84
Speed changer, industrial high-speed drive, and gear manufacturing	4.24
Automatic environmental control manufacturing	4.21
Steel wire drawing	3.77
Other electronic component manufacturing	3.77
Telephone apparatus manufacturing	2.39
Electric lamp bulb and part manufacturing	2.34
Turbine and turbine generator set units manufacturing	2.22
Other aluminum rolling, drawing, and extruding	1.63
Other fabricated wire product manufacturing	0.70
Pharmaceutical preparation manufacturing	0.29
Total	**325.36**

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II. Output by State

Table 3.B: Output by State, 2023

State	Output ($ billions)	State	Output ($ billions)
California	34.03	New Hampshire	3.88
Texas	25.53	Arkansas	3.03
Pennsylvania	19.36	Kansas	2.92
Illinois	18.95	Arizona	2.91
Ohio	17.66	Iowa	2.89
Georgia	15.73	Colorado	2.61
Wisconsin	14.99	Oregon	2.04
New York	14.28	Oklahoma	1.91
North Carolina	13.96	Rhode Island	1.83
Indiana	11.11	Nebraska	1.77
Missouri	9.70	Maryland	1.74
South Carolina	9.43	Idaho	1.06
Florida	9.11	West Virginia	0.99
Massachusetts	8.36	Louisiana	0.83
Tennessee	8.12	Delaware	0.80
Michigan	7.83	New Mexico	0.58
Minnesota	7.41	Vermont	0.55
Connecticut	6.61	Maine	0.45
New Jersey	5.94	South Dakota	0.38
Nevada	5.89	Wyoming	0.22
Kentucky	5.25	North Dakota	0.20
Virginia	5.02	Montana	0.12
Utah	4.69	Alaska	0.05
Alabama	4.52	District of Columbia	0.03
Washington	4.06	Hawaii	0.03
Mississippi	4.03	Total	**325.36**

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Chapter 4: Electroindustry Employment & Labor Income

Employment and labor income for the U.S. electroindustry are derived from IMPLAN data and encompass both full- and part-time employees. Labor income (as defined in Chapter 2) is the sum of employee compensation (i.e., wages and benefits) and proprietor income. Tables 4.A and 4.B below break down electroindustry employment and labor income by sector and state, respectively.

- The electroindustry provided 580,494 jobs and $67.5 billion in labor income in 2023.
- Battery manufacturing, relay and industrial control manufacturing, and wiring device manufacturing provided the most electroindustry jobs in 2023, comprising 8.9%, 7.4%, and 7.0% of total employment, respectively.
- In 2023, the sectors battery manufacturing, relay and industrial control manufacturing, and all other miscellaneous electrical equipment and component manufacturing provided the most labor income, supplying 8.7%, 8.1%, and 7.0% of total labor income, respectively.
- The pharmaceutical preparation manufacturing, telephone apparatus manufacturing, and electricity and signal testing instruments manufacturing sectors supplied the most per capita income in 2023 at $200,180, $198,184, and $165,347, respectively.
- California, Texas, and Pennsylvania provided the most electroindustry jobs in 2023, contributing 11.0%, 7.1%, and 5.9% of total employment, respectively.

I. Employment & Labor Income by Sector

Table 4.A: Employment & Labor Income by Sector, 2023

Sector	# of Employees	Labor Income ($ billions)
Battery manufacturing	51,452	5.90
Relay and industrial control manufacturing	43,046	5.49
Wiring device manufacturing	40,652	4.47

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Sector	# of Employees	Labor Income ($ billions)
Switchgear and switchboard apparatus manufacturing	39,309	4.51
All other miscellaneous electrical equipment and component manufacturing	37,367	4.72
Motor and generator manufacturing	36,308	3.88
Lighting fixture manufacturing	32,576	3.40
Power, distribution, and specialty transformer manufacturing	30,741	3.23
Copper rolling, drawing, extruding, and alloying manufacturing	29,002	3.48
Electricity and signal testing instruments manufacturing	22,456	3.71
Electronic connector manufacturing	19,808	2.14
Other communications equipment manufacturing	16,173	2.21
Welding and soldering equipment manufacturing	15,821	1.72
Capacitor, resistor, coil, transformer, and other inductor manufacturing	15,478	1.38
Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing	14,870	1.32
Electromedical and electrotherapeutic apparatus manufacturing	14,458	2.19
Irradiation apparatus manufacturing	13,803	2.18
Other communication and energy wire manufacturing	13,386	1.39
Fiber optic cable manufacturing	13,219	1.45
Automatic environmental control manufacturing	12,363	1.38
Speed changer, industrial high-speed drive, and gear manufacturing	11,709	1.09
Motor vehicle electrical and electronic equipment manufacturing	11,677	1.09
Other electronic component manufacturing	10,943	1.16
Carbon and graphite product manufacturing	10,437	1.15
Electric lamp bulb and part manufacturing	5,319	0.62
Steel wire drawing	5,316	0.52
Turbine and turbine generator set units manufacturing	4,688	0.69

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Sector	# of Employees	Labor Income ($ billions)
Telephone apparatus manufacturing	3,056	0.61
Other aluminum rolling, drawing, and extruding	2,802	0.26
Other fabricated wire product manufacturing	2,059	0.17
Pharmaceutical preparation manufacturing	200	0.04
Total	**580,494**	**67.54**

II. Employment & Labor Income by State

Table 4.B: Employment & Labor Income by State, 2023

State	# of Employees	Labor Income ($ billions)
California	64,074	9.47
Texas	41,023	4.98
Pennsylvania	34,417	3.82
Illinois	32,232	3.88
Ohio	29,932	3.41
Wisconsin	28,106	3.38
New York	26,727	3.13
North Carolina	25,121	2.69
Georgia	21,912	2.57
Florida	18,964	1.92
Missouri	18,684	1.91
South Carolina	18,103	1.90
Indiana	16,121	1.51
Michigan	15,895	1.84
Tennessee	14,838	1.57
Massachusetts	13,980	1.99
Minnesota	13,730	1.68

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State	# of Employees	Labor Income ($ billions)
Nevada	13,455	1.47
Virginia	10,843	1.07
New Jersey	10,546	1.31
Connecticut	9,923	1.30
Washington	8,441	1.04
Mississippi	7,687	0.60
Utah	7,336	0.88
Alabama	7,039	0.71
Kentucky	6,995	0.83
New Hampshire	6,569	0.75
Iowa	5,817	0.57
Arkansas	5,577	0.49
Arizona	5,536	0.63
Colorado	5,320	0.70
Kansas	4,930	0.47
Oregon	4,309	0.49
Oklahoma	4,051	0.35
Maryland	3,642	0.47
Nebraska	3,397	0.30
Idaho	2,489	0.24
Rhode Island	2,186	0.23
Louisiana	2,041	0.20
Delaware	1,541	0.18
Vermont	1,166	0.11
New Mexico	1,124	0.08
West Virginia	1,100	0.12
Maine	1,082	0.10
South Dakota	982	0.07

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State	# of Employees	Labor Income ($ billions)
North Dakota	504	0.04
Wyoming	499	0.04
Montana	289	0.02
Alaska	88	0.01
District of Columbia	70	0.01
Hawaii	60	0.01
Total	**580,494**	**67.54**

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Chapter 5: Electroindustry Global Trade

The U.S. electroindustry's global trade picture is presented below. Tables A-G depict export and import trends by sector, country, and region, based on U.S. Census Bureau trade data.

- The electroindustry exported $109.1 billion and imported $211.7 billion of goods in 2024, resulting in a $102.5 billion trade deficit.
- Miscellaneous electrical equipment & components manufacturing, motors & generators manufacturing, and battery manufacturing were the top contributors to the electroindustry's export value in 2024, accounting for 15.1%, 9.3%, and 9.3% of total exports, respectively.
- Batteries, miscellaneous electrical equipment & components, and motors & generators represented the largest shares of the electroindustry's import value in 2024, accounting for 15.6%, 15.4%, and 10.3% of total imports, respectively.
- The communication and energy wire sector is moving the needle the most on trade balance improvement, with the deficit down $1.25 billion from 2019 to 2024
- The leading exporting sectors for the top five U.S. export destinations in 2024 were:
    - *Mexico*: Miscellaneous electrical equipment & components ($4,658 million)
    - *Canada*: Miscellaneous electrical equipment & components ($2,971 million)
    - *China*: Miscellaneous electrical equipment & components ($852 million)
    - *Germany*: Switchgear & switchboard apparatus ($676 million)
    - *UK*: Miscellaneous electrical equipment & components ($470 million)
- The leading importing sectors for the top five U.S. import countries in 2024 were:
    - *Mexico*: Switchgear and switchboard apparatus ($8,962 million)
    - *China*: Batteries ($18,264 million)
    - *Japan*: Batteries ($3,078 million)
    - *Germany*: Miscellaneous electrical equipment & components ($1,652 million)
    - *Canada*: Copper rolling, drawing, extruding, and alloying ($2,198 million)
- Top U.S. export sector by region in 2024:
    - *Asia*: Miscellaneous electrical equipment & components ($4,152 million)

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- *Europe*: Miscellaneous electrical equipment & components ($3,226 million)
- *North America*: Miscellaneous electrical equipment & components ($7,629 million)
- *South/Central America*: Miscellaneous electrical equipment & components ($962 million)

- Top U.S. import sector by region in 2024:
  - *Asia*: Batteries ($26,958 million)
  - *Europe*: Motors & generators ($5,258 million)
  - *North America*: Switchgear & switchboard apparatus ($10,858 million)
  - *South/Central America*: Switchgear & switchboard apparatus ($805 million)

I. Trade by Sector

Table 5.A: Exports by Sector, 2019-2024 ($ billions)

Sector	2019	2020	2021	2022	2023	2024
Misc Electrical Equipment & Components, Nesoi	8.47	7.25	7.61	14.78	16.15	16.43
Motors & Generators	6.94	6.36	6.87	6.90	9.99	10.20
Battery Manufacturing	4.71	4.28	4.36	5.00	6.38	10.14
Switchgear & Switchboard Apparatus	6.47	5.76	6.41	7.21	8.25	8.85
Current-carrying Wiring Devices	6.78	5.76	6.81	7.83	8.15	7.90
Relays & Industrial Controls	5.89	4.99	5.78	6.80	8.12	7.69
Electricity Measuring/testing Instruments	5.16	4.82	4.93	5.52	5.65	5.73
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	3.98	3.87	4.60	5.00	4.78	4.55
Irradiation Apparatus	4.05	3.73	3.74	3.76	4.33	4.34
Copper Rolling, Drawing & Extruding, & Alloying	2.70	2.33	3.44	3.89	3.88	4.04
Electromedical Apparatus	2.35	2.30	2.56	3.14	3.62	3.56
Speed Changers/industrial High-speed Drives/gears	2.46	2.11	2.42	2.79	2.91	2.97
Electronic Connectors, Including Parts	2.38	2.26	2.51	2.76	2.72	2.89

