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<https://minnesotaoah.granicusideas.com/discussions/39667-minnesota-pollution-control-agency-request-for-comments-on-pfas-in-products-currently-unavoidable-use-rule/topics/submit-a-comment-290>

IDEXX Laboratories Inc. Response to Request for Comments on: Planned New Rules Governing Currently Unavoidable Use Determinations about Products Containing Per-and polyfluoroalkyl substances (PFAS), Revisor's ID Number R-4837

Thank you for the opportunity to provide feedback on the planned new rules government currently unavoidable use products.

By way of background, IDEXX manufactures human, animal (pet and livestock), dairy, and water diagnostic products, including complex electronic instruments primarily in Maine. Our products test for, among other things, infectious diseases that can be zoonotic (spreadable from animals to humans, such as SARS CoV2) or cause significant impact to the food supply (such as African Swine Fever and Mad Cow Disease). IDEXX's diagnostic products help enable the health and well-being of people, livestock, and pets, and help ensure the safety of milk and water, here in Minnesota, throughout the United States, and in more than 175 countries globally.

IDEXX offers not only diagnostic solutions to most of the animal production chain but also provides services that, for example, help animal producers manage vaccination more efficiently, reduce the use of antibiotics, re-introduce animals in herds after treatments, optimize reproduction cycles, and ensure early and definitive identification of highly contagious and life-threatening diseases that threaten human and animal populations.

Our focus on human and animal health diagnostic products allies us with the Program's environmental protection goals. Indeed, Reduction of harmful environmental contaminants is at the core of our business. However, it is crucial that that essential products such as IDEXX's remain available and of the same high quality and performance within IDEXX's heavily regulated marketplace. Accordingly, IDEXX submits the following information in support of a CUU designation for its products.

IDEXX requests a currently unavoidable use (CUU) designation for the following categories of products, each of which is essential for human and animal health and safety, as well as the functioning of society:

1. Diagnostic devices and equipment used in veterinary medicine. PFAS are used in the manufacture of such diagnostic devices and equipment, which are essential for the prevention, and detection of animal diseases, including zoonotic diseases, and are critical to the health of pets and livestock, the latter which could affect the supply of food and/or human health. If veterinary diagnostics were unavailable, there would be a significant increase in negative human and animal healthcare outcomes, as well as an inability to mitigate significant risks to human and animal health.
2. Diagnostic devices and equipment used in human medicine. PFAS are used in the manufacture of such diagnostic devices and equipment, which are essential for the prevention, detection, and treatment of disease in humans. If human diagnostics were unavailable, there would be a

significant increase in negative healthcare outcomes, as well as an inability to mitigate significant risks to human health.

3. Diagnostic devices and equipment used for water quality testing. PFAS are used in the manufacture of such diagnostic devices and equipment, which are essential for monitoring of clean potable water, wastewater, and recreational water. If water quality diagnostics were unavailable, there would be a significant increase in negative human and animal healthcare outcomes, as well as an inability to mitigate significant risks to human and animal health.
4. Manufacturing equipment that contains PFAS chemicals. PFAS are used in the manufacturing equipment and raw materials used to manufacture components of diagnostic devices and equipment and diagnostic devices and equipment itself, including (but not limited to) gaskets, O-rings, filters, membranes, tubes, inner layers of chemical reactors, primary packaging materials, tubes in analytical equipment, and tape used to build inert laboratory scale equipment. The manufacturing equipment necessary to make IDEXX's veterinary diagnostic, human diagnostic, and water quality testing products is essential because if unavailable, there would be a significant increase in negative human and animal healthcare outcomes, as well as an inability to mitigate significant risks to human and animal health.

1) Should criteria be defined for “essential for health, safety, or the functioning of society”? If so, what should those criteria be?

IDEXX manufactures human, animal (pet and livestock), dairy, and water diagnostic products that, if unavailable, would result in significant impacts to the health of people, pets and livestock. The products we design and produce in Maine are exported to ~175 different countries and territories, including Minnesota.

Our products test for infectious diseases, including those that spread from animals to humans such as SARS coronavirus 2, and that endanger the food supply, such as African Swine Fever. Our diagnostic solutions help animal producers manage vaccination programs more efficiently and reduce the use of antibiotics.

Veterinarians and pet owners across Minnesota rely on IDEXX Companion Animal products to help our pets lead longer and fuller lives. The relationships IDEXX has with veterinary practices allow us to develop and advance the veterinary standard of care around the world.

IDEXX has a subsidiary company, OPTI Medical Systems that develops and provides human diagnostic products around the world. Our human diagnostics are used in emergency rooms and intensive care units in more than 100 countries to aid in critical care diagnoses. In early 2020, OPTI launched its OPTI® SARS-CoV-2 RT-PCR Covid test.

Our water testing products are relied on throughout Minnesota, including the Minnesota Departments of Health and Agriculture, water utilities of Minneapolis and St. Paul, and more than 500 local public health laboratories, water utilities and wastewater treatment plants across the state. Additionally, more than 2.5 billion people worldwide rely on our test to ensure safe drinking water. We offer solutions for drinking water, wastewater monitoring, and recreational water.

IDEXX products provide significant global support for veterinary care of animals that supply the global markets for food sources and help diagnose and control zoonotic diseases (diseases that can infect both animals and humans). IDEXX's inability to supply our products would result in significant global impacts. For example, transboundary animal diseases (TADs) that could result from the loss of IDEXX products cause livestock production losses (which may be very high if the disease in question spreads very rapidly, particularly if it causes high levels of mortality) and considerable disruption to trade, causing particular concern in countries where export is an important source of revenue for the livestock sector. The prevention and control of TADs add to the cost of livestock production and to the national veterinary budget. Zoonotic TADs (those that can infect humans and cause human disease) cause economic impacts from human sickness and costs to public health systems. Governments spend scarce resources controlling outbreaks of TADs and applying prevention measures, farmers must deal with the impacts in their livestock production systems, and consumers experience the effects of local or widespread market disruptions caused by TADs.

2) Should costs of PFAS alternatives be considered in the definition of “reasonably available”? What is a “reasonable” cost threshold? And 4) What criteria should be used to determine the safety of potential PFAS alternatives.

MPCA asks questions about the cost and safety aspect of alternatives. Alternatives should be evaluated on a cost/benefit basis. Often costs to determine if there are alternatives to existing product already can outweigh the socio-economic impacts. It is likely the threshold costs will vary considerably among industries and products. Veterinary medicines differ from human medicines in that there are generally no third-party payers in veterinary medicine, meaning the customer/animal owner bears the full cost of the product. Many of our products support disease eradication programs around the world. As such, disruption in animal testing for disease programs can have significant consequences to the health of people and animals on a global scale.

3) Should unique considerations be made for small businesses with regards to economic feasibility?

IDEXX provides no comments on this matter.

5) How long should PFAS currently unavoidable use determinations be good for? How should the length of the currently unavoidable use determination be decided. Should significant changes in available information about alternatives trigger a re-evaluation?

These critical diagnostic tests used to keep our pets, food and water safe are subject to stringent regulatory frameworks around the world, and in the US under the jurisdiction of the United States Food and Drug Administration and the United States Department of Agriculture pursuant to the federal Virus-Serum-Toxin Act, 21 U.S.C. § 151, et seq. Accordingly, our products and their components, including the use of PFAS within our products, cannot simply be switched out for products that do not contain PFAS. Instead, our products are subject to heavily regulated processes that involve years of research and development, regulatory review, and governmental approvals before they can reach market. As one example, the IDEXX diagnostic kit used to test for mad cow disease is written into EU laws. Those laws would need to be changed to change that diagnostic kit.

The length of time to change a regulated health product, either animal or human, needs to be measured in decades, as many of our products have long life cycles. Transitioning to alternatives requires research, followed by generation of data to support the change, followed by regulatory approval from the governing agency.

Our ability to identify PFAS in our diagnostic products is limited to currently available test methods or data provided by our suppliers. Current test methods are developed only in response to national regulations, such as the EPA and pending EU-wide requirements. This means that while Minnesota's legislation calls for identifying all of the more than 10,000 PFAS compounds, internationally recognized labs currently offer screening tests for only about 70 recognized compounds. International test methods are developed as a result of nationally regulated compounds, and it takes years to develop targeted methods that meet the regulations. The Minnesota legislation simply does not account for these practical limitations in PFAS testing capability.

We have invested in multiple systems and technology solutions to monitor regulated lists of chemicals, which includes systems that gather information from more than 100,000 global suppliers. Even still, IDEXX estimates that we have definitive information of PFAS use in only about 1% of our purchased materials. IDEXX buys more than 10,000 unique components or materials sourced from roughly 1,000 global suppliers used to manufacture IDEXX products. A single analyzer that tests for chemistry analytes in animal samples can contain more than 1,000 unique parts.

IDEXX is still investigating our complex supply chain and continue to gather details on use of PFAS in our products. Additionally, we have partnered with Claijan Environmental to better understand the use of PFAS in the electronics sector. Attached hereto as **Appendix A** is IDEXX's letter in support of the Claijan February 29, 2024, CUU submission ("Industry PFAS CUU Project PFAS Currently Unavoidable Uses (CUU) Submission by Industry"), which we incorporate herein by reference.

In conclusion, any human or veterinary diagnostics or water quality testing approved to restore or protect the health and welfare of animals and people and the processes used to produce the products should be considered as necessary for health and therefore considered a currently unavoidable use. This designation should include the entire manufacturing process and not only the final diagnostics. We therefore respectfully request to take this into account when publishing the rule.

A handwritten signature in black ink that reads "Diana Rondeau". The signature is fluid and cursive, with a small dot above the "i" in "Diana".

Diana Rondeau

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Appendix A



Claigan Environmental Inc.
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Letter of Support

IDEXX Laboratories Inc. stands firmly behind efforts to minimize the presence of Per- and Polyfluorinated Substances (PFAS) in the environment. However, we express concern regarding the potential economic, social, and health ramifications of current PFAS restrictions. It's important to acknowledge that PFAS play a vital role in ensuring product functionality and meeting stringent safety standards.

In line with our commitment to finding balanced solutions, Claigan Environmental has developed a comprehensive Currently Unavoidable Uses (CUU) proposal, which is being submitted to the states of Maine and Minnesota. This proposal is founded upon rigorous laboratory testing and incorporates valuable insights gathered from diverse stakeholders. By engaging experts from various industries, Claigan Environmental has adopted a collaborative approach to address this complex issue.

IDEXX Laboratories Inc. actively participated in the consultation process and supports Claigan Environmental's submission. We believe that their proposal represents a thoughtful and pragmatic approach to managing PFAS while mitigating adverse impacts on businesses, communities, and public health.

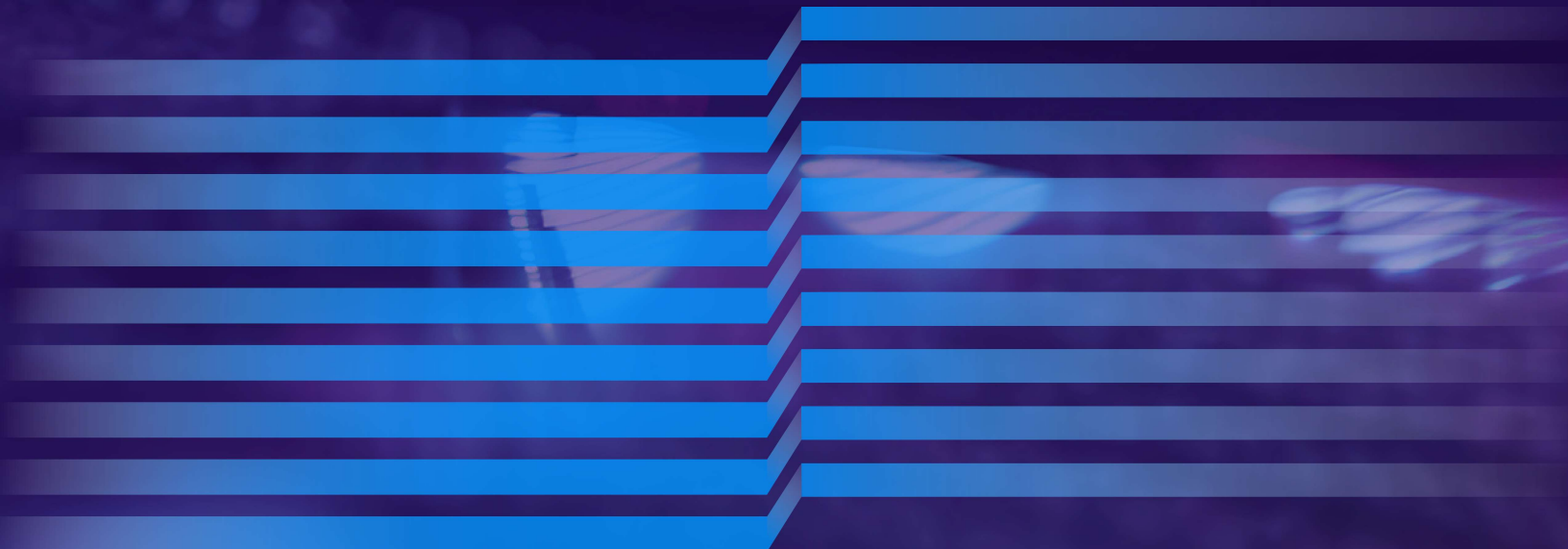
A handwritten signature in black ink that reads 'Diana & Rondeau'.

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NOVEMBER 2025

Powering the U.S. Economy:

The Economic Reach of Electronics Manufacturing





Foreword

Electronics are the unseen infrastructure of our modern world. Whether it is the phone in your hand, the car you drive, the medical device that keeps you healthy, or the constellation of satellites guiding your every step, electronics and the people who manufacture them make it all possible.

The U.S. electronics manufacturing sector is more than a critical industrial base. It is a catalyst for innovation, a pillar of economic resilience, a cornerstone of national defense, and a foundation for long-term competitiveness. Supporting nearly 5.2 million American jobs and generating \$1.8 trillion in annual economic output, this sector reaches into every corner of the country and every layer of modern life.

Electronics manufacturing is deeply woven into the fabric of the American economy. From powering cutting-edge technologies to supporting national security, from

sustaining small manufacturers to enabling global trade, the industry delivers both visible and invisible value. Every job created, every dollar invested, and every component produced ripples across the broader economy, multiplying opportunity for workers, suppliers, and communities.

To lead in the technologies of tomorrow, we must invest in the foundations of today. That means a strong, resilient, and globally competitive electronics manufacturing sector. It means a trained and ready workforce. And it means smart, forward-looking policies that promote innovation, sustainability, and secure supply chains.

At the Global Electronics Association, we are committed to helping our members build electronics better through industry standards, workforce development, research, and advocacy.

Let's work together to ensure the future runs on electronics.