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Sector	2019	2020	2021	2022	2023	2024
Turbines & Turbine Generator Sets	1.90	1.69	1.79	2.20	2.38	2.83
Fiber Optic Cable	1.20	1.01	1.36	2.12	1.83	2.11
Carbon & Graphite Products	1.81	1.32	1.38	1.77	1.83	1.78
Communication & Energy Wire, Nesoi	6.22	5.24	6.32	1.61	1.60	1.62
Motor Vehicle Electrical & Electronic Equip, Nesoi	1.48	1.16	1.23	1.43	1.61	1.59
Electric Lamp Bulb And Other Light Equipment Manuf	1.94	1.54	1.80	1.49	1.50	1.53
Automatic Environmental Controls	0.39	0.35	0.39	1.45	1.51	1.49
Welding & Soldering Equipment	1.26	0.94	1.15	1.38	1.59	1.48
Ac/warm Air Htg & Commercial Refrig Equip	0.82	0.71	0.79	0.92	0.94	0.95
Other Communications Equipment	0.70	0.61	0.65	0.71	0.89	0.86
Noncurrent-carrying Wiring Devices	0.36	0.31	0.33	0.86	0.86	0.73
Power/distribution/specialty Transformers	0.49	0.41	0.42	0.49	0.57	0.68
Commercial,indust,institut Elec Light Fixture Manu	0.32	0.27	0.32	0.72	0.62	0.64
Other Electronic Components	0.71	0.73	0.82	1.02	0.66	0.56
Telephone Apparatus	0.21	0.17	0.20	0.32	0.37	0.33
Steel Wire Drawing	0.21	0.18	0.22	0.25	0.25	0.25
Residential Elec Lighting Fixture Manufacturing	0.23	0.21	0.26	0.22	0.22	0.19
Other Aluminum Rolling, Drawing, And Extruding	0.15	0.12	0.14	0.16	0.15	0.14
Other Fabricated Wire Products	0.05	0.04	0.05	0.06	0.06	0.06
Pharmaceutical Preparations	0.03	0.03	0.03	0.03	0.03	0.03
Total	**82.85**	**72.90**	**81.71**	**94.61**	**104.40**	**109.14**

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Table 5.B: Imports by Sector, 2019-2024 ($ billions)

Sector	2019	2020	2021	2022	2023	2024
Battery Manufacturing	8.85	10.20	15.71	24.38	30.59	33.09
Misc Electrical Equipment & Components, Nesoi	17.21	18.79	21.01	31.51	30.42	32.62
Motors & Generators	13.54	12.87	15.65	17.13	17.25	21.83
Switchgear & Switchboard Apparatus	13.42	12.57	14.50	16.60	19.15	21.29
Relays & Industrial Controls	6.48	5.81	6.63	7.92	8.56	8.56
Power/distribution/specialty Transformers	2.72	2.99	3.04	4.00	6.02	8.36
Current-carrying Wiring Devices	6.10	5.58	6.95	7.89	7.64	8.17
Electric Lamp Bulb And Other Light Equipment Manuf	9.05	8.20	9.77	8.89	7.28	7.55
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	4.53	4.08	5.49	6.82	6.09	7.41
Electricity Measuring/testing Instruments	4.89	4.51	5.26	5.89	6.40	6.81
Copper Rolling, Drawing & Extruding, & Alloying	3.48	3.20	5.25	6.48	5.95	6.62
Motor Vehicle Electrical & Electronic Equip, Nesoi	4.36	3.68	4.41	4.88	5.24	5.37
Electromedical Apparatus	2.63	2.52	3.12	4.21	4.53	5.12
Speed Changers/industrial High-speed Drives/gears	4.63	3.82	4.58	4.77	4.76	4.82
Irradiation Apparatus	4.26	3.64	4.36	4.47	4.46	4.55
Commercial,indust,institut Elec Light Fixture Manu	2.61	2.44	2.71	3.52	3.06	3.12
Ac/warm Air Htg & Commercial Refrig Equip	1.80	1.76	2.30	2.75	2.75	2.99
Electronic Connectors, Including Parts	2.33	2.03	2.49	3.03	2.56	2.83
Fiber Optic Cable	1.01	1.01	1.76	3.21	2.51	2.68
Communication & Energy Wire, Nesoi	8.24	8.24	10.42	2.53	2.69	2.39
Other Electronic Components	1.38	1.55	1.93	2.55	2.91	2.21
Residential Elec Lighting Fixture Manufacturing	2.30	2.37	2.78	2.51	1.89	2.12

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Sector	2019	2020	2021	2022	2023	2024
Automatic Environmental Controls	1.53	1.35	1.48	2.11	2.05	2.02
Other Communications Equipment	1.70	1.45	1.60	1.79	1.71	1.86
Welding & Soldering Equipment	1.56	1.51	1.66	1.85	1.76	1.81
Turbines & Turbine Generator Sets	1.11	1.47	1.27	1.19	1.17	1.35
Carbon & Graphite Products	1.62	1.11	1.10	1.45	1.43	1.35
Steel Wire Drawing	0.94	0.88	1.25	1.51	1.06	1.04
Noncurrent-carrying Wiring Devices	0.33	0.33	0.47	0.90	0.83	0.88
Telephone Apparatus	0.51	0.40	0.41	0.51	0.37	0.34
Other Aluminum Rolling, Drawing, And Extruding	0.18	0.18	0.27	0.38	0.32	0.30
Other Fabricated Wire Products	0.11	0.10	0.13	0.17	0.13	0.13
Pharmaceutical Preparations	0.09	0.09	0.10	0.10	0.09	0.10
Total	**135.50**	**130.73**	**159.86**	**187.91**	**193.64**	**211.68**

Table 5.C: Trade Balance by Sector, 2019-2024 ($ billions)

Sector	2019	2020	2021	2022	2023	2024
Turbines & Turbine Generator Sets	0.79	0.23	0.52	1.01	1.20	1.48
Carbon & Graphite Products	0.19	0.21	0.28	0.32	0.40	0.43
Electronic Connectors, Including Parts	0.05	0.23	0.02	-0.27	0.16	0.06
Telephone Apparatus	-0.30	-0.23	-0.21	-0.20	0.00	-0.01
Pharmaceutical Preparations	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
Other Fabricated Wire Products	-0.06	-0.06	-0.08	-0.11	-0.07	-0.07
Other Aluminum Rolling, Drawing, And Extruding	-0.03	-0.06	-0.14	-0.22	-0.17	-0.15
Noncurrent-carrying Wiring Devices	0.03	-0.02	-0.14	-0.04	0.04	-0.15
Irradiation Apparatus	-0.21	0.09	-0.63	-0.71	-0.13	-0.21

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Sector	2019	2020	2021	2022	2023	2024
Current-carrying Wiring Devices	0.68	0.18	-0.14	-0.07	0.50	-0.28
Welding & Soldering Equipment	-0.30	-0.56	-0.52	-0.46	-0.17	-0.33
Automatic Environmental Controls	-1.14	-1.00	-1.09	-0.65	-0.54	-0.53
Fiber Optic Cable	0.19	0.00	-0.40	-1.09	-0.67	-0.57
Communication & Energy Wire, Nesoi	-2.02	-3.00	-4.10	-0.92	-1.09	-0.77
Steel Wire Drawing	-0.74	-0.69	-1.03	-1.26	-0.81	-0.79
Relays & Industrial Controls	-0.59	-0.82	-0.85	-1.12	-0.44	-0.87
Other Communications Equipment	-1.00	-0.84	-0.95	-1.08	-0.82	-0.99
Electricity Measuring/testing Instruments	0.27	0.32	-0.33	-0.37	-0.75	-1.08
Electromedical Apparatus	-0.28	-0.22	-0.56	-1.07	-0.91	-1.56
Other Electronic Components	-0.67	-0.82	-1.11	-1.53	-2.25	-1.66
Speed Changers/industrial High-speed Drives/gears	-2.17	-1.71	-2.16	-1.97	-1.85	-1.85
Residential Elec Lighting Fixture Manufacturing	-2.07	-2.16	-2.52	-2.29	-1.67	-1.93
Ac/warm Air Htg & Commercial Refrig Equip	-0.98	-1.04	-1.51	-1.83	-1.81	-2.04
Commercial,indust,institut Elec Light Fixture Manu	-2.28	-2.17	-2.39	-2.81	-2.44	-2.48
Copper Rolling, Drawing & Extruding, & Alloying	-0.78	-0.86	-1.82	-2.59	-2.07	-2.59
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	-0.56	-0.22	-0.89	-1.81	-1.31	-2.86
Motor Vehicle Electrical & Electronic Equip, Nesoi	-2.87	-2.52	-3.17	-3.46	-3.64	-3.79
Electric Lamp Bulb And Other Light Equipment Manuf	-7.11	-6.66	-7.98	-7.40	-5.78	-6.02
Power/distribution/specialty Transformers	-2.23	-2.59	-2.61	-3.51	-5.45	-7.68
Motors & Generators	-6.60	-6.51	-8.78	-10.23	-7.26	-11.63
Switchgear & Switchboard Apparatus	-6.94	-6.81	-8.09	-9.39	-10.90	-12.44
Misc Electrical Equipment & Components, Nesoi	-8.73	-11.54	-13.41	-16.74	-14.27	-16.19

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Sector	2019	2020	2021	2022	2023	2024
Battery Manufacturing	-4.14	-5.92	-11.35	-19.37	-24.21	-22.95
Total	**-52.65**	**-57.83**	**-78.15**	**-93.30**	**-89.24**	**-102.54**

II. Trade by Country

Table 5.D: Exports – Top 5 Countries, 2024 ($ millions)

Sector	Mexico	Canada	China	Germany	UK
Ac/warm Air Htg & Commercial Refrig Equip	281.4	366.8	15.0	17.5	30.9
Automatic Environmental Controls	352.1	240.5	79.7	72.9	28.7
Battery Manufacturing	3,907.0	2,567.7	99.8	261.2	260.8
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	2,126.2	446.2	254.5	190.5	71.9
Carbon & Graphite Products	156.2	121.6	203.1	155.2	106.1
Commercial,indust,institut Elec Light Fixture Manu	150.5	319.4	5.9	7.5	14.1
Communication & Energy Wire, Nesoi	785.7	208.8	52.0	31.1	42.4
Copper Rolling, Drawing & Extruding, & Alloying	2,163.3	942.3	125.6	74.9	35.5
Current-carrying Wiring Devices	3,471.4	1,250.3	337.1	251.2	168.8
Electric Lamp Bulb And Other Light Equipment Manuf	200.7	498.0	94.4	67.5	41.1
Electricity Measuring/testing Instruments	713.4	610.9	682.4	316.4	175.1
Electromedical Apparatus	407.8	348.6	331.1	266.5	71.1
Electronic Connectors, Including Parts	622.0	204.7	230.1	93.7	139.0
Fiber Optic Cable	485.5	231.5	191.4	61.1	97.7
Irradiation Apparatus	505.9	330.1	623.7	381.8	119.1
Misc Electrical Equipment & Components, Nesoi	4,658.4	2,970.7	851.5	656.9	470.0

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Sector	Mexico	Canada	China	Germany	UK
Motor Vehicle Electrical & Electronic Equip, Nesoi	553.3	508.1	44.0	62.4	66.8
Motors & Generators	2,375.4	2,340.3	384.7	520.4	404.3
Noncurrent-carrying Wiring Devices	210.1	109.7	44.0	18.5	9.5
Other Aluminum Rolling, Drawing, And Extruding	70.8	35.2	3.1	1.0	4.8
Other Communications Equipment	129.5	228.6	23.9	33.8	51.0
Other Electronic Components	97.1	59.3	64.1	17.3	16.2
Other Fabricated Wire Products	19.6	19.1	1.8	0.9	1.3
Pharmaceutical Preparations	1.5	4.1	2.1	1.1	3.9
Power/distribution/specialty Transformers	152.4	271.0	25.6	11.2	5.3
Relays & Industrial Controls	3,103.3	776.0	466.0	241.5	306.3
Residential Elec Lighting Fixture Manufacturing	15.2	125.3	2.3	0.9	4.1
Speed Changers/industrial High-speed Drives/gears	383.4	908.2	189.9	186.1	66.3
Steel Wire Drawing	78.1	67.1	4.9	2.6	5.3
Switchgear & Switchboard Apparatus	2,507.3	2,222.0	346.9	676.2	250.9
Telephone Apparatus	48.9	22.4	3.5	8.4	12.5
Turbines & Turbine Generator Sets	299.6	231.2	99.1	116.3	123.5
Welding & Soldering Equipment	443.6	437.5	69.2	42.6	20.0
Total	**31,476.5**	**20,023.3**	**5,952.4**	**4,847.1**	**3,224.3**

Table 5.E: Imports – Top 5 Countries, 2024 ($ millions)

Sector	Mexico	China	Japan	Germany	Canada
Ac/warm Air Htg & Commercial Refrig Equip	1,417.4	602.6	86.1	30.7	243.5

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Sector	Mexico	China	Japan	Germany	Canada
Automatic Environmental Controls	913.2	148.4	34.6	91.1	153.8
Battery Manufacturing	1,699.1	18,264.2	3,078.5	548.7	846.2
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	1,272.7	2,409.6	1,126.3	283.1	207.8
Carbon & Graphite Products	202.5	112.3	232.6	205.2	23.7
Commercial,indust,institut Elec Light Fixture Manu	1,172.3	589.4	9.0	67.1	519.5
Communication & Energy Wire, Nesoi	620.8	295.7	21.1	68.0	188.4
Copper Rolling, Drawing & Extruding, & Alloying	762.0	196.6	188.4	587.6	2,198.4
Current-carrying Wiring Devices	2,418.4	1,576.5	482.5	544.5	155.7
Electric Lamp Bulb And Other Light Equipment Manuf	664.5	4,121.1	116.3	254.8	219.6
Electricity Measuring/testing Instruments	1,176.7	406.1	461.1	785.8	362.4
Electromedical Apparatus	972.3	325.7	186.0	531.9	154.9
Electronic Connectors, Including Parts	867.2	410.2	228.0	130.9	34.6
Fiber Optic Cable	1,526.8	183.9	175.5	51.4	14.2
Irradiation Apparatus	297.6	360.5	368.9	1,531.7	113.1
Misc Electrical Equipment & Components, Nesoi	8,205.9	5,691.6	1,360.1	1,652.0	1,050.6
Motor Vehicle Electrical & Electronic Equip, Nesoi	2,987.3	301.1	312.3	74.0	82.6
Motors & Generators	5,014.2	2,696.4	2,693.2	1,638.1	779.2
Noncurrent-carrying Wiring Devices	198.9	223.5	49.9	44.6	96.5
Other Aluminum Rolling, Drawing, And Extruding	33.3	3.6	1.4	11.0	116.9
Other Communications Equipment	802.2	278.2	29.6	34.0	101.9
Other Electronic Components	381.4	398.1	199.4	73.3	40.6
Other Fabricated Wire Products	16.6	35.3	5.5	9.8	12.5
Pharmaceutical Preparations	0.7	6.3	2.0	5.9	4.4

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Sector	Mexico	China	Japan	Germany	Canada
Power/distribution/specialty Transformers	2,752.5	346.0	52.4	231.6	1,037.6
Relays & Industrial Controls	2,913.1	778.3	449.7	715.1	458.9
Residential Elec Lighting Fixture Manufacturing	20.3	1,404.5	0.2	2.5	23.4
Speed Changers/industrial High-speed Drives/gears	263.7	486.2	483.1	565.6	282.1
Steel Wire Drawing	146.9	179.2	32.9	27.7	148.2
Switchgear & Switchboard Apparatus	8,961.6	1,395.4	625.6	1,081.7	1,896.1
Telephone Apparatus	31.1	178.8	3.2	2.7	6.5
Turbines & Turbine Generator Sets	255.4	65.9	101.5	85.8	64.6
Welding & Soldering Equipment	173.8	187.8	225.3	263.2	246.4
Total	**49,142.4**	**44,658.7**	**13,422.1**	**12,230.9**	**11,884.8**

III. Trade by Region

Table 5.F: Exports by Region, 2024 ($ millions)

Sector	Asia	Europe	North America	South/Central America
Ac/warm Air Htg & Commercial Refrig Equip	110.4	92.9	648.2	76.6
Automatic Environmental Controls	424.7	353.0	592.5	80.5
Battery Manufacturing	983.7	1,319.1	6,474.8	397.0
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	1,085.2	677.7	2,572.4	165.1
Carbon & Graphite Products	614.7	779.0	277.9	70.0
Commercial,indust,institut Elec Light Fixture Manu	51.6	57.8	469.9	48.4
Communication & Energy Wire, Nesoi	291.7	171.3	994.5	144.5
Copper Rolling, Drawing & Extruding, & Alloying	623.0	211.5	3,105.6	82.7

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Sector	Asia	Europe	North America	South/Central America
Current-carrying Wiring Devices	1,453.7	1,010.7	4,721.7	564.4
Electric Lamp Bulb And Other Light Equipment Manuf	371.1	279.8	698.7	134.9
Electricity Measuring/testing Instruments	2,898.8	1,122.7	1,324.3	235.4
Electromedical Apparatus	1,089.1	1,353.2	756.4	229.8
Electronic Connectors, Including Parts	1,080.2	645.4	826.7	281.0
Fiber Optic Cable	772.8	384.4	717.0	167.5
Irradiation Apparatus	1,783.4	1,251.9	836.0	276.4
Misc Electrical Equipment & Components, Nesoi	4,151.8	3,225.6	7,629.3	962.2
Motor Vehicle Electrical & Electronic Equip, Nesoi	175.9	238.6	1,061.4	64.6
Motors & Generators	2,047.3	2,371.0	4,715.7	723.6
Noncurrent-carrying Wiring Devices	264.5	83.5	319.8	44.6
Other Aluminum Rolling, Drawing, And Extruding	16.0	15.7	106.0	4.8
Other Communications Equipment	199.2	185.6	358.1	85.9
Other Electronic Components	215.2	94.4	156.4	78.7
Other Fabricated Wire Products	6.7	5.4	38.7	6.0
Pharmaceutical Preparations	9.6	15.6	5.6	2.4
Power/distribution/specialty Transformers	119.3	53.1	423.4	72.0
Relays & Industrial Controls	1,710.6	1,330.3	3,879.4	538.1
Residential Elec Lighting Fixture Manufacturing	13.6	16.6	140.6	18.3
Speed Changers/industrial High-speed Drives/gears	516.9	691.9	1,291.6	316.6
Steel Wire Drawing	21.9	36.8	145.2	44.0
Switchgear & Switchboard Apparatus	1,463.0	1,673.0	4,729.3	791.6
Telephone Apparatus	117.5	54.0	71.3	75.7

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Sector	Asia	Europe	North America	South/Central America
Turbines & Turbine Generator Sets	912.6	938.4	530.9	306.5
Welding & Soldering Equipment	265.7	140.2	881.1	152.1
Total	**25,861.2**	**20,880.1**	**51,500.3**	**7,242.1**

Table 5.G: Imports by Region, 2024 ($ millions)

Sector	Asia	Europe	North America	South/Central America
Ac/warm Air Htg & Commercial Refrig Equip	1,131.4	183.2	1,661.0	14.3
Automatic Environmental Controls	640.1	286.6	1,067.0	15.0
Battery Manufacturing	26,957.9	3,500.9	2,545.3	83.8
Capacitors, Resistors, Coils, Trnsfors,&oth Induct	4,813.1	955.8	1,480.5	149.8
Carbon & Graphite Products	571.3	536.7	226.2	6.5
Commercial,indust,institut Elec Light Fixture Manu	1,138.7	278.2	1,691.8	3.6
Communication & Energy Wire, Nesoi	1,054.7	369.5	809.2	143.5
Copper Rolling, Drawing & Extruding, & Alloying	1,731.3	1,294.7	2,960.4	624.1
Current-carrying Wiring Devices	3,461.9	1,902.4	2,574.0	182.8
Electric Lamp Bulb And Other Light Equipment Manuf	6,017.4	620.1	884.1	4.0
Electricity Measuring/testing Instruments	2,909.8	2,307.2	1,539.1	19.7
Electromedical Apparatus	1,556.2	1,802.5	1,127.2	440.6
Electronic Connectors, Including Parts	1,384.7	477.1	901.9	56.0
Fiber Optic Cable	808.7	312.0	1,541.0	12.1
Irradiation Apparatus	1,275.2	2,836.6	410.7	14.7
Misc Electrical Equipment & Components, Nesoi	18,267.0	4,699.5	9,256.5	200.4