John W. Mitchell
President and CEO

Global Electronics
Association

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Executive Summary

Electronics Manufacturing is a Core Engine of U.S. Growth

- The sector does more than make chips and devices, it powers a broad economic system. In 2023 it supported nearly 5.2 million jobs and about \$1.8 trillion in total output once supply-chain and household-spending effects are included, showing how activity inside plants multiplies across the economy.
- Its contribution to GDP, roughly \$853 billion, and labor income, about \$513 billion, places electronics among the country's most consequential production platforms, comparable to other headline industries that anchor national competitiveness.
- Even before ripple effects, direct activity alone accounted for about 1.3 million jobs and \$802 billion in output, underscoring a substantial "base load" of economic activity that the rest of the ecosystem builds upon.

The Sector Anchors High-Wage, High-Skill Employment

- Average pay reached about \$156,000 in 2023, more than 20% higher than in 2017. These are durable, career-track roles that reward engineering, advanced manufacturing, and data-centric skills.

- Wages outpace broader manufacturing and compare favorably with information services and corporate management, which signals strong returns to technical know-how and continual process innovation.
- Job content spans R&D, design, fabrication, assembly, testing, and quality assurance, reflecting a pipeline that blends scientific discovery with production excellence.

The Ripple Effects of Industry Impact Are Broad and Strengthening.

- Every direct job in electronics supports about three additional jobs in the wider economy, and each dollar of direct output drives more than two dollars in total activity. This multiplier profile demonstrates how tightly electronics is woven into domestic supply chains.
- Over time, these multipliers have strengthened, suggesting deeper domestic linkages, more specialized inputs, and stronger services complements around design, testing, logistics, and management.
- The largest upstream beneficiaries include wholesale trade, corporate management, staffing, transportation, and professional services, which

together collectively expand the sector's overall footprint well beyond factory walls.



The Electronics Industry Footprint is National, Concentrated in Key State Hubs

- Activity is present in every region, yet clusters in a handful of innovation-intensive states. California leads in jobs and output, reflecting its unique mix of design talent, fabrication capacity, and downstream tech markets.



- Texas follows as a diversified hub anchored by chip manufacturing, defense electronics, and logistics infrastructure that connects domestic production to global customers.
- Oregon stands out for intensity because semiconductors account for a high share of state GDP, illustrating how world-class fabs can shape regional economies.

The Electronics Industry has Broad Economic Reach and Growing Linkages

- Each direct job supports roughly three additional jobs

across the economy, yielding an employment multiplier of 4.0.

- Every \$1 of direct output generates about \$2.25 in total economic activity when supplier purchases and household spending are included.
- Since 2017, the labor income multiplier has increased from 2.46 to 2.54, the value added multiplier has risen from 2.32 to 2.77, and the output multiplier has grown from 2.05 to 2.25.
- Gains reflect tighter domestic linkages, more specialized intermediate inputs, and stronger services complements in design, testing, logistics, and management.

Electronics manufacturing fuels \$1.8 trillion in U.S. economic output and supports more than 5.2 million jobs nationwide. Each dollar produced generates more than twice that amount in total activity, underscoring the sector's broad economic reach.

Introduction

Electronics manufacturing anchors U.S. innovation, linking technology, talent, and economic growth nationwide.

Electronics manufacturing is one of the most strategically important and economically impactful sectors in the United States. As digital transformation accelerates across industries, from energy and transportation to healthcare and defense, understanding the true reach of electronics manufacturing has become essential for policymakers, business leaders, and workforce planners alike.

The United States plays a critical role in this global ecosystem, serving as both a center of production and a hub for high-value suppliers. Some

of the world's most recognized companies, including Apple, Intel, IBM, Texas Instruments, Lockheed Martin, and Honeywell, manufacture critical components and systems in the U.S. International leaders such as Foxconn, TSMC, and Samsung also rely on U.S.-based operations, partnerships, and talent to support advanced production. Together, these firms drive innovation not only in consumer electronics but also in transportation, aerospace, healthcare, and energy.

This report provides a comprehensive economic analysis of the U.S. electronics manufacturing sector. It quantifies the industry's contribution to employment, income, GDP, and output using an input-output modeling framework that captures direct activity, supply chain linkages, and consumer-driven ripple effects. The analysis includes both national and state-level impacts and highlights how electronics manufacturing connects deeply with virtually every corner of the U.S. economy. In addition to measuring economic value, this report sheds light on where that value is created, across subsectors and regions. Electronics were long seen as inputs, not end products. Semiconductors, sensors, and circuit boards were treated as components inside





the “real” products such as smartphones, cars, and jets that drew attention and investment. As a result, policymakers prioritized industries that consumed electronics over those that produced them. Public discourse focused more on consumer tech brands and software platforms than on the upstream manufacturing infrastructure that made them possible.

Only recently, amid supply chain shocks like the shortages experienced during the COVID-19 pandemic, rising geopolitical tensions, and major industrial policy shifts such as the CHIPS Act, has electronics manufacturing been

recognized as critical infrastructure and a strategic national priority.

From semiconductors that power artificial intelligence to the precision instruments used in healthcare and aerospace, electronics manufacturing enables critical capabilities across nearly every sector. The industry fuels technological leadership, strengthens national resilience through domestic supply chains, and generates high-paying jobs that anchor communities. This report explains how and why the sector has become indispensable to America’s economic strength and global competitiveness.

Supply chain shocks revealed a truth: America’s strength depends on a vibrant electronics manufacturing base.

Measuring the Electronics Economy

Measuring the Electronics Economy

From materials to logistics, electronics manufacturing fuels a nationwide ecosystem of economic activity.

Electronics manufacturing does more than build devices. It sets off a chain reaction that moves from clean rooms and assembly lines to a wide network of suppliers and local services. Upstream materials include specialty chemicals and photoresists, industrial gases, solder pastes and epoxies, copper foil and wire, glass fiber and laminates, ceramics and substrates, precision metals and machined components. Production enablers include manufacturing equipment, vacuum and filtration systems, ultrapure water systems, HVAC and cleanroom builders, automation integrators, control systems, and independent testing and calibration labs. Design and technical services span EDA and developer tools, cloud and data platforms, cybersecurity, systems

engineering, and specialized staffing. Logistics and site operations keep plants running through trucking, warehousing, freight forwarding, utilities, facility maintenance, security, janitorial, waste and hazardous materials management, and construction for plant buildouts and retrofits.

Downstream, the impact reaches buyers and system integrators across automotive, aerospace and defense, medical devices, industrial equipment, telecom networks, data centers, and consumer brands. Local spillovers appear in professional services like accounting, legal, and marketing, and in hospitality and retail that support the workforce. Every dollar spent inside the sector pulls in these suppliers, supports





local services, and fuels household spending as employees pay rent, buy groceries, and dine out. To capture this full footprint, we separate the effects into clear categories that show how activity inside the factory walls expands across the broader economy.

Every dollar spent inside the sector pulls in these suppliers, supports local services, and fuels household spending as employees pay rent, buy groceries, and dine out. To capture this full footprint, we separate the effects into clear categories that show how activity inside the factory walls expands across the broader economy.

TYPES OF ECONOMIC IMPACT

Electronics manufacturing influences the economy through several distinct channels. To reveal the sector's full footprint, results are organized into three categories that trace activity inside the sector, through its supplier networks, and into household

spending across local communities. This structure separates the initial effects of production from supply chain ripple effects and from the consumer activity supported by those paychecks, providing a clearer view of how factory-floor decisions translate into broader regional and national outcomes. The summaries below define each category and describe how it contributes to the total impact while avoiding double counting.

- **DIRECT IMPACTS** capture employment, income, output, and value added within the electronics manufacturing sector itself. This includes the jobs, wages, and production happening inside electronics companies, such as assembling circuit boards or designing semiconductors.
- **INDIRECT IMPACTS** result from the sector's purchases of materials, services, and other inputs from domestic suppliers. These are the ripple effects

through the supply chain, including jobs at companies that provide raw materials, shipping services, or manufacturing equipment to electronics firms.

- **INDUCED IMPACTS** result additional economic activity generated by the household spending of employees supported by both direct and indirect activities. This is the broader economic boost that occurs when those workers spend their income at grocery stores, restaurants, car dealerships, and other local businesses.

ECONOMIC MEASURES TRACKED

Clear, consistent metrics are essential for comparing results across regions and time. The analysis reports standard measures that capture jobs, earnings, value creation, and total production, allowing readers to understand both the scale and

composition of economic activity. Employment figures reflect the breadth of jobs supported, labor income indicates how much pay and benefits flow to workers and proprietors, value added aligns with GDP and is the best gauge of net contribution, and output shows the full transactional volume moving through the economy. The definitions below specify what each measure includes so results can be interpreted accurately and compared on a like-for-like basis.

- **EMPLOYMENT** includes full-time, part-time, and self-employed workers.
- **LABOR INCOME** consists of wages, salaries, employer-provided benefits, and proprietor income.
- **VALUE ADDED** measures the sector's contribution to GDP, including labor compensation, taxes on production, and business profits.

- **OUTPUT** reflects the total value of goods and services produced, including both intermediate inputs and final demand.

DEFINING THE ELECTRONICS VALUE CHAIN

Electronics manufacturing spans a complex set of interconnected industries. For this analysis, the sector includes eight North American Industry Classification System (NAICS) categories that represent core areas of production and component integration:

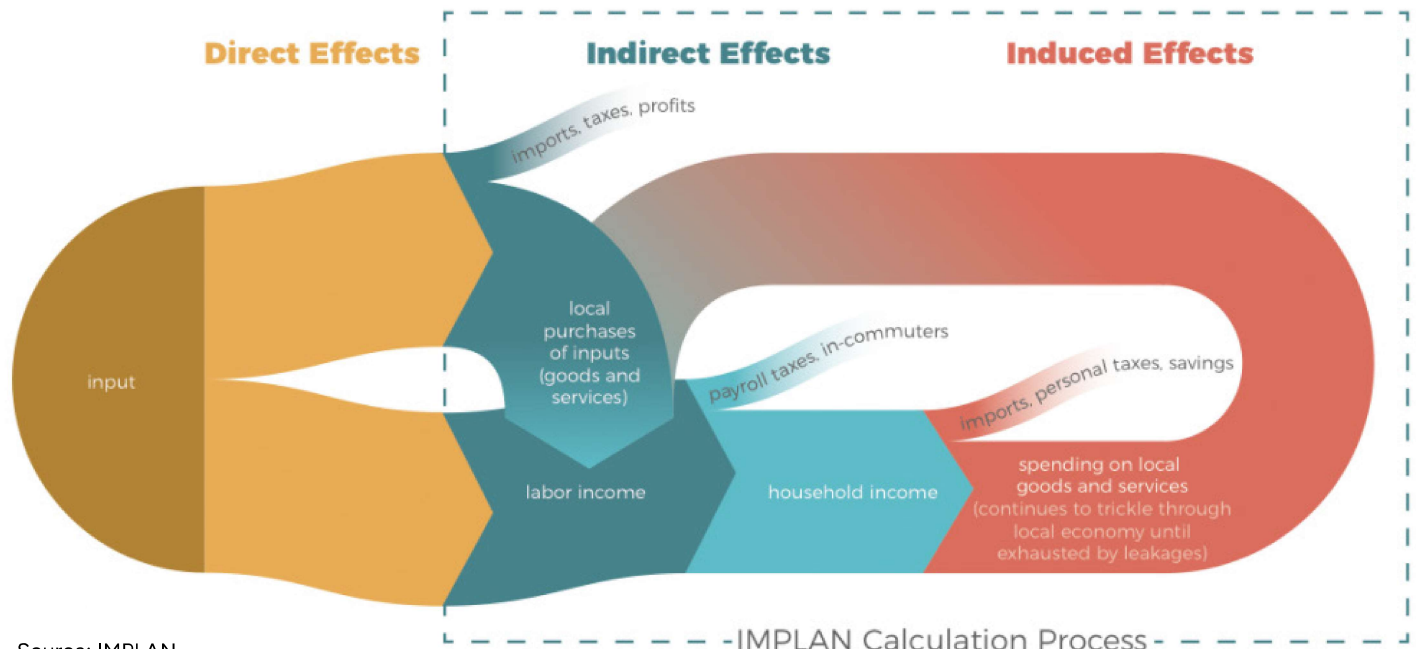
- **NAICS 3341** – Computer and Peripheral Equipment Manufacturing
- **NAICS 3342** – Communications Equipment Manufacturing
- **NAICS 3343** – Audio and Video Equipment Manufacturing
- **NAICS 3344** – Semiconductor and Other Electronic Component Manufacturing

- **NAICS 3345** – Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
- **NAICS 3353** – Electrical Equipment Manufacturing
- **NAICS 3359** – Other Electrical Equipment and Component Manufacturing
- **NAICS 33632** – Motor Vehicle Electrical and Electronic Equipment Manufacturing

To quantify the sector's total economic contribution, this study applies input-output (I-O) analysis. This modeling technique traces the flow of goods, services, and income across industries, capturing direct effects within the sector, indirect effects through supply chains, and induced effects from household spending.

The analysis uses the 2023 IMPLAN database and model, reflecting the most current economic structure.

THE INPUT-OUTPUT MODEL



IMPLAN is used by government agencies, academic researchers, and industry analysts to model how spending flows through the economy. All results are presented in inflation-adjusted 2023 dollars and reflect activity for the calendar year 2023. Appendix A provides 2025 projections assuming the same industry relationships from 2023 continue through 2025.¹

REGIONAL SCOPE AND DATA CONSIDERATIONS

Input-output models use interindustry tables to track how goods and services flow between sectors. These tables support the estimation of secondary economic effects while avoiding double-counting in key metrics such as employment, labor income, and value added. Output figures may reflect some duplication, particularly when intermediate goods are produced and consumed within the same geographic region.

This report includes estimates at both the national level and for all 50 states and the District of Columbia.

By combining detailed industry data with region-specific modeling, the analysis offers a comprehensive picture of electronics manufacturing's role in driving economic activity across the United States.

Input-output models trace how every dollar moves through the economy, revealing how factory-floor activity drives growth far beyond manufacturing itself.

TOTAL ECONOMIC IMPACT



INDIRECT IMPACTS

(Backward Linkages)

Supply-chain inputs and upstream business activity

Electronics manufacturers buy supplies, materials, and other services



DIRECT IMPACTS

(Direct Spending)

Employment, income, output and value added within the electronics manufacturing sector



INDUCED IMPACTS

(Forward Linkages)

Household spending by employees supported by both direct and indirect activities



Electronics Manufacturing and its Impact on the U.S. Economy

Electronics Manufacturing & its Impact on the U.S. Economy

Electronics manufacturing is a powerful driver of economic activity in the United States. It spans a wide array of technologies and end-use applications, from semiconductors and sensors to advanced instrumentation and vehicle systems. As a result, its influence reaches across industries as diverse as healthcare, aerospace, automotive, consumer electronics, and national defense.

The sector's importance goes far beyond the factory floor. In addition to the direct jobs, income, and output generated within electronics manufacturing itself, the industry supports a vast ecosystem of upstream suppliers and downstream service providers. It also fuels local economies through the everyday spending of workers employed in the sector and its supply chain.