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Sector	Asia	Europe	North America	South/Central America
Motor Vehicle Electrical & Electronic Equip, Nesoi	1,520.9	362.9	3,069.9	397.1
Motors & Generators	10,156.9	5,257.8	5,793.4	589.0
Noncurrent-carrying Wiring Devices	452.8	129.0	295.3	4.3
Other Aluminum Rolling, Drawing, And Extruding	77.1	36.8	150.2	30.4
Other Communications Equipment	657.1	277.4	904.1	5.7
Other Electronic Components	1,412.4	357.7	422.0	5.1
Other Fabricated Wire Products	67.6	31.1	29.1	2.0
Pharmaceutical Preparations	27.1	65.7	5.1	0.1
Power/distribution/specialty Transformers	2,317.0	1,468.6	3,790.2	777.5
Relays & Industrial Controls	2,671.0	2,345.4	3,372.0	123.1
Residential Elec Lighting Fixture Manufacturing	1,944.6	128.5	43.7	0.8
Speed Changers/industrial High-speed Drives/gears	2,095.9	2,119.9	545.8	31.3
Steel Wire Drawing	559.0	164.5	295.1	9.0
Switchgear & Switchboard Apparatus	5,114.9	4,382.6	10,857.7	805.3
Telephone Apparatus	278.1	16.0	37.7	0.2
Turbines & Turbine Generator Sets	300.0	721.7	320.0	10.7
Welding & Soldering Equipment	753.6	619.4	420.2	6.7
Total	**104,125.4**	**40,847.9**	**61,027.3**	**4,769.4**

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Chapter 6: Electroindustry Market Size Trends

U.S. electroindustry market growth varies by sector. Market size is calculated as the sum of domestic output and imports for consumption, minus domestic exports, presented in nominal dollars. Table 6.A below presents market size estimates for each electroindustry sector between 2019 and 2023, as well as the percentage changes over the five-year period and the last year.

- The electroindustry market size expanded by 33.3% over the period from 2019 to 2023, with a 5.2% increase from 2022 to 2023.
- Copper rolling, drawing, extruding, and alloying ($55.1 billion), battery manufacturing ($46.2 billion), and switchgear and switchboard apparatus manufacturing ($34.0 billion) were the largest domestic electroindustry markets in 2023.
- Battery manufacturing (+174.5%), copper rolling, drawing, extruding, and alloying (+92.3%), and other electronic component manufacturing (+59.2%) experienced the largest growth over the span of 2019-2023
- Between 2022 and 2023, market size grew the most for power, distribution, and specialty transformer manufacturing (+27.7%)

Table 6.A: Electroindustry Market Size by Sector, 2019-2023 ($ billions)

Sector	2019	2020	2021	2022	2023	% Chg (2019-2023)	% Chg (2022-2023)
Battery manufacturing	16.84	18.22	28.40	38.06	46.22	174.5%	21.5%
Copper rolling, drawing, extruding, and alloying manufacturing	28.64	27.73	44.28	51.08	55.08	92.3%	7.8%
Other electronic component manufacturing	3.89	3.98	4.62	5.38	6.20	59.2%	15.2%
All other miscellaneous electrical equipment and component manufacturing	21.20	23.75	27.31	33.23	32.53	53.4%	-2.1%
Other aluminum rolling, drawing, and extruding	1.33	1.14	1.64	1.90	1.87	40.9%	-1.4%

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Sector	2019	2020	2021	2022	2023	% Chg (2019-2023)	% Chg (2022-2023)
Steel wire drawing	3.29	3.06	4.33	4.87	4.54	38.1%	-6.7%
Power, distribution, and specialty transformer manufacturing	12.80	11.52	11.50	13.52	17.26	34.8%	27.7%
Switchgear and switchboard apparatus manufacturing	25.27	24.23	26.74	29.85	34.05	34.8%	14.0%
Capacitor, resistor, coil, transformer, and other inductor manufacturing	5.92	5.70	6.96	8.24	7.98	34.7%	-3.2%
Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing	6.73	6.37	7.79	8.60	9.07	34.7%	5.4%
Electronic connector manufacturing	7.55	6.99	8.50	9.34	9.35	23.8%	0.1%
Welding and soldering equipment manufacturing	6.85	6.15	8.02	8.28	8.45	23.3%	2.1%
Other communications equipment manufacturing	8.36	7.76	9.03	9.74	10.14	21.3%	4.1%
Carbon and graphite product manufacturing	3.92	2.83	3.53	4.00	4.61	17.6%	15.2%
Fiber optic cable manufacturing	7.36	7.12	7.61	9.21	8.59	16.7%	-6.7%
Wiring device manufacturing	19.31	18.56	20.37	21.78	22.46	16.3%	3.1%
Motor and generator manufacturing	24.34	21.60	26.16	29.76	27.95	14.8%	-6.1%
Other fabricated wire product manufacturing	0.68	0.61	0.71	0.79	0.77	13.7%	-2.0%
Other communication and energy wire manufacturing	9.51	10.19	12.92	9.80	10.77	13.2%	9.8%
Motor vehicle electrical and electronic equipment manufacturing	9.40	8.23	8.90	9.88	10.64	13.2%	7.7%
Electromedical and electrotherapeutic apparatus manufacturing	9.27	9.61	10.13	10.58	10.48	13.0%	-1.0%
Irradiation apparatus manufacturing	12.05	13.13	12.35	12.76	13.22	9.7%	3.6%
Electricity and signal testing instruments manufacturing	12.10	10.88	12.50	12.17	13.12	8.4%	7.8%

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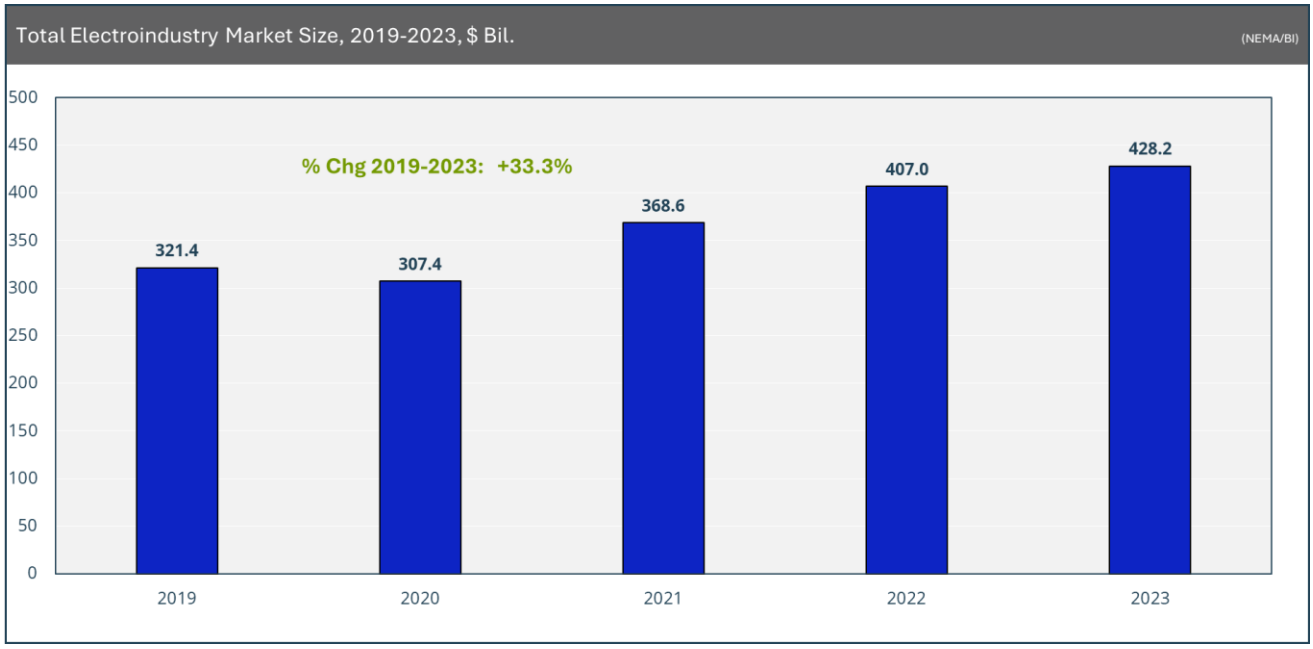
Sector	2019	2020	2021	2022	2023	% Chg (2019-2023)	% Chg (2022-2023)
Speed changer, industrial high-speed drive, and gear manufacturing	6.11	4.96	5.87	5.95	6.35	4.0%	6.7%
Pharmaceutical preparation manufacturing	0.34	0.35	0.34	0.35	0.35	3.7%	1.1%
Relay and industrial control manufacturing	20.27	17.33	18.80	19.87	20.76	2.4%	4.5%
Automatic environmental control manufacturing	5.06	4.24	4.98	4.82	5.08	0.4%	5.3%
Electric lighting equipment manufacturing[1]	28.54	26.42	30.08	29.54	26.77	-6.2%	-9.4%
Telephone apparatus manufacturing	2.71	2.73	2.53	2.53	2.40	-11.5%	-5.0%
Turbine and turbine generator set units manufacturing	1.73	1.99	1.70	1.10	1.16	-32.6%	5.5%
Total	**321.4**	**307.4**	**368.6**	**407.0**	**428.2**	**33.3%**	**5.2%**

Figure 6.1: Electroindustry Market Size, 2019-2023 ($ Bil.)



[1] Market size aggregates lighting fixtures and lamp bulbs/parts into electric lighting equipment manufacturing (NAICS 3351) to maintain consistency across the 2022 NAICS revision

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Chapter 7: Powering Tomorrow

I. Projecting Power Demand

After two decades of stagnant power demand growth, electricity consumption is now rising despite improved energy efficiency. This transformation positions the electroindustry at the center of a changing energy landscape. Mature tailwinds such as power sector decarbonization, financial and technical advancements in electrification technologies, changes in consumer preferences, and increased data connectivity are driving this transformation, representing a fundamental shift away from molecules to electrons to meet the economy's energy needs. Accordingly, electricity's share of final energy consumption is expected to rise through mid-century, reaching about 32 percent, up from 21 percent today.

U.S. electricity demand is projected to grow by an average of 2 percent annually through 2050, representing a total increase of nearly 50 percent from current levels (Figure 7.1; PA Consulting & NEMA, 2025). Demand growth is likely to be driven by data centers, e-mobility, building electrification, and manufacturing reshoring. The emergence of more energy-intensive data centers is expected to account for nearly one-third of total electricity demand growth through 2035, with more than 90 percent of data center consumption growth between now and 2050 projected to occur within the next decade (Figure 7.2). As a share of total U.S. power demand, data center consumption is expected to rise from less than 5 percent today to around 8 percent by 2030 (Figure 7.3). By 2035, transportation and industrial electrification are expected to lead electricity demand growth, as EVs become more cost-effective and technological advancements enable the electrification of industrial heat processes. EV electricity demand is projected to account for about 3 percent of total U.S. demand in 2035, surging to 15-20 percent by 2050 (Figures 7.4 and 7.5).

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Figure 7.1: U.S. Net Electricity Consumption Projections by Sector, 2024-2050

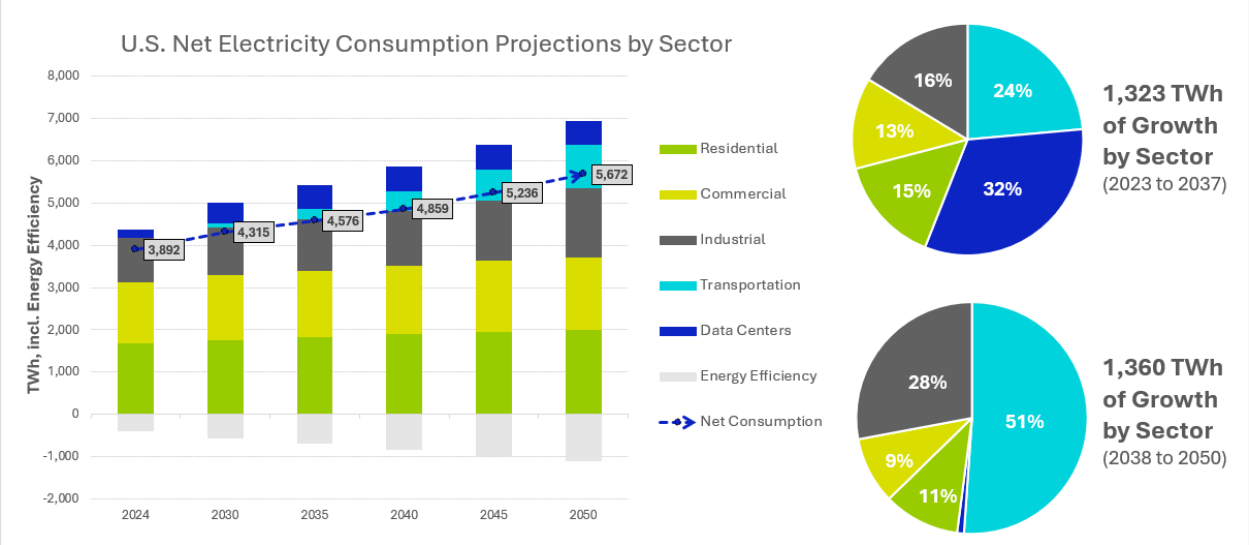

Figure 7.2: Projected U.S. Data Center Electricity Consumption, 2024-2035

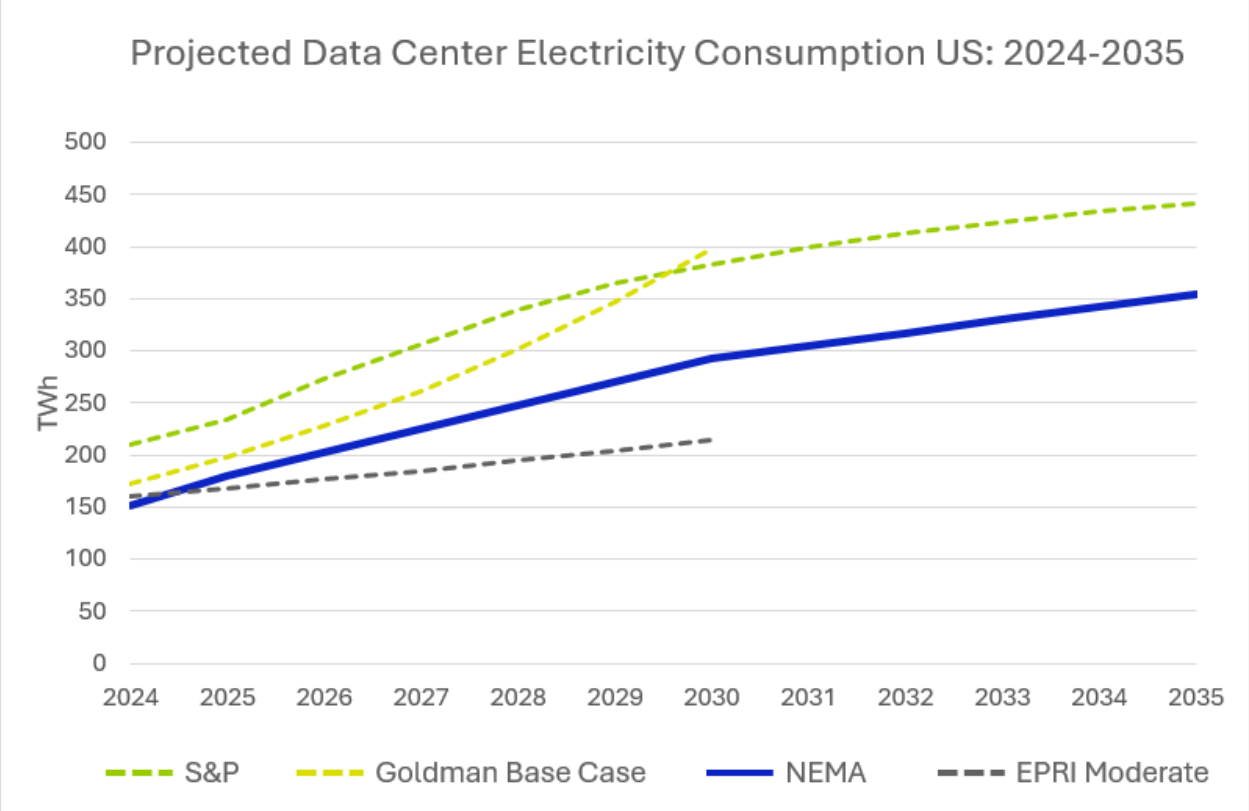

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Figure 7.3: Data Centers Share of U.S. Power Demand, 2023-2030

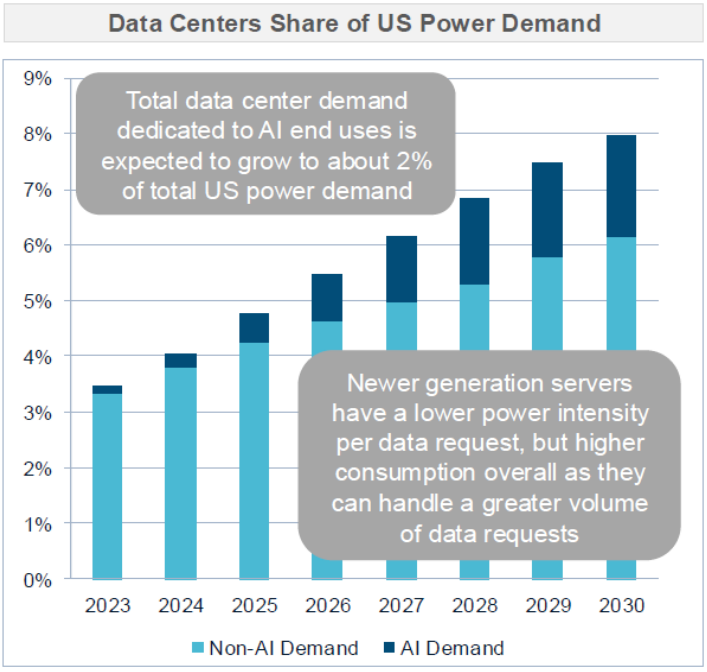

Figure 7.4: Projected U.S. EV Electricity Consumption, 2024-2035

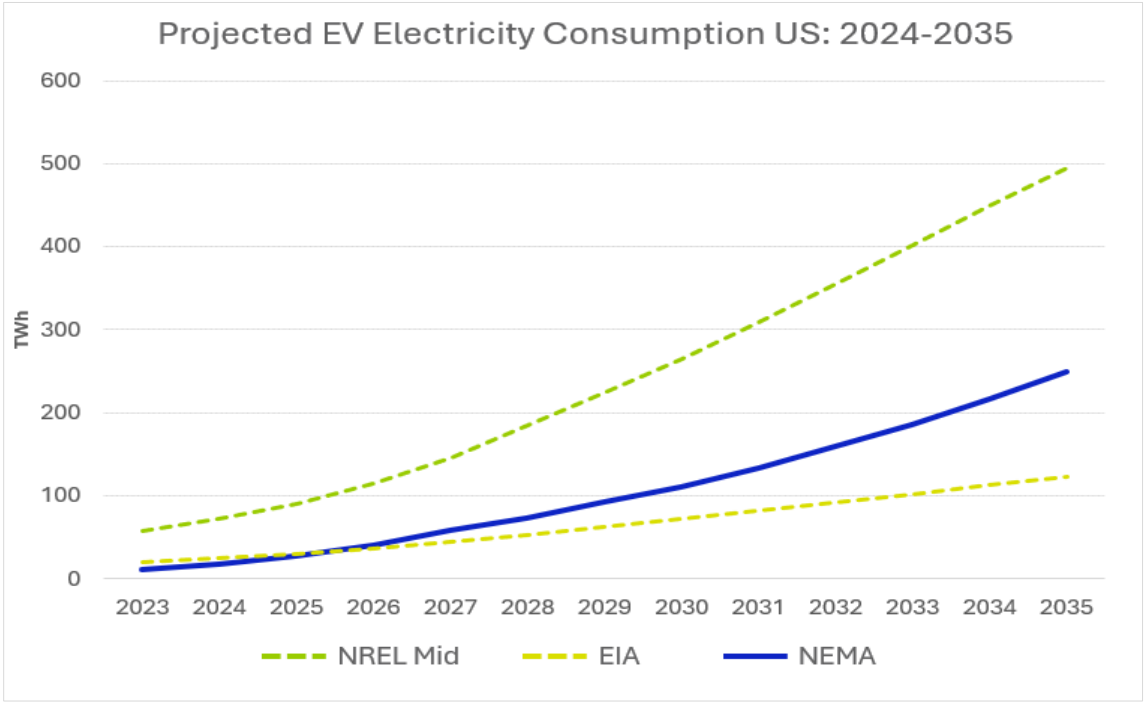

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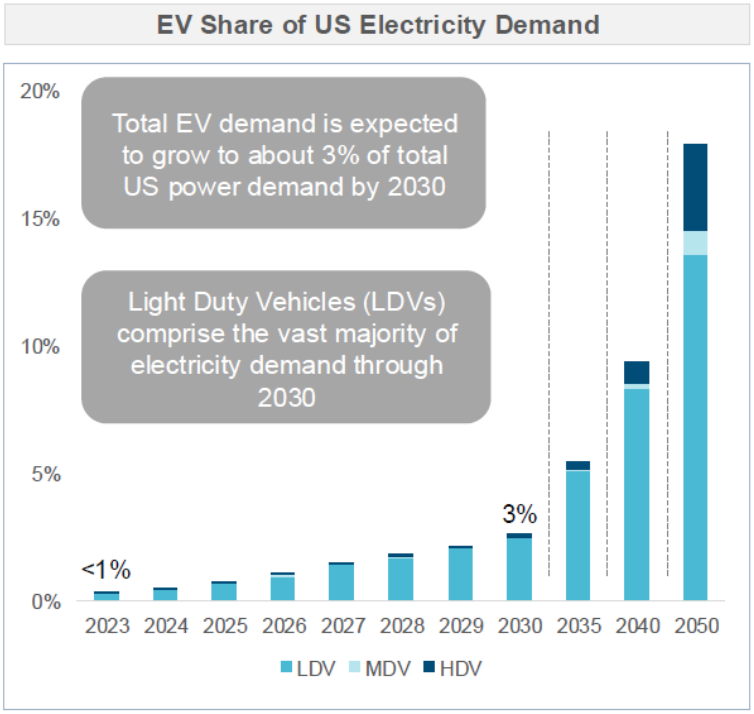
Figure 7.5: EV Share of U.S. Electricity Demand, 2023-2050