Understanding the full economic footprint of electronics manufacturing requires looking at all

three dimensions of impact: direct, indirect, and induced. Together, these reveal not only how much the sector contributes to the national economy, but how deeply it is woven into its fabric.

Direct Impacts

The electronics manufacturing sector in the United States is composed of a diverse set of industries that span a wide range of technologies and end markets. Understanding the contribution of each subsector helps clarify where economic activity is concentrated and how different components of the industry drive national performance.

Table 1 presents a detailed breakdown of the direct economic contribution of the U.S. electronics manufacturing sector by NAICS subsector. Collectively, the sector accounted for approximately 1.3 million direct jobs, \$202.3 billion in labor income, \$307.7

billion in value added, and \$802.4 billion in total output.

Within the sector, Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (NAICS 3345) and Semiconductor and Other Electronic Component Manufacturing (NAICS 3344) emerge as the two largest subsectors by both employment and output. NAICS 3345 employed over 400,000 workers and generated \$224.8 billion in output, while NAICS 3344 supported over 300,000 jobs and contributed \$239.9 billion in output. Together, these two subsectors represented more than 57% of total employment and nearly 58% of total output within the electronics manufacturing sector.

NAICS 3344 and NAICS 3345 account for a disproportionately large share of employment and output in the electronics manufacturing sector because they produce foundational technologies that power modern systems. NAICS 3344 includes

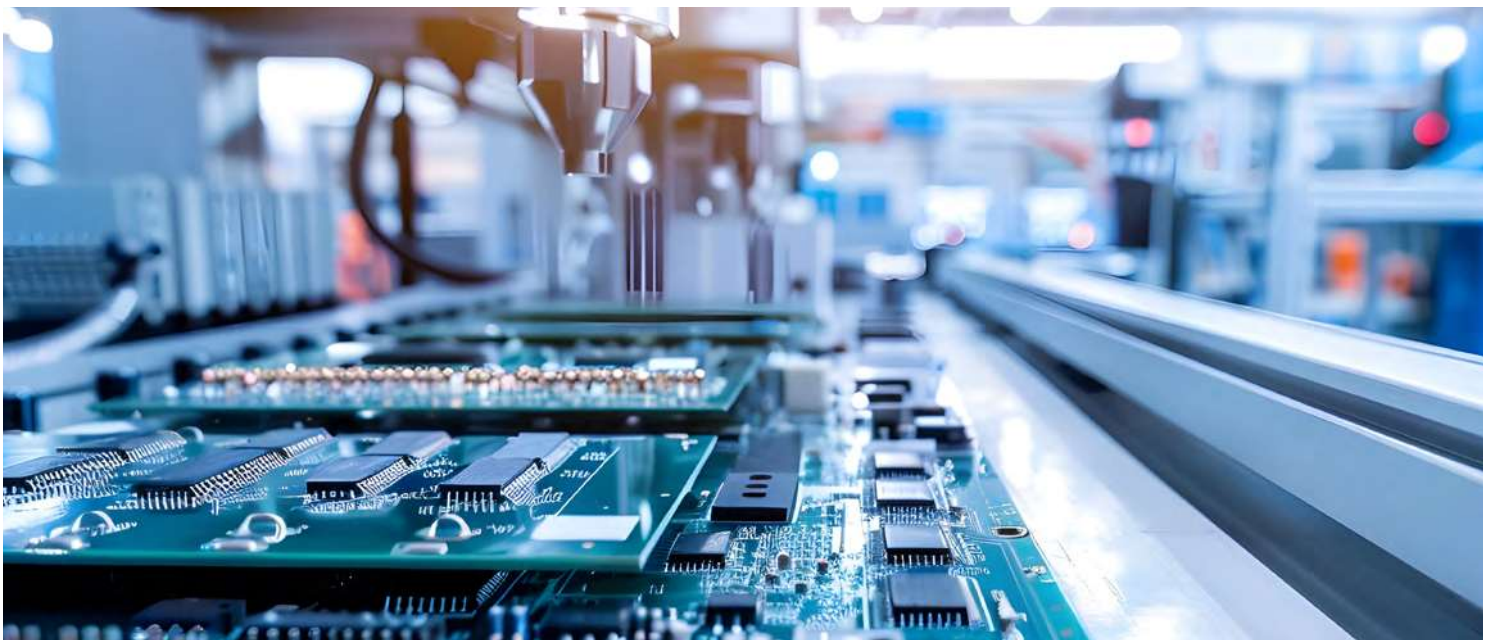


TABLE 1. ELECTRONICS MANUFACTURING, DIRECT IMPACTS SUMMARY

NAICS INDUSTRY	EMPLOYMENT (THOUSAND PERSONS)	LABOR INCOME (BILLIONS \$)	VALUE ADDED (BILLIONS \$)	OUTPUT (BILLIONS \$)
Electronics Manufacturing	1,296.10	\$202.3	\$307.7	\$802.4
3341 Computer and Peripheral Equipment Manufacturing	92.2	\$28.3	\$39.1	\$92.9
3342 Communications Equipment Manufacturing	71.8	\$11.3	\$16.8	\$41.5
3343 Audio and Video Equipment Manufacturing	17.8	\$2.9	\$5.4	\$17.2
3344 Semiconductor and Other Electronic Component Manufacturing	334.3	\$57.7	\$93.7	\$239.9
3345 Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	405.7	\$60.5	\$90.0	\$224.8
3353 Electrical Equipment Manufacturing	149.4	\$17.1	\$25.9	\$71.1
3359 Other Electrical Equipment and Component Manufacturing	166.5	\$19.1	\$29.2	\$82.4
33632 Motor Vehicle Electrical and Electronic Equipment Manufacturing	58.4	\$5.5	\$7.5	\$32.5

semiconductors, sensors, circuit boards, and other components essential to everything from smartphones and cloud infrastructure to electric vehicles and military platforms. NAICS 3345 focuses on complex, precision systems such as MRI machines, avionics, factory controls, and scientific instruments, with strong ties to the growing medical device industry. These subsectors are highly capital and research intensive, often requiring advanced facilities, specialized tooling, and highly skilled labor. Their products typically involve multiple design and production stages and serve high-growth industries like healthcare, aerospace, and defense. Even limited production runs can generate significant economic output due to the complexity and value of the goods.

Other significant contributors include Computer and Peripheral Equipment Manufacturing (NAICS

3341), which produces servers, laptops, storage devices, and data infrastructure equipment, and Other Electrical Equipment and Component Manufacturing (NAICS 3359), which supplies relays, switches, and connectors essential to energy systems, automation, and control networks. These subsectors generated \$92.9 billion and \$82.4 billion in output, respectively. Though smaller in scale, Audio and Video Equipment Manufacturing (NAICS 3343) and Motor Vehicle Electrical and Electronic Equipment Manufacturing (NAICS 33632) continue to play important roles, particularly in delivering key technologies for consumer electronics, in-vehicle systems, and next-generation transportation platforms.

The entire sector spans high-tech, capital-intensive production and complex value chains that extend across industries such as automotive,

aerospace, communications, energy, and healthcare. This broad integration reinforces the sector's strategic importance to U.S. innovation, competitiveness, and economic resilience.

EMPLOYMENT

Electronics manufacturing is not only a major source of jobs, but also a powerful engine of high-value employment. These jobs are among the best compensated in the economy, reflecting the sector's demand for technical expertise, precision, and innovation. As global reliance on advanced electronics continues to grow, so too does the demand for a highly skilled and well-compensated workforce to support this complex and rapidly evolving sector.

As shown in Figure 1, two subsectors dominate employment: Navigational,



\$802.4B

U.S. electronics manufacturers produce \$802.4 billion in goods and services.

Measuring, Electromedical, and Control Instruments Manufacturing (NAICS 3345) and Semiconductors and Other Electronic Components (NAICS 3344). Together, they support approximately 740,000 jobs, or 57% of total direct employment in the sector. Their scale reflects the complexity, strategic importance, and widespread demand for the components and systems they produce.

NAICS 3344 is central to domestic semiconductor fabrication and core components like printed circuit boards, which are essential for national security and economic competitiveness. NAICS 3345, in parallel, supports high-growth fields such as medical diagnostics, factory automation, and scientific

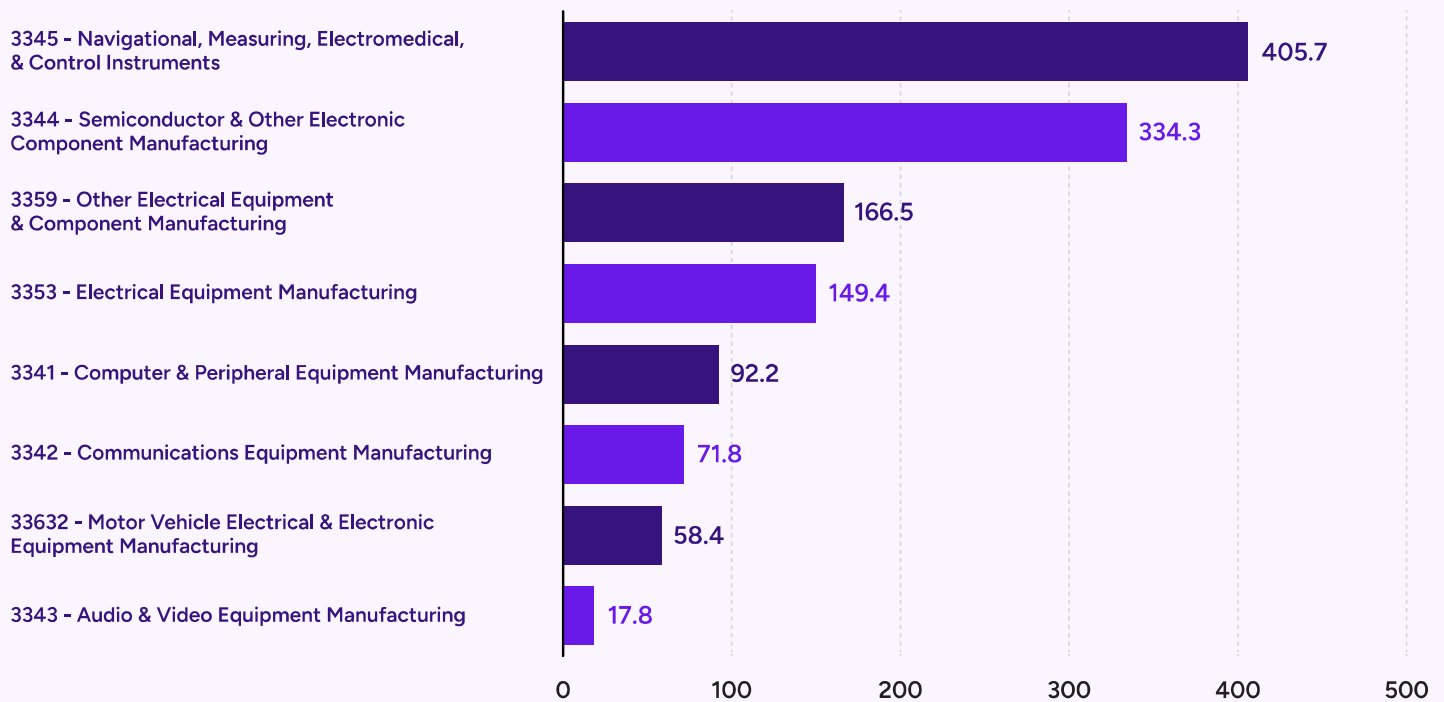
instrumentation. As global demand for advanced electronics accelerates, these subsectors will remain essential to U.S. innovation and industrial resilience.

Beyond the number of jobs, electronics manufacturing stands out for the quality of employment it offers. In 2023, the sector's average annual wage reached \$156,102, a 23% increase since 2017, reflecting rising demand for technical talent and the growing complexity of the technologies produced. This wage level far exceeds the national average and surpasses earnings in many major industries. For example, average wages are \$48,000 in retail, \$75,000 in construction, and \$77,000 in transportation and warehousing. Even professional, scientific, and technical services, often considered high-wage sectors, report average earnings of \$134,000.

Compared to the broader manufacturing sector, where the average wage is \$98,000, electronics manufacturing delivers both higher income and more specialized career opportunities. In fact, average wages in the sector now rival those in information services (\$168,000) and corporate management (\$173,000), highlighting its alignment with advanced engineering, design, and research-intensive roles.

These compensation trends underscore the sector's dual importance, not only as a hub of technological production but also as a key platform for sustaining high-wage, middle-class employment across the country. The workforce spans roles in engineering, fabrication, design, and quality control, supported by a mix of large multinationals and small to mid-sized manufacturers. As the industry evolves to meet the demands of global competition and digital transformation, the need for a highly skilled, well-compensated workforce

Figure 1. Electronics Manufacturing Employment by Detailed Industry
(THOUSAND PERSONS)



will remain strong, backed by education and training systems that can deliver talent at scale.

OUTPUT BY SUBSECTOR

The largest contributors to industry output are semiconductor and electronic component manufacturers (NAICS 3344), instrument and control system producers (NAICS 3345), and computer and peripheral equipment manufacturers (NAICS 3341). Together, these three

The sector's \$156,000 average wage reflects strong demand for advanced skills and technical expertise.

industries account for nearly 69% of total sector output, underscoring their central role in both production volume and value.

As shown in Figure 2, NAICS 3344 leads the sector with \$239.9 billion in output, driven by persistent demand for integrated circuits, sensors, and other critical technologies used in smartphones, data centers, electric vehicles, and defense systems. NAICS 3345 follows closely with \$224.8 billion, reflecting continued growth in medical diagnostics, factory automation, and precision instrumentation. NAICS 3341 contributes \$92.9 billion, highlighting sustained need for computing hardware across enterprise, personal, and embedded systems.

Several other subsectors contribute meaningfully to the overall ecosystem. Other Electrical Equipment and Component Manufacturing (NAICS 3359) and Electrical Equipment Manufacturing (NAICS 3353) added \$82.4 billion and \$71.1 billion, respectively, with applications in power systems, automation, and transportation. Additional contributors include

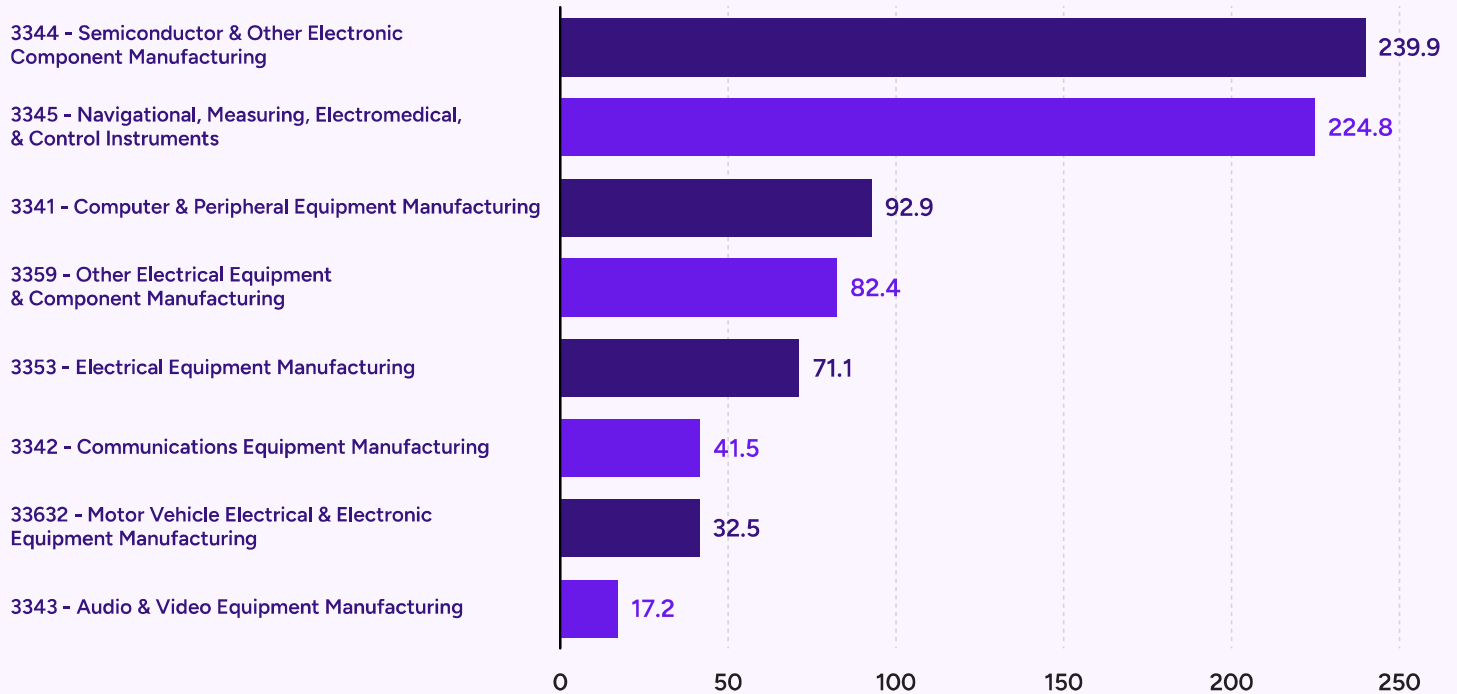
Communications Equipment (NAICS 3342, \$41.5 billion), Motor Vehicle Electronics (NAICS 33632, \$32.5 billion), and Audio and Video Equipment (NAICS 3343, \$17.2 billion).

It is important to note that output does not always align with employment. Capital-intensive industries such as semiconductors generate high output per worker through automation and scale, while more labor-dependent segments, like instrumentation, contribute to a larger share of employment. This reflects the structural diversity of the sector and the different ways value is created across subsectors.

Indirect and Induced Impacts

The economic contribution of electronics manufacturing in the United States extends far beyond the direct activity within

Figure 2. Electronics Manufacturing Output by Detailed Industry
(BILLIONS \$)



the sector. While direct impacts capture employment, income, and output generated by electronics manufacturers themselves, the industry also produces significant ripple effects that reach across the broader economy. These come in the form of indirect and induced impacts, which together magnify the sector's role as a foundational economic engine.

Indirect impacts arise from the electronics sector's extensive demand for goods and services from domestic suppliers. These include raw materials, machinery, energy, transportation, and professional services, all of which are critical to keeping production lines running and facilities operating at scale. Induced impacts, on the other hand, reflect the household spending of workers whose incomes are supported either directly by electronics manufacturing or indirectly through its supply chains. This spending flows into the economy through retail, healthcare,

housing, food services, and other consumer-facing industries.

As shown in Table 2, the direct economic footprint of electronics manufacturing includes 1.3 million jobs, \$202.3 billion in labor income, \$307.7 billion in value added, and \$802.4 billion in output. Beyond that, the industry indirectly supports 1.68 million additional jobs, \$159.4 billion in labor income, \$263.9 billion in value added, and \$532.4 billion in output through its supplier networks. Induced activity contributes another 2.21 million jobs, \$151.7 billion in labor income, \$281.8 billion in value added, and \$472.1 billion in output, stemming from consumer spending by workers across the electronics manufacturing value chain.

Taken together, electronics manufacturing supports nearly 5.2 million jobs, generates \$513.4 billion in labor income, contributes \$853.4 billion in value added to GDP, and drives a total of \$1.8 trillion in U.S.

economic output. These figures confirm that the sector is far more than a standalone industrial base. It is deeply embedded in the fabric of the national economy. For every facility that produces semiconductors, sensors, or printed circuit boards, there are hundreds of businesses and millions of workers whose livelihoods depend on the sector's continued strength and expansion.

When an EMS facility ramps up production or adds new capacity, the impact extends well beyond its own operations. It sources components from local and regional suppliers, contracts with logistics and packaging firms, and requires ongoing support from equipment vendors and maintenance providers. At the same time, increased employment boosts local spending on housing, groceries, healthcare, and other services, creating a ripple effect that drives growth throughout the surrounding economy.

**TABLE 2. U.S. ELECTRONICS
MANUFACTURING IMPACTS (UNITS INDICATED)**

NAICS INDUSTRY	EMPLOYMENT (1,000 PERSONS)	LABOR INCOME (BILLIONS \$)	VALUE ADDED (BILLIONS \$)	OUTPUT (BILLIONS \$)
Direct	1,296.1	\$202.3	\$307.7	\$802.4
Indirect	1,683.9	\$159.4	\$263.9	\$532.4
Induced	2,209.4	\$151.7	\$281.8	\$472.1
Total	5,189.3	\$513.4	\$853.4	\$1,806.9

For policymakers, these numbers highlight the high return on investments in domestic electronics production. Targeted support for workforce development, research

and development, infrastructure, and supply chain resilience not only benefits core manufacturers but also creates multiplier effects that touch nearly every sector of

the economy. For business leaders, the data reinforce the competitive advantage of investing in high-value, high-wage jobs and maintaining robust domestic supply chains. In short, the success of U.S. electronics manufacturing is not only essential for technological leadership. It is vital to the country's long-term economic stability and growth.

MULTIPLIER EFFECTS

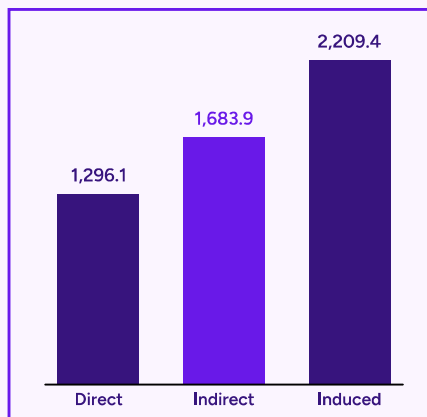
Economic multipliers measure how activity in one sector ripples through the broader economy. In electronics manufacturing, they capture how each job or dollar of output leads to additional employment, income, and production across supply chains and consumer spending. These multipliers are not fixed. They evolve alongside shifts in supply chain integration, labor markets, and consumer behavior.

Since 2017, the multipliers associated with the U.S. electronics manufacturing sector have strengthened, reflecting the industry's deeper integration with the broader economy. While the employment multiplier remained steady at 4.0, other key measures have increased. The labor income multiplier rose from 2.46 to 2.54, the value-added multiplier climbed from 2.32 to 2.77, and the output multiplier grew from 2.05 to 2.25.

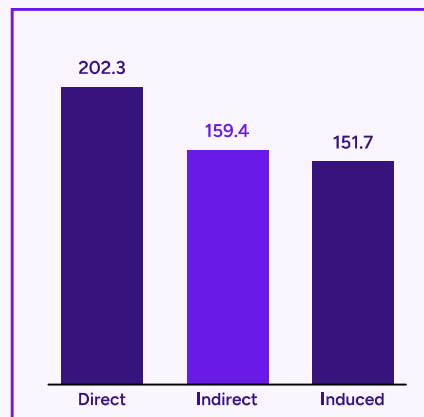
These values illustrate the expanding economic reach of the sector. With an employment multiplier of 4, each direct job supports three additional jobs elsewhere in the economy. An output multiplier of 2.25 means that every \$1 in direct output results in \$2.25 in total economic activity, including supplier purchases and household spending. These rising multipliers underscore the sector's growing influence and its critical role in sustaining national economic growth.

**Figure 3. U.S. Electronics Manufacturing Impacts
(UNITS INDICATED)**

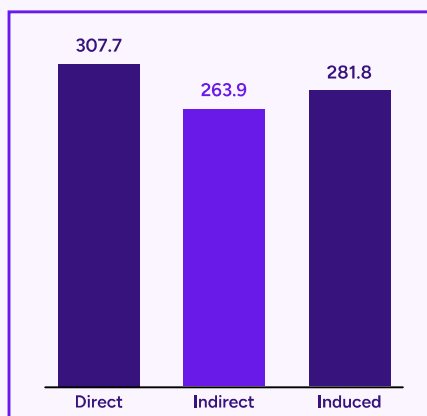
EMPLOYMENT EFFORTS
(THOUSAND PERSONS)



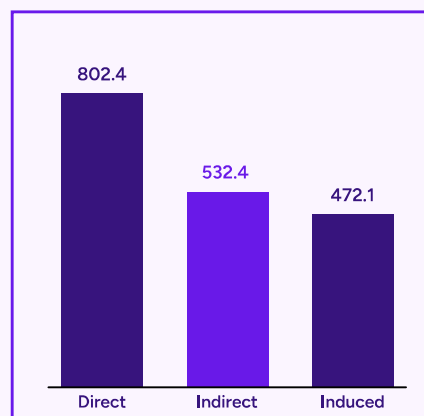
LABOR INCOME EFFORTS
(BILLIONS \$)



VALUE-ADDED EFFECTS
(BILLIONS \$)



OUTPUT EFFECTS
(BILLIONS \$)



Several factors are driving these gains. Tighter supply chain linkages, greater reliance on domestic sourcing, and increased use of high-value intermediate inputs have deepened the sector's economic footprint. Together, these dynamics make electronics

(NAICS 48–49) follows closely with 255,900 jobs, underscoring the logistical intensity of electronics supply chains, which move high-value, globally sourced components and finished products through ports, air cargo, and domestic distribution hubs.

TABLE 3. U.S. ELECTRONICS MANUFACTURING MULTIPLIERS

EMPLOYMENT (THOUSAND PERSONS)	LABOR INCOME (BILLIONS \$)	VALUE ADDED (BILLIONS \$)	OUTPUT (BILLIONS \$)
4.00	2.54	2.77	2.25

manufacturing not only a driver of innovation and productivity, but also a pillar of long-term economic strength and resilience within the U.S. industrial base.

INDIRECT EMPLOYMENT AND OUTPUT IMPACTS ACROSS THE ECONOMY

The influence of the electronics manufacturing sector extends well beyond its own footprint, reaching deeply into a variety of upstream industries that supply goods and services essential to its operations. These indirect effects represent a critical dimension of the sector's total economic contribution, particularly in terms of job creation and output generation across the broader economy. Table 4 shows the top ten industries that benefit from indirect employment linked to electronics manufacturing activity.

Other manufacturing sectors (NAICS 32–33) lead the list, supporting roughly 262,500 jobs. This reflects the electronics industry's deep interdependence with other areas of manufacturing, from plastics and metals that go into casings and connectors to chemicals and fabricated parts used in assembly. Transportation and warehousing

Wholesale trade (NAICS 42) accounts for 244,000 jobs, as distributors and resellers play a crucial role in handling electronic components, semiconductors, and finished goods that must be stored, catalogued, and delivered to downstream industries. Administrative and support services (NAICS 56), with 231,200 jobs, reflect the industry's reliance on outsourced functions such as staffing, facilities management, call centers, and security—common in a sector that often operates in complex, high-volume environments. Professional, scientific, and technical services (NAICS 54) contribute 208,600 jobs, mirroring the need for engineering, design, R&D, and consulting support that underpins rapid innovation and regulatory compliance in electronics.

Management of companies and enterprises (NAICS 55) adds 122,600 jobs, representing corporate headquarters, holding companies, and shared service centers that coordinate strategy and governance for multi-national electronics firms. Finance and insurance (NAICS 52), with 98,600 jobs, highlights the heavy capital requirements of the sector, which depend on financing, risk management, and insurance



The economic contribution of electronics manufacturing in the United States extends far beyond the direct impacts like employment, income. The industry produces significant ripple effects that reach across the broader economy.

coverage for global operations and sensitive supply chains. Real estate and rental and leasing (NAICS 53) employs 62,000 indirectly, linked to the demand for factory space, distribution centers, and office facilities, as well as leased equipment for production.

Other services (NAICS 81), with 43,700 jobs, include industries like repair and maintenance, which are vital for keeping production equipment and IT infrastructure operational. Finally, accommodation and food services (NAICS 72) support 34,600 jobs, as electronics manufacturing hubs draw a significant workforce and frequent business travelers, creating steady demand for lodging, dining, and catering services.

Together, these figures underscore how electronics manufacturing stimulates activity across a wide cross-section of the economy, with especially strong spillovers in industries tied to logistics, supply chain coordination, and technical expertise. Collectively, these top ten industries account for approximately 93% of the 1.6 million jobs supported indirectly by electronics manufacturing, underscoring the breadth and intensity of its economic linkage.