II. Energizing Applications

Electroindustry manufacturers enable AI growth, lead industrial reshoring, and power the digital economy. Power failures that shut down businesses and supply chain kinks that delay availability of electrical equipment to build data centers highlight the prominent economic role of the electroindustry. From essential building systems like lighting and security to advanced automation and controls, electroindustry equipment touches virtually every corner of an AI data center or manufacturing facility. Electroindustry equipment comprises roughly one-third of the total materials spend to build a typical AI data center in the U.S. Likewise, electrical generally accounts for around 10 percent of the total hard input costs for a typical manufacturing plant. See figures 7.6 and 7.7 below depicting the electrical equipment commonly found in AI data centers and manufacturing facilities, respectively.

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Figure 7.6: Electrical Equipment in AI Data Centers

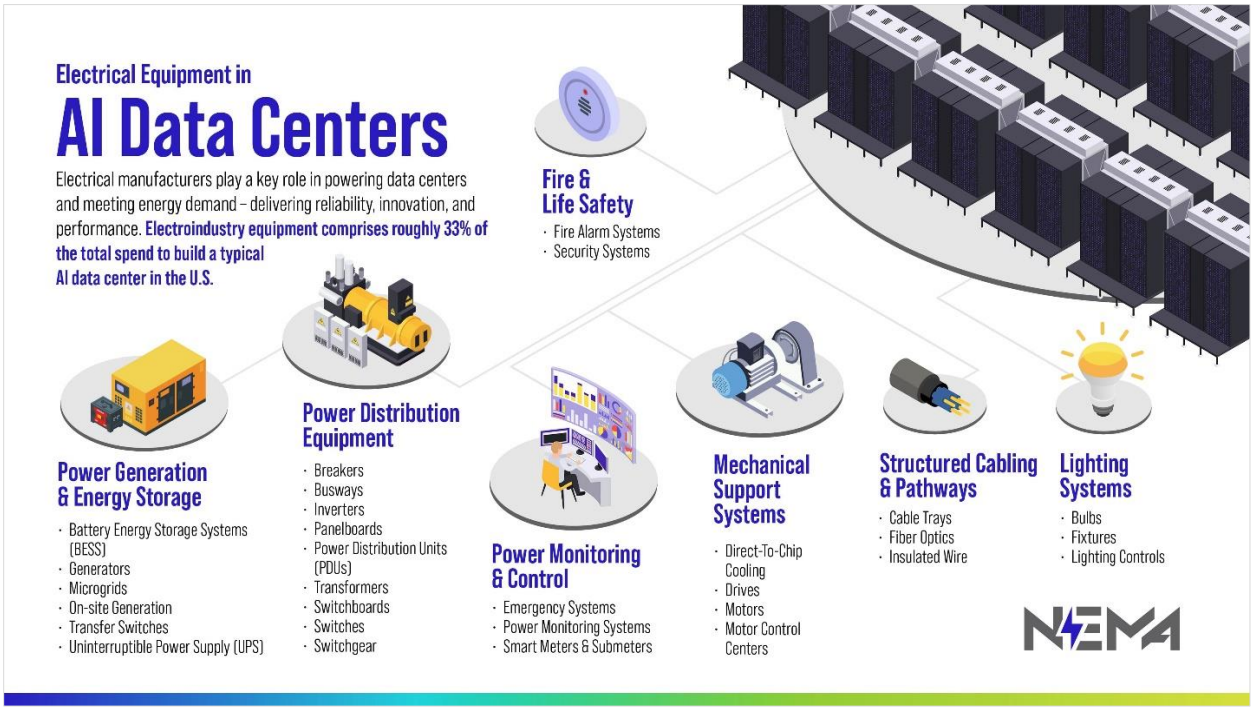
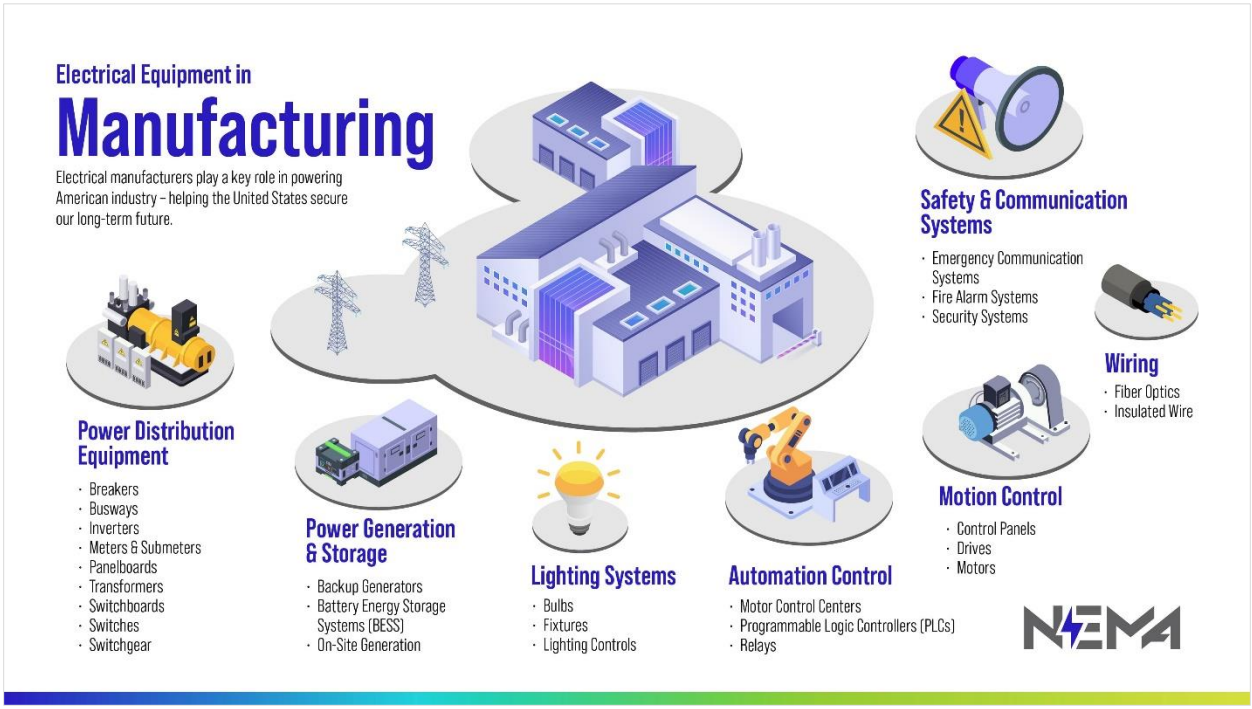


Figure 7.7: Electrical Equipment in Manufacturing



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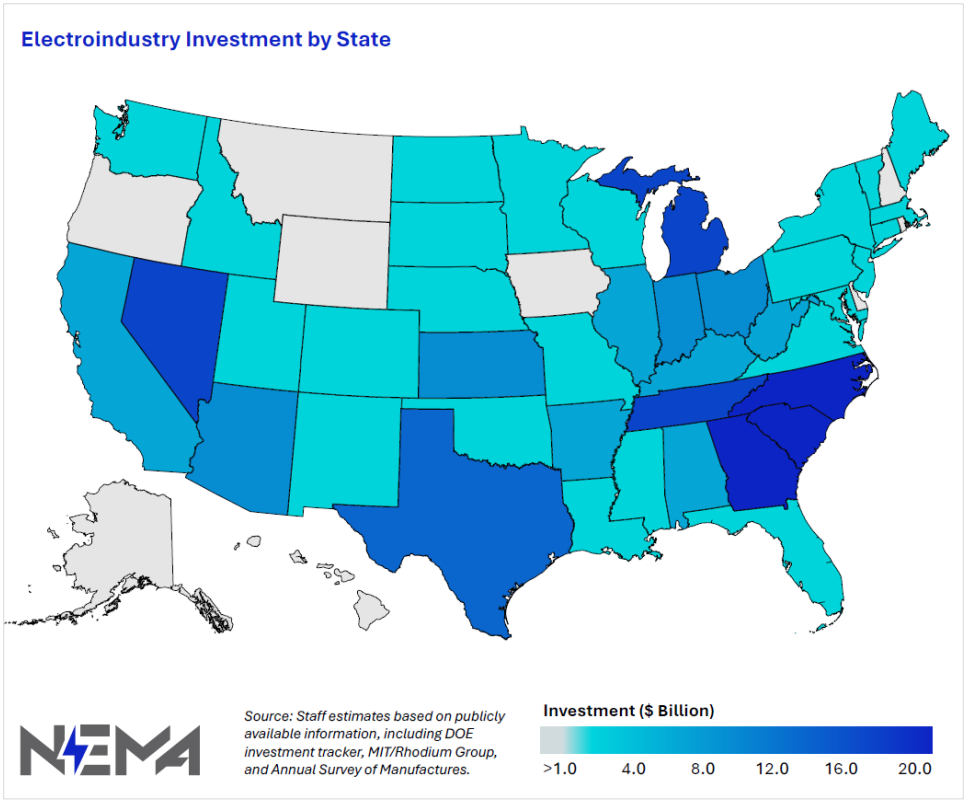
III. Building Domestic Capacity

Despite the industry's global nature, electroindustry manufacturers have invested heavily in domestic capacity in recent years, strengthening critical infrastructure and supporting economic prosperity amid shifting energy use. Based on publicly available sources—including press releases, the Department of Energy's investment tracker, the MIT/Rhodium Group Clean Energy Monitor, and the Annual Survey of Manufactures (ASM)—the electroindustry has invested over $185 billion in the United States since 2018, with batteries accounting for a significant share. Beyond batteries, electroindustry manufacturers have invested substantially in facilities that produce equipment such as transformers, switchgear, and power electronics, which are critical to grid modernization, industrial growth, and AI data centers. Electroindustry investments have been concentrated largely in the Southeast region, with North Carolina ($18.8 B), Georgia ($18.4 B), South Carolina ($18.0 B), and Tennessee ($13.6 B) leading the way, while Michigan ($13.3B) rounds out the top five. These five states accounted for $82.1 billion, or 44 percent, of total investment since 2018 (Figure 7.8).