While employment highlights how many workers are connected to electronics through upstream industries, output provides a complementary perspective by quantifying the value of goods and services these industries generate. Table 5 shifts the focus from jobs to production value, identifying the industries that benefit most in terms of economic output from electronics-related demand. Manufacturing (NAICS 31–33) ranks first, generating \$158.2 billion in indirect output, nearly 30% of the total. Wholesale trade (NAICS 42) follows with \$112.7 billion, just over 21%. Professional,

TABLE 4. INDIRECT EMPLOYMENT IMPACTS BY INDUSTRY (THOUSAND PERSONS)

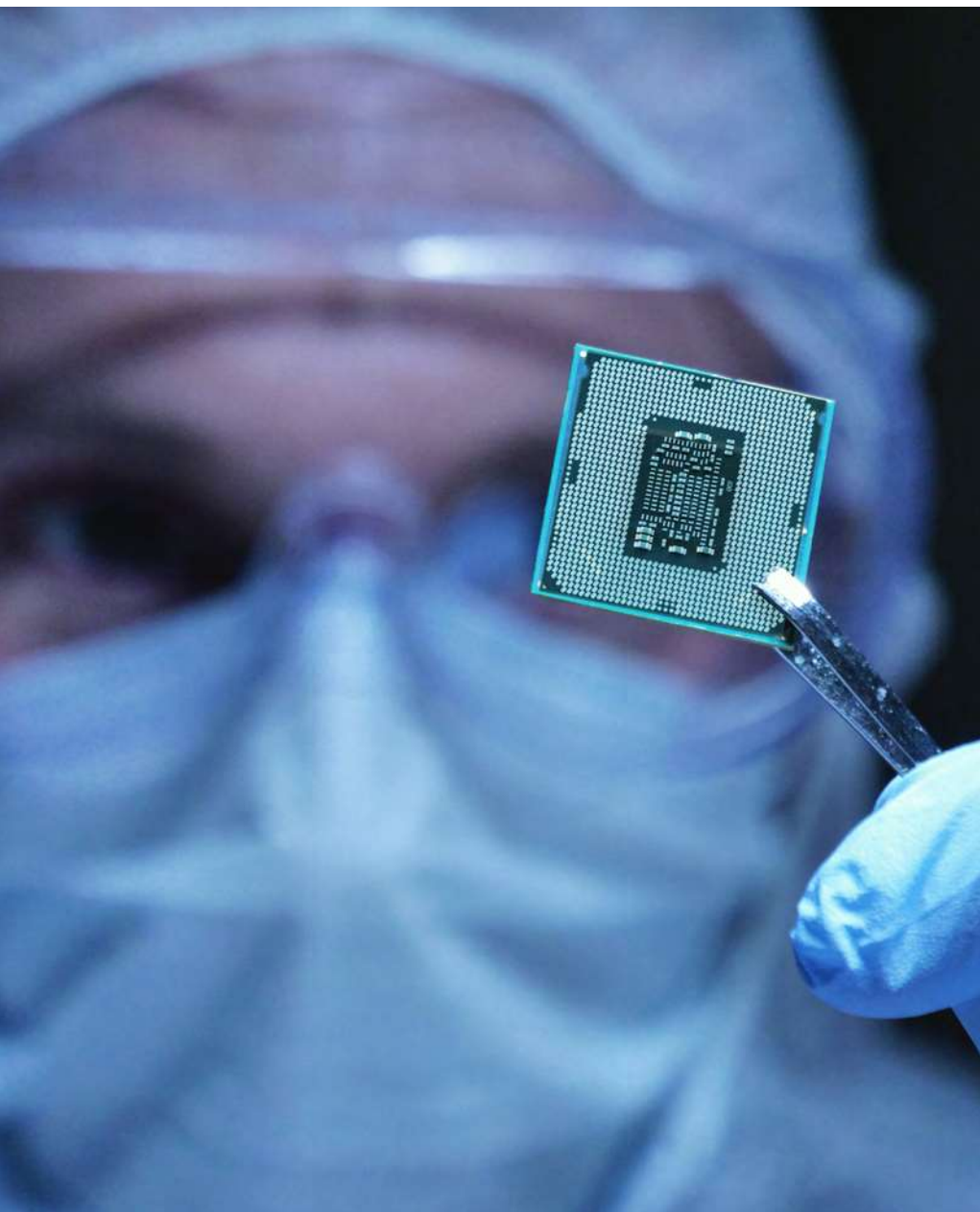
RANK	NAICS INDUSTRY	THOUSANDS OF PERSONS
1	Other Manufacturing Sectors (32-33)	262.5
2	Transportation and Warehousing (48-49)	255.9
3	Wholesale Trade (42)	244.0
4	Administrative and Support Services (56)	231.2
5	Professional, Scientific, and Technical Services (54)	208.6
6	Management of Companies and Enterprises (55)	122.6
7	Finance and Insurance (52)	98.6
8	Real Estate and Rental and Leasing (53)	62.0
9	Other Services (81)	43.7
10	Accommodation and Food Services (72)	34.6

TABLE 5. OUTPUT IMPACTS BY INDUSTRY (BILLIONS \$)

NAICS INDUSTRY	INDIRECT OUTPUT (BILLIONS \$)	% SHARE
Manufacturing (31–33)	\$158.2	29.7%
Wholesale Trade (42)	\$112.7	21.2%
Professional, Scientific, and Technical Services (54)	\$41.3	7.8%
Finance and Insurance (52)	\$33.9	6.4%
Transportation and Warehousing (48–49)	\$33.2	6.2%
Management of Companies and Enterprises (55)	\$32.5	6.1%
Administrative and Support and Waste Management and Remediation Services (56)	\$28.1	5.3%
Information (51)	\$21.2	4.0%
Real Estate and Rental and Leasing (53)	\$20.8	3.9%
Utilities (22)	\$19.4	3.6%
All Other	\$31.0	5.8%

scientific, and technical services (NAICS 54) contribute \$41.3 billion, nearly 8%. Finance and insurance (NAICS 52) add \$33.9 billion, about 6.4%. Transportation and warehousing (NAICS 48–49) provide \$33.2 billion, about 6.2%.

Management of companies and enterprises (NAICS 55) accounts for \$32.5 billion. Administrative and support and waste management and remediation services (NAICS 56) contribute \$28.1 billion. Information (NAICS 51) generates \$21.2 billion.



Real estate and rental and leasing (NAICS 53) adds \$20.8 billion. Utilities (NAICS 22) contribute \$19.4 billion.

Together, the top ten industries account for 94.2% of the sector's \$532.4 billion in indirect output. The remaining \$31.0 billion, or 5.8%, is distributed across a wide range of industries. This dual lens of employment and output demonstrates the full scope of electronics manufacturing's economic reach: it not only supports more

than a million jobs indirectly but also fuels hundreds of billions of dollars in production across sectors as varied as logistics, finance, information services, and utilities.

State-Level Impacts

While electronics manufacturing has a powerful national footprint, its impact is also deeply felt at the state level. This section explores how the

industry contributes to individual state economies, highlighting the jobs, income, and output generated within each state's borders. As in the national analysis, the effects are categorized as direct, indirect, and induced. However, for clarity and ease of comparison, the charts presented here combine indirect and induced impacts into a single figure. Together, these measures provide a clearer picture of how electronics manufacturing supports regional economic ecosystems across the country. Additional detail for each state can be found in the Fact Sheets included in Appendix A.

Employment

Electronics manufacturing is a national economic engine with a strong regional presence, and its impact is especially concentrated in a core group of states. Table 6 presents employment impacts by state, ranking regions by total jobs supported through direct, indirect, and induced effects. The 5 leading states account for nearly 41% of all direct electronics manufacturing jobs and 31.2% of total employment supported by the sector nationwide. The top 10 states are nearly 58% of direct electronics manufacturing jobs.

California stands out as the clear leader, accounting for 20% of the nation's direct electronics manufacturing employment. With 260,500 direct jobs, the state plays a pivotal role in the sector. When indirect and induced effects are included, California's total employment impact from electronics manufacturing reaches nearly 854,000 jobs, underscoring the depth of its industry ecosystem.

Texas is the second-largest hub, with 107,100 direct jobs and a total of 331,000 jobs supported statewide. The state's growth is driven by major investments in chip manufacturing, defense electronics, and logistics

TABLE 6. STATE-LEVEL EMPLOYMENT IMPACTS (THOUSAND PERSONS)

REGION	DIRECT	INDIRECT	INDUCED	TOTAL	REGION	DIRECT	INDIRECT	INDUCED	TOTAL
UNITED STATES	1,296.1	1,683.9	2,209.4	5,189.3	Missouri	23.5	12.6	14.7	50.7
Alabama	13.6	8.1	7.0	28.7	Montana	1.0	0.6	0.6	2.1
Alaska	0.2	0.1	0.1	0.3	Nebraska	4.7	2.8	2.6	10.2
Arizona	32.5	31.9	37.9	102.4	Nevada	16.5	9.8	9.5	35.9
Arkansas	5.8	3.2	2.9	11.9	New Hampshire	18.3	11.5	13.2	43.0
California	260.5	239.5	353.6	853.7	New Jersey	27.9	22.2	21.8	71.9
Colorado	22.1	20	22.4	64.6	New Mexico	5.1	2.8	2.9	10.8
Connecticut	15.3	9.6	10.5	35.4	New York	59.5	39.8	39.4	138.7
Delaware	3.5	1.9	2.0	7.5	North Carolina	43.0	37.9	37.0	117.9
District of Columbia	0.1	0	0	0.2	North Dakota	1.4	0.6	0.6	2.7
Florida	52.1	51.7	54.4	158.2	Ohio	39.9	30.5	30.3	100.7
Georgia	24.2	18.7	21.1	63.9	Oklahoma	5.3	3.5	3.0	11.8
Hawaii	0.3	0.2	0.1	0.6	Oregon	36	30.3	35.2	101.6
Idaho	10.8	7.9	8.8	27.5	Pennsylvania	50.4	33.2	37.5	121.0
Illinois	47.2	33.7	39.2	120.2	Rhode Island	4.2	3.0	2.7	10.0
Indiana	20.6	13.0	12.3	45.9	South Carolina	19.7	12.4	11.4	43.4
Iowa	14.8	9.6	9.3	33.8	South Dakota	2.5	1.3	1.1	4.9
Kansas	10.5	5.6	5.6	21.6	Tennessee	22.0	15.4	14.9	52.2
Kentucky	8.5	5.2	5.0	18.8	Texas	107.1	103.3	120.5	331.0
Louisiana	3.9	2.2	2.5	8.6	Utah	14.4	13.9	12.8	41.2
Maine	2.3	1.3	1.6	5.1	Vermont	3.9	2.7	2.9	9.4
Maryland	22.3	16.7	17.6	56.5	Virginia	18.8	11.2	11.7	41.6
Massachusetts	50.5	38.4	49.5	138.4	Washington	21.3	14.6	14.3	50.1
Michigan	38.0	25.5	30.4	93.9	West Virginia	1.9	0.8	0.7	3.4
Minnesota	45.6	37.5	43.8	127.0	Wisconsin	33.2	24.1	24.8	82.1
Mississippi	8.4	3.9	3.5	15.8	Wyoming	0.8	0.3	0.2	1.3

infrastructure, along with a favorable business environment that supports continued expansion in advanced manufacturing.

Other high-impact states include Florida, New York, and Massachusetts, each with over 50,000 direct jobs and total employment impacts between 138,000 and 158,000. These states host a mix of defense contractors, R&D centers, and globally integrated electronics firms. For example, Massachusetts benefits from strong medical device and instrumentation

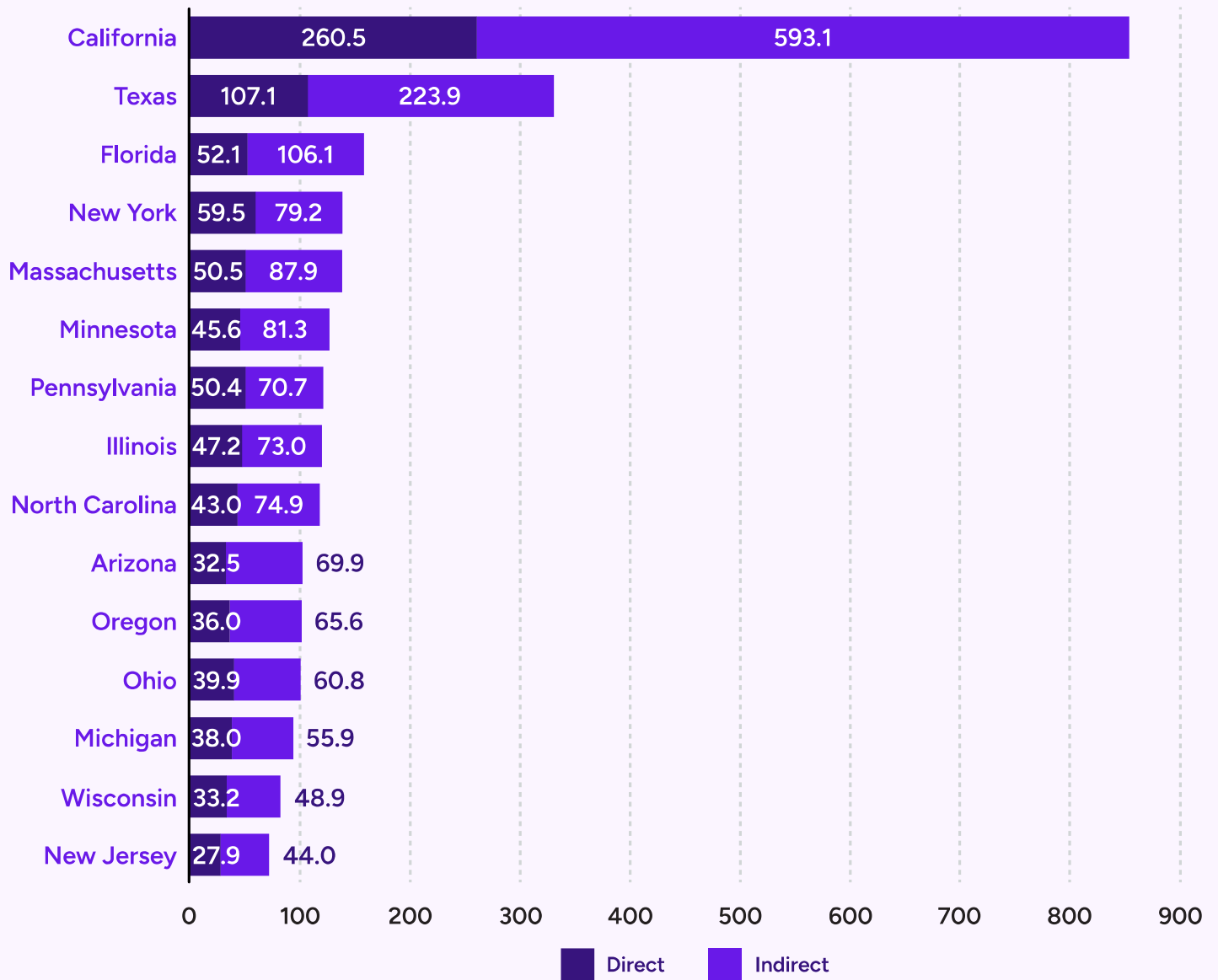
manufacturing, while New York is home to critical semiconductor R&D and fabrication operations.

Smaller states also make significant contributions. Oregon, with 36,000 direct jobs, supports 101,600 total jobs through its specialization in semiconductor manufacturing. Minnesota, Pennsylvania, Illinois, North Carolina, Arizona, and Ohio each support over 100,000 jobs in total, reflecting their importance as production and assembly hubs. Even states with relatively modest direct employment still experience

meaningful economic impact through extended supply chains and household spending. States like New Hampshire, Utah, and Nevada each support over 35,000 jobs, while Idaho, driven by a strong semiconductor presence, supports nearly 28,000.

Overall, electronics manufacturing supports nearly 5.2 million jobs across all 50 states and the District of Columbia. While the industry is anchored in traditional high-tech regions, its economic benefits extend nationwide. The data reinforce the

FIGURE 4. STATE-LEVEL EMPLOYMENT IMPACTS – TOP 15 STATES (THOUSAND PERSONS)



Electronics manufacturing firms provide well-paying jobs for American workers. Employees average annual income over \$156,000.

importance of state-level strategies to invest in talent pipelines, incentivize infrastructure, and strengthen domestic supply chains, ensuring that regions across the country continue to benefit from the sector's growth.