Figure 7.8: Electroindustry Investment by State



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While the industry is committed to expanding U.S. production, supported by its track record since 2018, rebuilding supply chains takes time. In the short run, manufacturers remain largely capacity-constrained and reliant on imported components and materials to meet surging demand, even for domestically produced equipment. Rising and unpredictable tariffs on essential inputs, coupled with the loss of key fiscal incentives, are hampering AI, grid, and U.S. manufacturing projects and slowing new investment. Figures 7.9 and 7.10 below show historical data on computer/electronic/electrical manufacturing construction, highlighting the sharp ramp-up in investment in recent years followed by a recent cooling. Since the beginning of 2018, electrical structures' share of total manufacturing construction soared from roughly 6 percent to over 50 percent.

Figure 7.9: Computer/Electronic/Electrical Manufacturing Construction

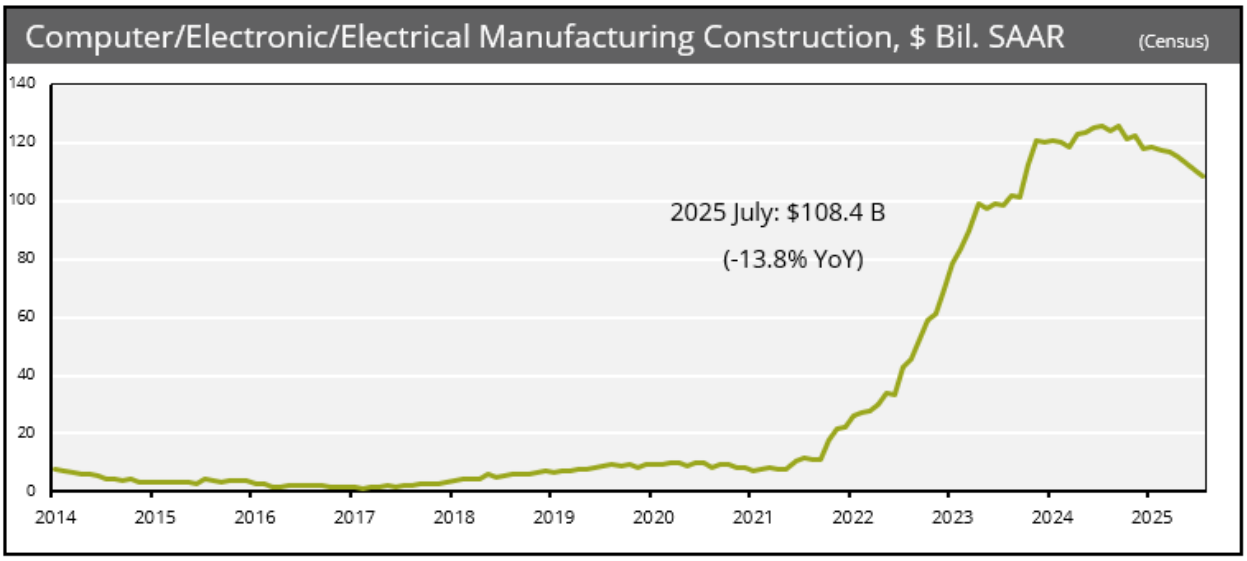

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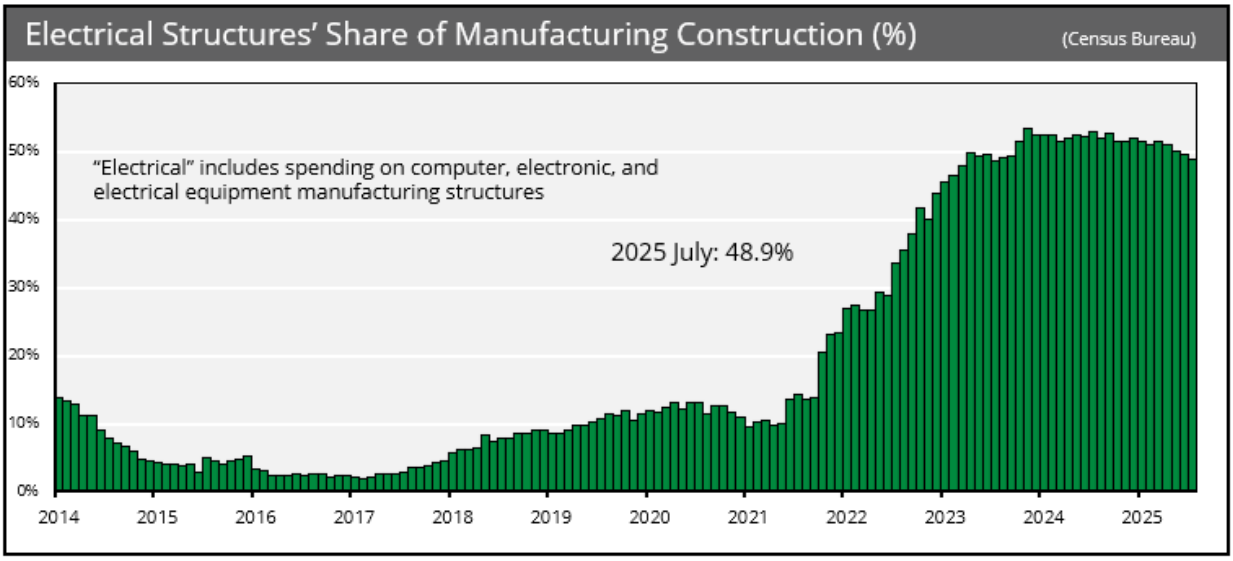
Figure 7.10: Electrical Structures Share of Manufacturing Construction



Above all, electroindustry manufacturers need policy certainty to continue to drive the investments that will power America's energy future for decades to come.

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Chapter 8: Grid Reliability

I. Reliability Risks

Resurgent electricity demand—projected to grow 2 percent annually through 2050 (see Chapter 7: Powering Tomorrow)—will test grid reliability, with growth unlikely to be uniform across time and geography. Peak demand periods are shifting unevenly across regions as buildings and transportation electrify. Moreover, generation capacity additions are now often intermittent (e.g., renewables) and far from urban centers, making it more challenging to respond to dynamic changes in electricity consumption. With transmission and distribution (T&D) capacity additions to meet demand growth 5-10 years out, flexibility solutions are needed to meet near-term demand and improve grid reliability. In addition to rising electricity demand, growing strain from natural disasters on aging infrastructure calls for solutions to harden the grid.

II. Grid-Enhancing Technologies

Grid-Enhancing Technologies (GETs)—advanced tools that increase the capacity, flexibility, and efficiency of existing T&D infrastructure—can help improve grid reliability by optimizing power usage. Various types of GETs exist, including technologies that reduce, shift, and store electricity consumption, as well as those that involve modernizing wiring. GETs vary in technology readiness, market readiness, and growth potential, indicating that investment in a suite of solutions will be needed to optimize grid performance over the next decade. Figure 8.1 below shows a flexibility solutions analysis for between now and 2035, prioritizing areas of investment to manage the expected changes in electricity supply and demand (PA Consulting & NEMA, 2025).

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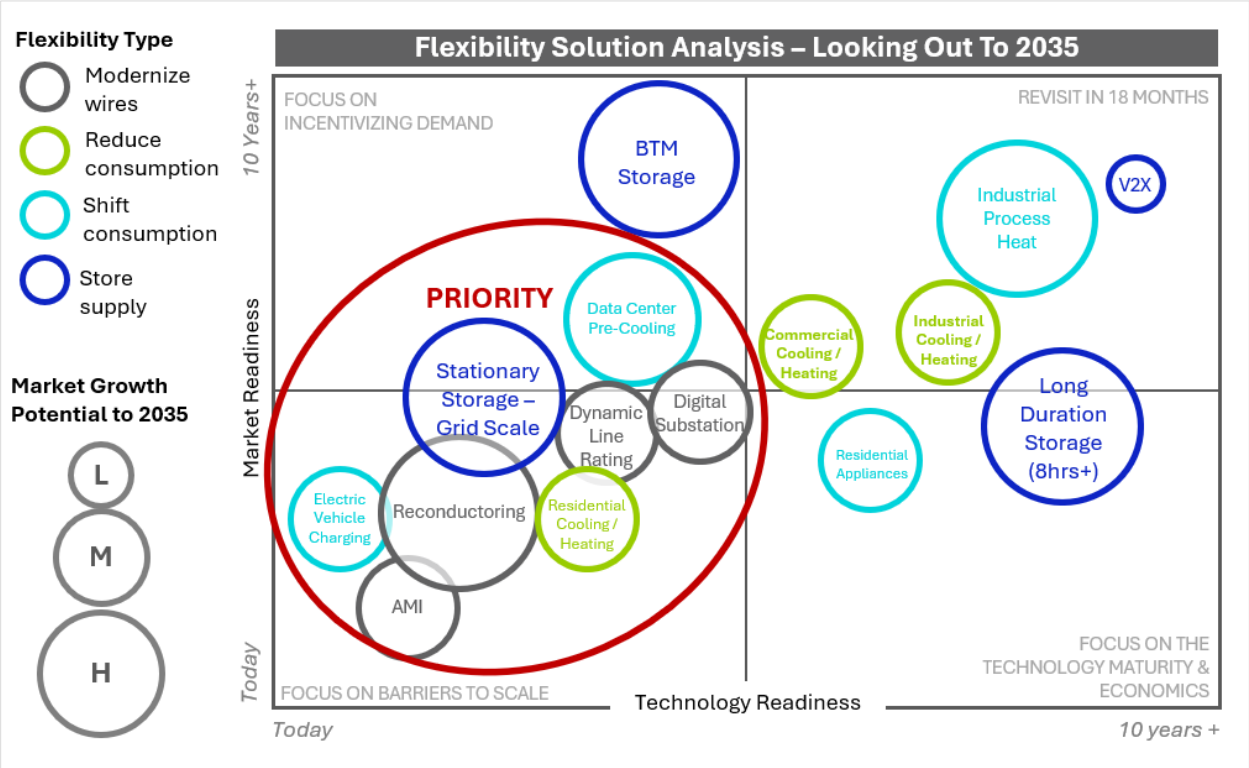
Figure 8.1: Flexibility Solution Analysis, 2025-2035



The grid flexibility analysis identified eight priority solutions for the electrical industry over the next 3–5 years. These solutions are outlined below in order of importance, along with their description, rationale, and potential barriers to scaling.