Labor Income

In addition to generating employment, the electronics

manufacturing sector is a major source of high-quality, high-wage jobs across the United States. The table above presents state-level labor income supported by the industry, including direct, indirect, and induced effects. In total, the sector supports \$513.4 billion in labor income nationally, reflecting its outsized role in powering household earnings and consumer spending in regional economies.

TABLE 7. STATE-LEVEL LABOR INCOME IMPACTS (MILLIONS \$)

REGION	DIRECT	INDIRECT	INDUCED	TOTAL	REGION	DIRECT	INDIRECT	INDUCED	TOTAL
UNITED STATES	202,319.1	159,390.3	151,737.2	513,446.5	Missouri	2,502.4	1,060.9	856.5	4,419.8
Alabama	1,291.2	566.2	361.4	2,218.8	Montana	95.0	45.6	33.0	173.6
Alaska	19.8	4.7	5.4	30.0	Nebraska	444.7	245.8	149.0	839.5
Arizona	5,446.6	2,740.3	2,403.6	10,590.5	Nevada	1,798.8	763.8	566.8	3,129.4
Arkansas	499.9	242.0	143.0	885.0	New Hampshire	2,629.1	1,217.0	939.0	4,785.0
California	66,094.1	26,389.4	26,242.8	118,726.3	New Jersey	3,921.5	2,360.0	1,592.3	7,873.8
Colorado	3,410.7	2,016.3	1,486.8	6,913.8	New Mexico	611.9	194.4	151.9	958.3
Connecticut	1,904.5	1,040.1	783.4	3,728.0	New York	8,072.1	4,506.9	3,159.8	15,738.9
Delaware	516.9	134.1	122.9	773.8	North Carolina	5,681.1	3,382.3	2,218.0	11,281.4
District of Columbia	24.7	6.0	2.2	32.9	North Dakota	145.9	54.7	38.0	238.6
Florida	6,907.0	4,108.3	3,189.4	14,204.8	Ohio	4,097.8	2,511.7	1,764.8	8,374.3
Georgia	3,015.3	1,561.0	1,213.7	5,790.0	Oklahoma	514.8	247.4	161.0	923.2
Hawaii	25.8	12.3	9.0	47.1	Oregon	6,184.2	2,921.2	2,286.6	11,392.0
Idaho	1,664.0	635.4	497.5	2,796.9	Pennsylvania	5,494.7	3,084.9	2,467.3	11,046.9
Illinois	5,692.4	3,331.0	2,631.2	11,654.5	Rhode Island	483.2	265.0	172.3	920.5
Indiana	2,052.8	1,052.4	739.1	3,844.3	South Carolina	2,057.6	899.3	580.5	3,537.4
Iowa	1,818.7	769.3	492.0	3,079.9	South Dakota	190.5	103.9	64.1	358.5
Kansas	1,127.9	448.0	320.0	1,896.0	Tennessee	2,308.9	1,332.3	998.0	4,639.3
Kentucky	914.4	408.6	290.9	1,613.8	Texas	16,911.2	9,328.8	7,402.0	33,642.0
Louisiana	430.6	153.6	128.0	712.2	Utah	1,783.9	1,132.9	724.5	3,641.2
Maine	252.2	104.6	94.3	451.1	Vermont	497.9	229.0	169.6	896.5
Maryland	3,705.9	1,443.6	1,094.6	6,244.1	Virginia	2,354.6	1,052.1	708.7	4,115.4
Massachusetts	8,451.8	4,825.7	4,016.3	17,293.8	Washington	2,878.5	1,822.7	1,109.8	5,811.0
Michigan	4,538.4	2,203.0	1,824.5	8,566.0	West Virginia	160.0	56.1	39.9	255.9
Minnesota	6,105.3	3,944.5	2,945.0	12,994.8	Wisconsin	3,823.8	2,088.9	1,484.5	7,397.2
Mississippi	695.2	228.6	156.3	1,080.1	Wyoming	68.6	20.8	10.4	99.7

California again leads all states with \$118.7 billion in total labor income tied to electronics manufacturing. Of this, \$66.1 billion comes from direct wages paid by electronics firms, while the remainder is supported through supplier activity and household spending. This figure accounts for over 32.7% of all direct labor income in the sector nationwide, underscoring California's dominance in high-value, innovation-driven electronics production.

Texas ranks second, with \$33.6 billion in total labor income, followed by

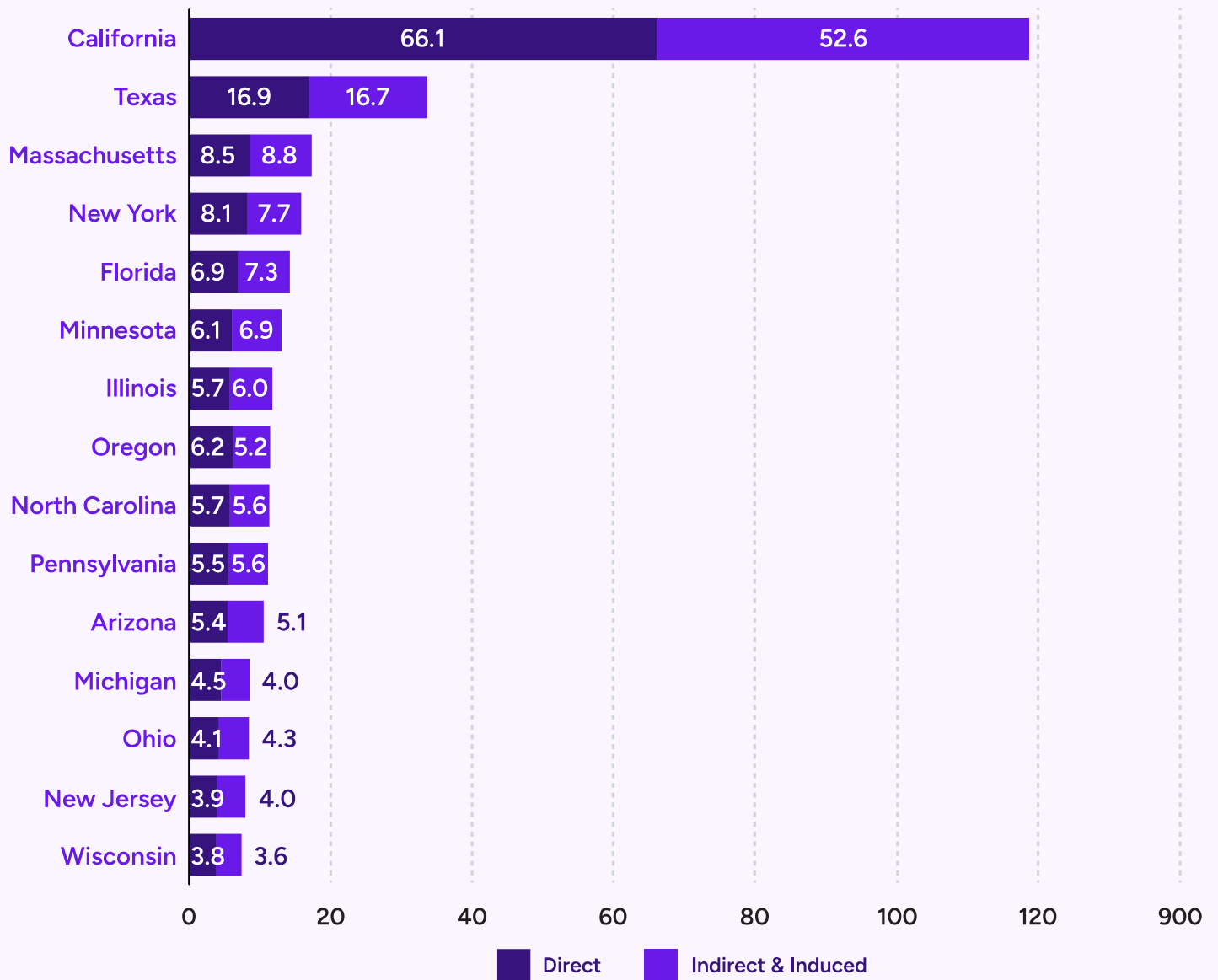
Massachusetts at \$17.3 billion, New York at \$15.7 billion, and Florida at \$14.2 billion. These states benefit not only from large employment bases but also from the presence of advanced industries such as semiconductor manufacturing, precision instruments, aerospace electronics, and medical devices, all of which tend to offer higher-than-average wages.

States like Minnesota, Illinois, North Carolina, and Oregon also report strong figures, each supporting between \$11 and \$13 billion in total

labor income. These regions are home to significant electronics manufacturing clusters with strong supplier networks and well-

Investing in electronics manufacturing is investing in people: skilled workers, resilient communities, and the future of U.S. competitiveness.

FIGURE 5. STATE-LEVEL LABOR INCOME IMPACTS – TOP 15 STATES (MILLIONS \$)



established labor markets. Their labor income totals reflect a combination of skilled production work, engineering talent, and high-wage technical occupations. Even smaller states and those with fewer direct jobs demonstrate the far-reaching impact of the industry. For example, Colorado and Maryland each support over \$6 billion in labor income through a mix of direct and ripple effects, while states such as New Hampshire, Tennessee, and

Missouri all surpass the \$4 billion threshold. These figures show how the electronics manufacturing sector nationally distributes income broadly across the country, including in both urban centers and regional manufacturing hubs.

Table 7 displays electronics manufacturing’s labor income impacts by state, notably highlighting the significant earnings generated by the sector across

the country. The 15 states with the largest labor income contribution are illustrated in Figure 5. These states account for nearly 78% of direct labor income in electronics manufacturing and more than 58% of total labor income when including indirect and induced effects.

Overall, the distribution of labor income reflects the sector’s ability to generate high earnings and support strong middle-class employment

TABLE 8. STATE-LEVEL VALUE ADDED IMPACTS (MILLIONS \$)

REGION	DIRECT	INDIRECT	INDUCED	TOTAL	REGION	DIRECT	INDIRECT	INDUCED	TOTAL
UNITED STATES	307,680.9	263,858.2	281,835.6	853,374.7	Missouri	3,910.2	1,721.5	1,606.7	7,238.4
Alabama	1,818.4	957.4	730.7	3,506.6	Montana	138.0	69.4	58.8	266.2
Alaska	26.7	7.4	10.1	44.2	Nebraska	655.1	413.1	293.1	1,361.3
Arizona	9,402.5	4,491.8	4,626.2	18,520.5	Nevada	2,006.8	1,308.8	1,161.2	4,476.9
Arkansas	898.4	458.1	292.8	1,649.3	New Hampshire	2,550.0	1,870.1	1,711.5	6,131.5
California	106,751.0	41,696.7	49,844.6	198,292.3	New Jersey	6,136.1	3,630.8	2,895.4	12,662.2
Colorado	3,977.3	3,030.6	2,828.1	9,836.0	New Mexico	1,209.1	342.7	308.4	1,860.2
Connecticut	3,037.0	1,632.8	1,444.1	6,113.9	New York	6,375.0	7,398.2	5,867.4	19,640.6
Delaware	700.8	274.3	247.5	1,222.6	North Carolina	9,234.0	5,354.7	4,240.7	18,829.4
District of Columbia	44.1	9.5	3.9	57.4	North Dakota	109.1	87.0	64.2	260.3
Florida	10,143.1	6,614.1	6,194.1	22,951.3	Ohio	5,195.1	4,181.7	3,375.2	12,752.0
Georgia	4,713.0	2,757.0	2,410.3	9,880.3	Oklahoma	748.6	410.7	311.9	1,471.2
Hawaii	51.1	18.3	18.5	88.0	Oregon	12,379.3	4,673.3	4,112.6	21,165.3
Idaho	2,081.8	1,092.4	959.5	4,133.6	Pennsylvania	8,524.0	5,017.1	4,393.1	17,934.2
Illinois	9,473.9	5,406.6	4,856.5	19,737.0	Rhode Island	436.1	413.2	327.7	1,177.0
Indiana	3,318.4	1,643.1	1,353.5	6,315.0	South Carolina	3,231.1	1,500.3	1,225.0	5,956.4
Iowa	2,838.2	1,232.2	970.0	5,040.4	South Dakota	192.7	178.8	115.3	486.8
Kansas	2,091.1	759.4	605.6	3,456.2	Tennessee	3,588.8	2,080.8	1,795.6	7,465.2
Kentucky	1,330.8	655.4	532.2	2,518.4	Texas	25,772.7	16,008.5	14,011.2	55,792.3
Louisiana	580.1	262.7	252.0	1,094.8	Utah	2,845.7	1,864.2	1,502.8	6,212.7
Maine	488.1	169.2	183.5	840.8	Vermont	602.5	340.7	323.3	1,266.5
Maryland	5,472.4	2,323.9	2,155.4	9,951.8	Virginia	2,701.9	1,750.0	1,418.6	5,870.5
Massachusetts	13,276.9	7,139.0	6,915.8	27,331.7	Washington	4,931.2	2,530.6	2,255.5	9,717.4
Michigan	5,439.8	3,508.9	3,373.2	12,321.9	West Virginia	217.2	91.8	75.1	384.1
Minnesota	9,369.1	5,968.5	5,277.9	20,615.5	Wisconsin	5,660.9	3,331.4	2,800.9	11,793.2
Mississippi	919.5	395.0	332.8	1,647.4	Wyoming	86.2	35.6	22.3	144.0

Electronics manufacturing contributes \$853 billion to U.S. GDP, about 3.1% of the national economy.