1. **Reconductoring of Transmission Lines**
    a. *Description*: The replacement of conventional aluminum conductor steel reinforced transmission cables with advanced conductors to help add additional capacity to existing transmission lines
    b. *Rationale*: The technology is already proven, and additional transmission capacity from reconductoring could allow the United States to get 90% of its electricity from emissions-free power sources by 2035 at 20% of the cost of building new transmission
    c. *Barriers*:
        i. Economic attractiveness for transmission owners to select this as a solution vs. building (and rate basing) new transmission infrastructure

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ii. Coordinated transmission planning and needs assessment needed to understand where reconductoring could be an operational and economically viable option

2. Coordination of EV Charging

a. *Description*: Involves the shifting of a minimum of 10 percent of daily EV charging load from peak to nonpeak hours

b. *Rationale*:

i. Could remove the need for approximately 40GW of generation capacity by 2050 (approximately 7% of expected additional generation capacity)

ii. The technology to automate charging times for vehicles already exists, making it easy for drivers to participate on a consistent basis

iii. Light Duty Vehicle utilization is on average less than 5 percent, meaning that EV batteries are rarely being used for driving during non-peak electricity hours (overnight/during 11am-2pm)

c. *Barriers*:

i. Charging and communication standards (including integration with utility systems or home energy management ecosystem)

ii. Battery warranties (no level of reasonable compensation for grid services will overcome any concern about degradation to vehicle)

iii. Utility policies/compensation mechanisms – currently only 6 percent of the US utility footprint has a residential V2G program today

3. Deployment of Stationary Storage

a. *Description*: The installation of grid scale and behind the meter storage to provide greater resource certainty for renewable generation, unblock T&D substation capacity bottlenecks, and provide local resilience and energy arbitrage for homes and businesses

b. *Rationale*:

i. It is expected that there could be in the region of 200 GW of storage deployed on the US grid by 2040

ii. Just 30 GW of stationary storage deployment could yield in the region of ~$2.0B in energy arbitrage and capacity value to the electricity system

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c. *Barriers*:
    i. Commercialization of longer duration storage (4+ hours)
    ii. Development of clear, compelling commercial and residential storage-specific electricity tariffs
    iii. Creation of direct utility to customer marketplace to animate consumer participation

4. Deployment of Digital Substations

a. *Description*: Involves the replacement or modernization of existing substations with the application of modern sensors, communication networks, digital technology, and intelligent devices to monitor, control, and manage distribution and grid edge electrical assets
b. *Rationale*:
    i. Digital substations cost less to deploy than physical substations and are safer, easier to maintain and provide granular access to real time data
    ii. Digital substations are critical to tapping into the potential value of behind the meter electrical assets in optimizing the matching of electricity supply and demand
c. *Barriers*:
    i. Sufficient economic attractiveness for distribution network owner operators to select this as a solution vs. building (and rate basing) new substation build out
    ii. Greater deployment of DER's and EV's is required to create demand for digital substation use cases and utility DERM's solutions to tap into digital substation value

5. Optimization of Residential Appliance Usage

a. *Description*: Involves shifting a small share of residential electricity use for non-critical appliances to non-peak electricity use times or temporarily reduce electricity consumption during peak electricity use times by raising AC temperatures or lower heating temperatures
b. *Rationale*:

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i. Reduces peak demand for electricity (and therefore the need for additional generation capacity and transmission capacity)
ii. One million smart thermostat customers participating in a demand response program can potentially deliver about 1,000 MW of generation need—equivalent to a single, large coal-fired power plant being removed from the grid or 2000-3000 MW of avoided renewable generation
iii. Control technologies already exist to automate residential appliance usage in the home and utility residential demand response programs are already being utilized in 10M homes in the US

c. *Barriers*:
    i. Building codes and standards for new construction to favor electrification, energy efficiency and consumption-based flexibility
    ii. Standardizing communication protocols for devices
    iii. More intelligent and automated demand management utility tariffs and programs are needed to enable scale

6. Deployment of Dynamic Line Rating Technologies

a. *Description*: Enables the rating of electrical conductors to be calculated based on local weather conditions rather than using "worst-case" assumptions of weather conditions
b. *Rationale*: Avoid permitting, right of way, cost and other issues that traditionally prevent transmission build out
c. *Barriers*:
    i. Sufficient economic attractiveness for transmission owners to select this as a solution vs. building (and rate basing) new transmission infrastructure
    ii. Coordinated transmission planning and needs assessment are required to understand where reconductoring could be an operational and economically viable option
    iii. Headwinds expanding beyond current pilot projects into mainstream use

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7. **Optimization of Data Center Electricity Use**
    a. *Description*: Involves shifting a small percentage of data center cooling load away from peak electricity consumption hours to earlier in the day when clean electricity generation supply is more plentiful to help reduce the need for additional generation and transmission capacity
    b. *Rationale*:
        i. Data centers present the most pressing risk to the electricity grid over the next 10 years – albeit concentrated over a small area
        ii. Shifting ~ 15 percent cooling load of a standard 180 MW data center from on-peak to off-peak times would save an estimated 1.97 percent of generation charges, or $635,000 a year
    c. *Barriers*:
        i. Proof of concepts – that data centers can shift cooling load without compromising reliability and down time of the facility
        ii. Utility tariffs and rates that are sufficient to incentivize participation – particularly for short periods of extreme peaks
8. **Continued Deployment of Advanced Metering Infrastructure (AMI)**
    a. *Description*: AMI is an integrated, fixed network system that enables more granular energy measurement/control and two-way communication between the utility and their customers
    b. *Rationale*:
        i. AMI has already been rolled out across 80 percent of bill paying locations across the US, meaning it wouldn't require a timely and costly roll out
        ii. The data that AMI provides helps to better optimize electricity use
    c. *Barriers*:
        i. Remainder of roll out dependent on utilities ability to rate base the cost of installation
        ii. Unlocking the full value of AMI requires improved smart and connected electrical appliances in the home/business and utility incentivization to harness the power of the data that AMI can provide

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Conclusion

The preceding chapters provide an in-depth analysis of the electroindustry, underscoring its vital role in the economy, its centrality to grid reliability, and its importance in powering the future. With electricity demand rising for the first time in decades—driven by the rapid growth of AI data centers and the expanding adoption of electrification technologies such as EVs and heat pumps—the industry now stands at a pivotal moment, marked by both extraordinary opportunity and formidable challenges.

Although recent years have seen historically strong industry growth, policies such as tariffs and domestic content requirements, combined with persistent material and workforce constraints, have complicated the ability of this globalized sector to deliver the grid of the future and the equipment needed to support the AI boom and broader energy goals—even as manufacturers invest heavily in domestic capacity.

As the grid flexibility analysis makes clear, technological solutions exist to help bridge the near-term gap between soaring electricity demand and constrained supply. Yet this represents only one part of the equation. To fully realize tomorrow's flexible, resilient grid—and to lift living standards in the process—industry manufacturers will also require consistent policy and regulatory clarity.

Ultimately, the electroindustry's ability to navigate these headwinds and rise to this moment will determine not only the reliability of the grid, but also the pace of innovation and prosperity in the decades ahead.

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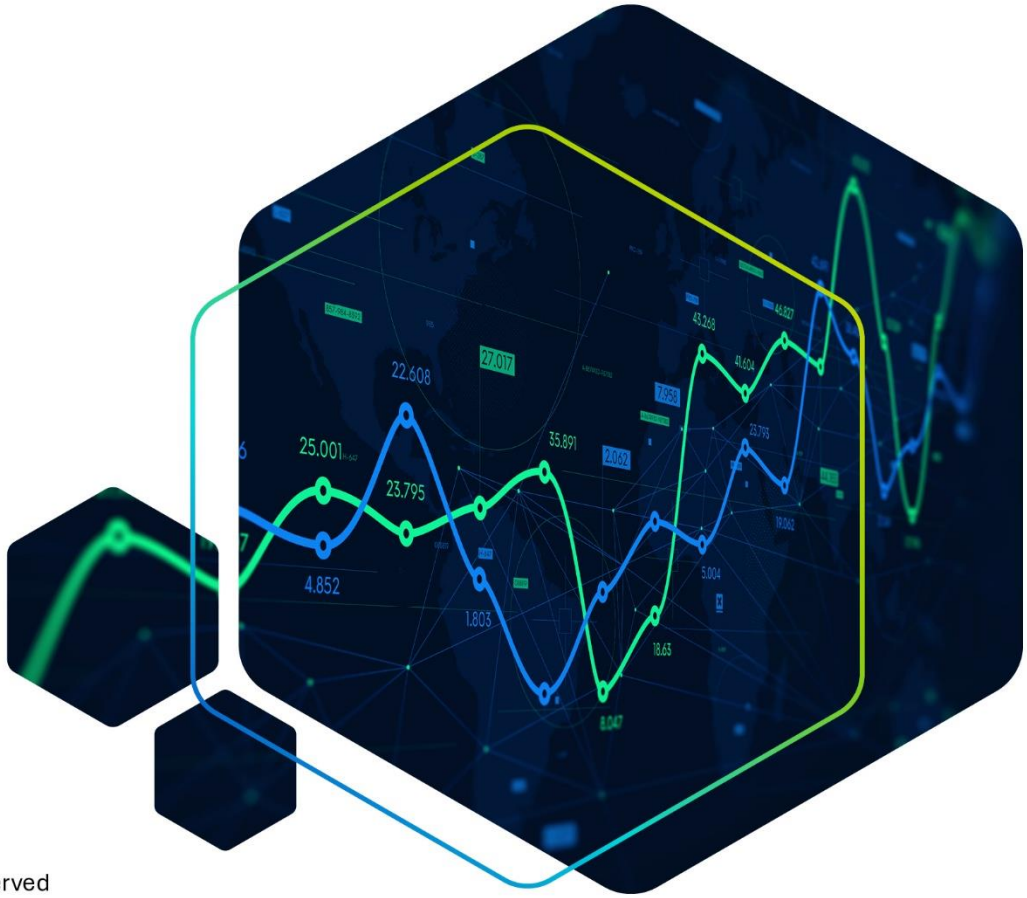

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