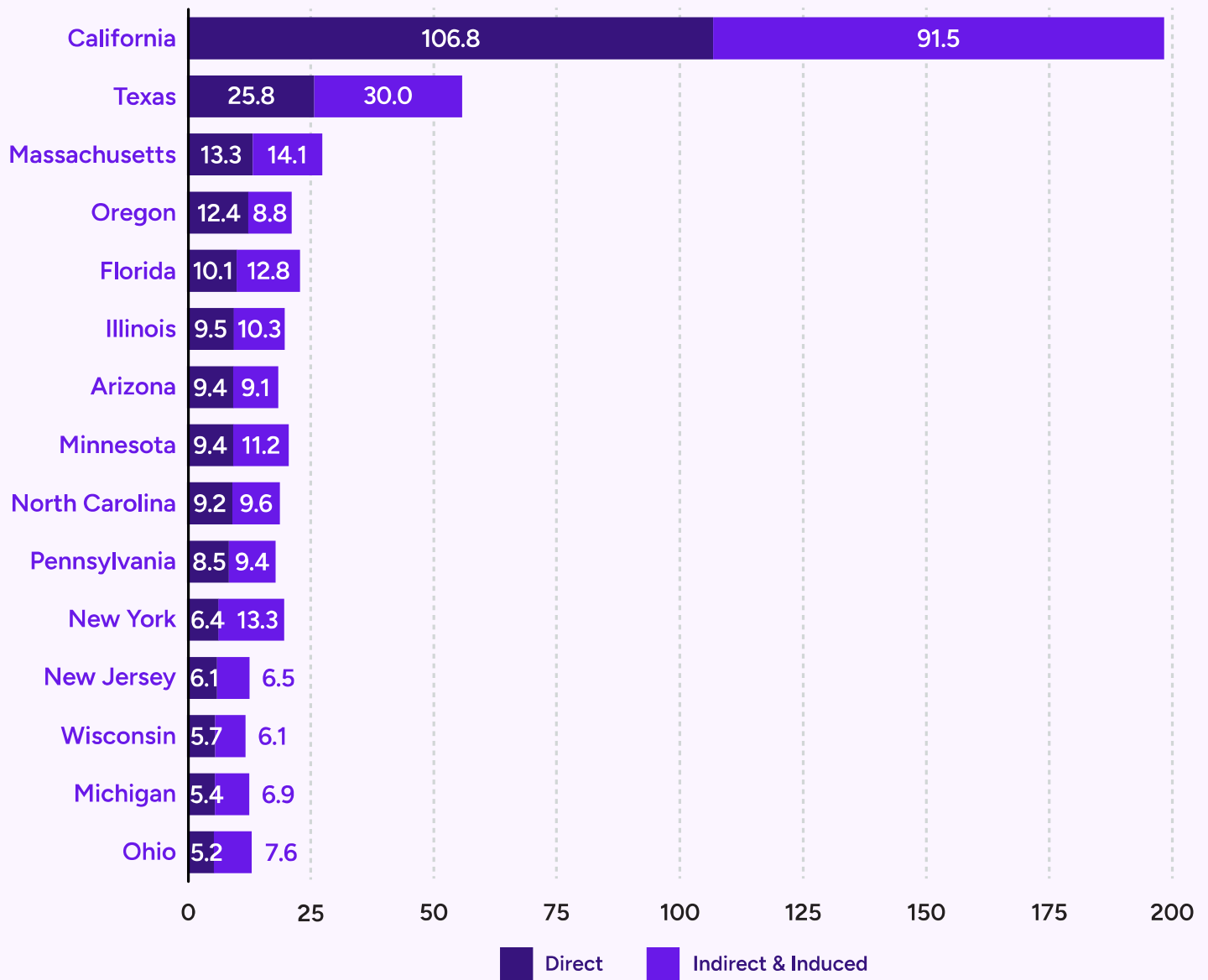
across a wide variety of states. This reinforces the argument that investments in electronics manufacturing pay long-term dividends for state economies, not only through job creation but through the support of stable, well-compensated careers that contribute to local economic vitality.

Value Added

Electronics manufacturing remains a powerful contributor to the U.S.

economy, generating more than \$853 billion in value added in 2023. This total represents 3.1% of U.S. gross domestic product (GDP), underscoring the sector's central role in national economic performance. However, its impact is not evenly distributed. At the state level, the share of GDP tied to electronics manufacturing varies widely, reflecting local industry composition, infrastructure, workforce specialization, and historical investment in advanced manufacturing.

**FIGURE 6. STATE-LEVEL VALUE ADDED IMPACTS –
TOP 15 STATES (BILLIONS \$)**



California leads the nation in both absolute and relative terms. The state generated \$198.3 billion in total value added from electronics manufacturing, accounting for 5.1% of California’s GDP. This reflects the state’s dominance in semiconductor design and fabrication, electronics R&D, and high-value production, especially in Silicon Valley and surrounding regions. Oregon ranks second by share of GDP,

with electronics manufacturing comprising an impressive 6.6% of its economy, largely due to its concentration of semiconductor fabrication facilities.

Other states with high GDP shares include New Hampshire (5.4%), Massachusetts (3.7%), Minnesota (4.3%), and Vermont (2.9%), each of which maintains specialized clusters in areas such as microelectronics,

medical devices, and precision instrumentation. Texas also stands out with a total value added of \$55.8 billion, representing 2.2% of its GDP, driven by strong growth in semiconductor manufacturing, defense electronics, and logistics.

Several other states demonstrate notable contributions. Arizona (3.5%), North Carolina (2.4%), Wisconsin (2.8%), and Idaho (3.4%)

TABLE 9. STATE-LEVEL OUTPUT IMPACTS (MILLIONS \$)

REGION	DIRECT	INDIRECT	INDUCED	TOTAL	REGION	DIRECT	INDIRECT	INDUCED	TOTAL
UNITED STATES	802,428.9	532,372.1	472,140.0	1,806,940.9	Missouri	10,667.7	3,244.4	2,653.8	16,565.9
Alabama	6,939.7	1,898.2	1,219.0	10,056.8	Montana	460.4	134.0	100.0	694.5
Alaska	92.5	14.5	15.9	122.9	Nebraska	2,143.2	733.2	478.2	3,354.6
Arizona	25,084.3	8,663.1	7,461.5	41,208.8	Nevada	7,231.9	2,444.1	1,835.2	11,511.2
Arkansas	2,908.1	881.1	493.8	4,283.0	New Hampshire	9,064.6	3,129.6	2,615.1	14,809.3
California	216,068.3	71,596.6	76,491.1	364,155.9	New Jersey	15,868.1	6,107.3	4,423.3	26,398.7
Colorado	12,389.0	5,360.3	4,515.5	22,264.9	New Mexico	3,652.9	726.7	510.7	4,890.3
Connecticut	8,142.0	2,720.3	2,157.9	13,020.2	New York	28,501.0	12,315.6	8,503.7	49,320.4
Delaware	1,766.7	457.4	380.5	2,604.7	North Carolina	25,720.7	9,795.8	6,906.1	42,422.5
District of Columbia	100.4	13.8	5.4	119.6	North Dakota	607.3	173.3	111.2	891.7
Florida	29,562.2	12,274.5	10,259.4	52,096.1	Ohio	19,151.6	7,977.6	5,502.4	32,631.6
Georgia	12,953.1	4,961.0	3,889.5	21,803.5	Oklahoma	2,592.9	827.0	542.1	3,962.1
Hawaii	151.6	34.1	28.6	214.3	Oregon	31,218.9	8,813.3	6,517.6	46,549.8
Idaho	7,226.3	2,126.0	1,592.2	10,944.5	Pennsylvania	24,970.6	9,532.7	6,997.8	41,501.1
Illinois	25,125.1	9,501.5	7,678.4	42,305.0	Rhode Island	1,859.2	724.4	508.6	3,092.2
Indiana	10,163.1	3,199.1	2,194.6	15,556.8	South Carolina	9,785.2	2,997.7	2,002.5	14,785.4
Iowa	7,874.8	2,291.3	1,595.0	11,761.0	South Dakota	1,155.6	351.3	195.1	1,701.9
Kansas	5,462.5	1,422.9	1,019.6	7,905.0	Tennessee	11,385.7	3,920.6	2,874.1	18,180.4
Kentucky	4,453.1	1,285.9	889.5	6,628.4	Texas	71,914.0	29,965.6	23,369.9	125,249.5
Louisiana	1,774.1	512.4	423.9	2,710.3	Utah	8,201.9	3,474.7	2,476.7	14,153.4
Maine	1,322.4	322.1	292.3	1,936.8	Vermont	2,344.8	655.0	514.4	3,514.1
Maryland	13,143.9	3,960.1	3,338.4	20,442.4	Virginia	9,310.1	3,017.6	2,208.9	14,536.7
Massachusetts	33,218.8	11,803.8	10,429.7	55,452.2	Washington	12,647.4	4,382.0	3,377.9	20,407.2
Michigan	18,810.9	6,560.8	5,575.1	30,946.8	West Virginia	864.6	180.7	123.4	1,168.7
Minnesota	25,505.7	10,737.6	8,495.0	44,738.4	Wisconsin	17,159.3	6,448.6	4,569.0	28,176.8
Mississippi	3,372.1	863.2	578.4	4,813.8	Wyoming	338.8	73.6	39.6	452.0

all exceed the national average in GDP share, signaling a deepening role in domestic electronics supply chains and component production. States such as New York, Illinois, and Florida, while contributing large dollar amounts, report more modest GDP shares (ranging from 0.9% to 1.8%) due to their broader, more diversified economic bases.

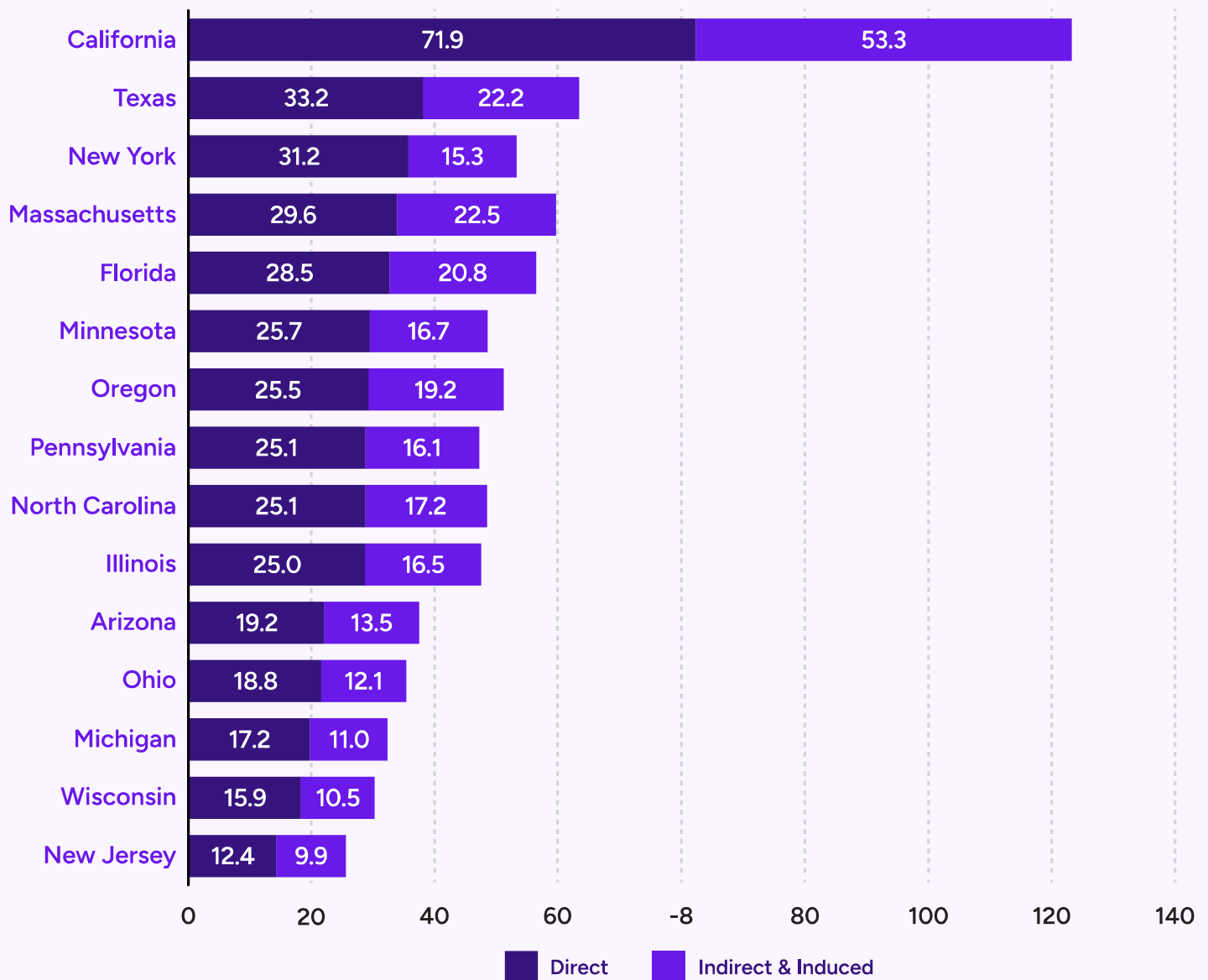
At the lower end, states like Hawaii, West Virginia, Montana, and the District of Columbia report minimal

electronics manufacturing activity, with the sector accounting for less than 0.5% of their GDP. However, even in these states, indirect and induced effects contribute to broader economic activity through consumer spending and supply chain linkages.

Overall, the data illustrate that while electronics manufacturing is a national industry, it is also a highly regionalized economic driver. States that have invested in semiconductor

infrastructure, technical education, and advanced manufacturing capabilities are reaping substantial economic rewards. As domestic production becomes increasingly central to U.S. industrial policy, states with a strong electronics footprint will play a pivotal role in shaping the next decade of economic growth, workforce development, and technological leadership.

FIGURE 7. STATE-LEVEL OUTPUT IMPACTS – TOP 15 STATES (MILLIONS \$)



State-Level Output of Electronics Manufacturing

Electronics manufacturing drives significant economic activity across all 50 states, contributing a total of \$1.81 trillion in output to the U.S. economy in 2023. This figure includes \$802.4 billion in direct output from electronics manufacturers, with an additional \$532.4 billion generated through upstream

suppliers (indirect effects) and \$472.1 billion from household spending (induced effects). This widespread activity highlights the central role of electronics in regional industrial ecosystems.

California leads the nation by a substantial margin, with total output from electronics manufacturing reaching \$364.2 billion. This includes more than \$216 billion in direct production and reflects the state's unique position as a global hub for

semiconductors, electronics design, and advanced manufacturing. California alone accounts for more than 20% of national sector output.

Texas ranks second, generating \$125.2 billion in total output, supported by strong growth in chip manufacturing, defense electronics, and logistics. Massachusetts follows with \$55.5 billion, benefiting from its highly specialized clusters in medical devices, instrumentation, and R&D-heavy electronics.

Other major contributors include Florida (\$52.1 billion), New York (\$49.3 billion), and Oregon (\$46.5 billion), each of which hosts significant production capacity across components, systems, and design. Minnesota, North Carolina, Illinois, Pennsylvania, and Arizona each report total output between \$41 and \$45 billion, reinforcing the national scale and geographic diversity of the sector.

Beyond the top states, mid-sized economies such as Ohio, Michigan, Wisconsin, and New Jersey demonstrate strong output ranging from \$26 billion to \$33 billion, reflecting balanced contributions across precision manufacturing, automotive electronics, and supply chain logistics.

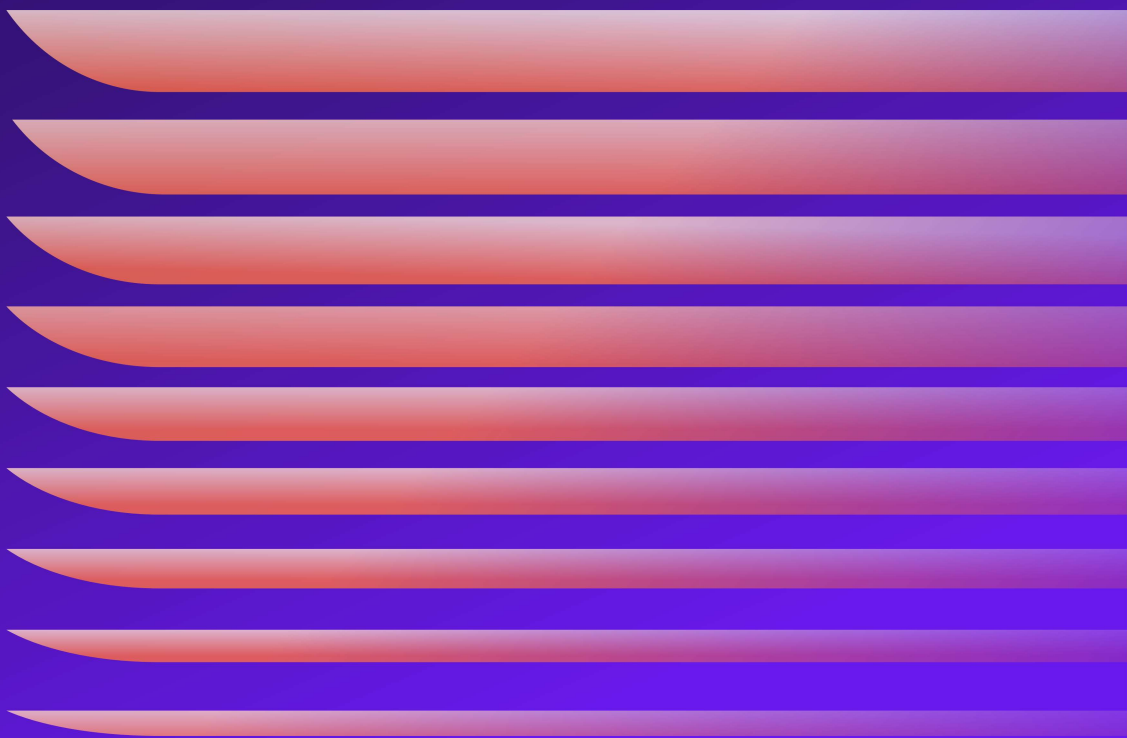
States like Colorado, Georgia, Maryland, and Washington contribute between \$20 billion and \$22 billion, with continued investment in aerospace systems, embedded technologies, and emerging digital infrastructure.

Even smaller states such as New Hampshire, Utah, Connecticut, and Iowa each exceed \$11 billion in total output, while states with niche specializations—such as Vermont, Idaho, and New Mexico—deliver several billion dollars in economic activity despite smaller workforce sizes.

This data underscores that electronics manufacturing is not only a pillar of the national economy but also a powerful catalyst for regional economic development. From semiconductors in Oregon to defense electronics in Texas and med-tech in Massachusetts, the sector supports robust industrial ecosystems, high-paying jobs, and broad economic spillovers across the United States. As the industry continues to evolve in response to reshoring, automation, and supply chain realignment, states with strong infrastructure and strategic investment plans are positioned to play leading roles in the future of U.S. electronics production.



Conclusion



Conclusion

Electronics manufacturing stands as one of the most powerful engines of the U.S. economy, driving output, employment, and innovation across multiple sectors. In 2023, it supported 5.2 million jobs, generated \$513.4 billion in labor income, contributed \$853.4 billion to GDP, and produced nearly \$1.8 trillion in total output when indirect and induced effects are included. The sector's role extends far beyond fabrication facilities and clean rooms, forming a foundation for national

competitiveness and serving as a catalyst for growth across energy, healthcare, automotive, and defense industries.

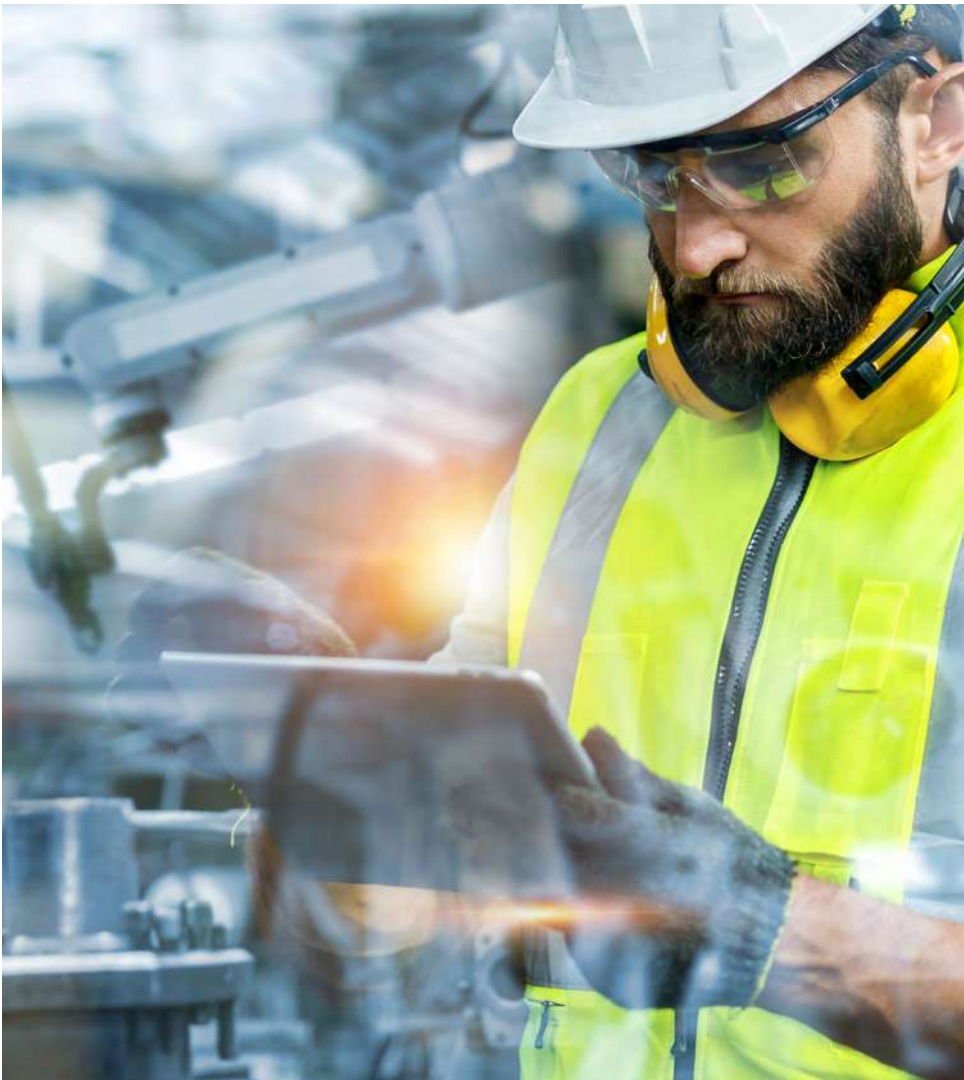
The core of this economic strength lies in the sector's diversity and specialization. Semiconductors, precision instruments, and control systems account for the largest share of output and employment, illustrating how these foundational technologies underpin modern systems. With an average annual

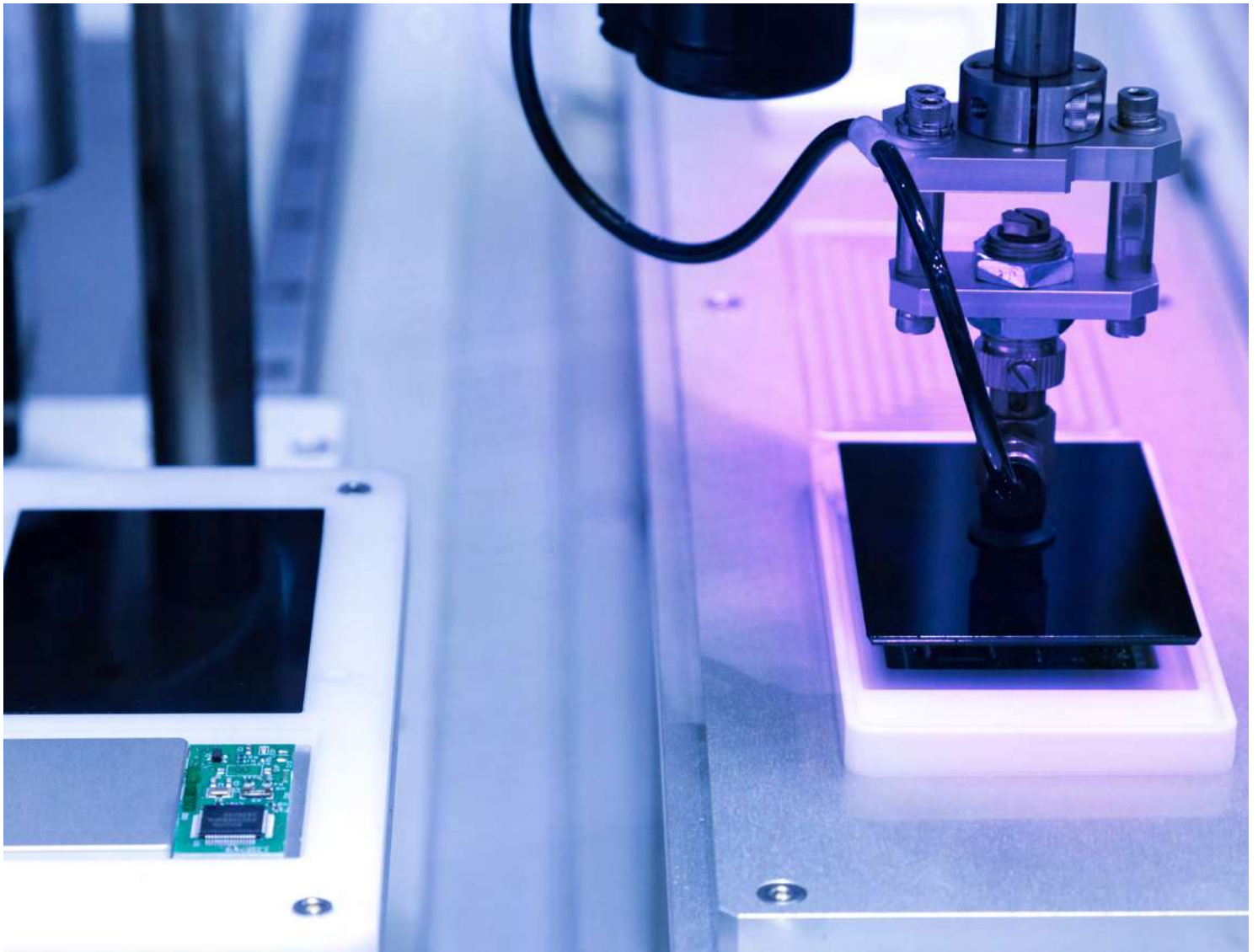
wage of \$156,102, up 23% since 2017, electronics manufacturing sustains a highly skilled workforce that supports high-value production, design, and engineering careers across the country. The result is not just more jobs, but better jobs that help anchor regional economies and expand the middle class.

The economic multipliers tied to electronics manufacturing reveal its deep integration with other industries. Each direct job in electronics supports roughly three additional jobs across the economy, and every dollar of direct output generates about \$2.25 in total economic activity. These ripple effects strengthen domestic supply chains, create demand for logistics and professional services, and sustain retail and service industries through household spending. The growing strength of these multipliers over time highlights the sector's expanding reach and importance to long-term economic stability.

Geographically, the sector is both nationally distributed and regionally concentrated. California, Texas, Oregon, and Massachusetts lead in overall employment, value added, and output. California alone accounts for roughly one fifth of all U.S. electronics manufacturing jobs and generates \$364 billion in total output. States like Oregon, where electronics represent more than 6% of GDP, illustrate how advanced manufacturing ecosystems can redefine regional economies. At the same time, nearly every state benefits through indirect supply chain linkages and induced household spending.

Electronics also serve as the foundation for innovation and





Strengthening the full electronics ecosystem from chips to systems drives innovation, jobs, and competitiveness.

productivity in other sectors. The electronics content of final sales surpasses \$1 trillion annually, with business investment as the largest driver of demand. These inputs power everything from data centers and industrial automation to medical imaging and aerospace systems. The steady balance of consumption, investment, and exports provides resilience through business cycles and positions the sector as a linchpin of the digital economy.

The findings point to clear imperatives for policymakers and business leaders. Invest in the workforce of the future, research and development, infrastructure,

and resilient supply chains to sustain domestic production capacity. Think in terms of silicon to systems, where value creation depends on the health of the entire chain, from chip design, wafer fabrication, and materials, to packaging, testing, board assembly, embedded software, cloud services, and final system integration. When these links are present together, knowledge moves faster, feedback loops tighten, and productivity gains compound. Strengthening the full ecosystem ensures that innovation, jobs, and economic growth remain deeply rooted within the country, and that U.S. firms can compete globally on speed, quality, security, and scale.

APPENDIX A:

Projected Upstream Impacts Through 2025

This section uses data from the U.S. Census Bureau's Manufacturers' Shipments, Inventories, and Orders (M3) survey to provide a forward-looking estimate of how the upstream impacts of electronics manufacturing may evolve.

Table A-1 replicates the national impact summary, offering a baseline view of the sector's economic footprint in 2023.

TABLE A-1. U.S. ELECTRONICS MANUFACTURING IMPACTS, 2023 (UNITS INDICATED)

	EMPLOYMENT (THOUSAND PERSONS)	LABOR INCOME (BILLIONS \$)	VALUE ADDED (BILLIONS \$)	OUTPUT (BILLIONS \$)
Direct	1,296.1	\$202.3	\$307.7	\$802.4
Indirect	1,683.9	\$159.4	\$263.9	\$532.4
Induced	2,209.4	\$151.7	\$281.8	\$472.1
TOTAL	5,189.3	\$513.4	\$853.4	\$1,806.9

To explore potential future trends, Table A-2 projects what those impacts might look like in 2025. These estimates are derived by applying the observed growth rate of computer and electronic product shipments between 2023 and 2025 to the 2023 impact figures. The projection assumes that supply chain structure and household spending behavior remain constant during this period.

It is important to note that these are not historical figures, nor do they reflect anticipated changes in productivity, labor dynamics, reshoring activity, or technological advancement. Instead, they serve as a conservative approximation of how the sector's economic footprint might scale if recent growth patterns continue.

These rough estimates offer a useful lens for understanding potential trends and reinforcing the sector's growing relevance to the broader economy.

TABLE A-2. U.S. ELECTRONICS MANUFACTURING IMPACTS, 2025 – ESTIMATED (UNITS INDICATED)

	EMPLOYMENT (THOUSAND PERSONS)	LABOR INCOME (BILLIONS \$)	VALUE ADDED (BILLIONS \$)	OUTPUT (BILLIONS \$)
Direct	1,354.8	211.5	321.6	838.8
Indirect	1,760.2	166.6	275.8	556.5
Induced	2,309.5	158.6	294.6	493.5
TOTAL	5,424.4	536.7	892.0	1,888.8

APPENDIX B:

National & State Fact Sheets

Appendix B offers a detailed look at how electronics manufacturing contributes to individual state economies. These fact sheets are based on 2023 data from the IMPLAN model and provide a localized snapshot of the industry's footprint across all 50 states and the District of Columbia.

Each fact sheet opens with key economic indicators for the region, setting the stage for understanding the scale of electronics manufacturing's role in the broader state economy.

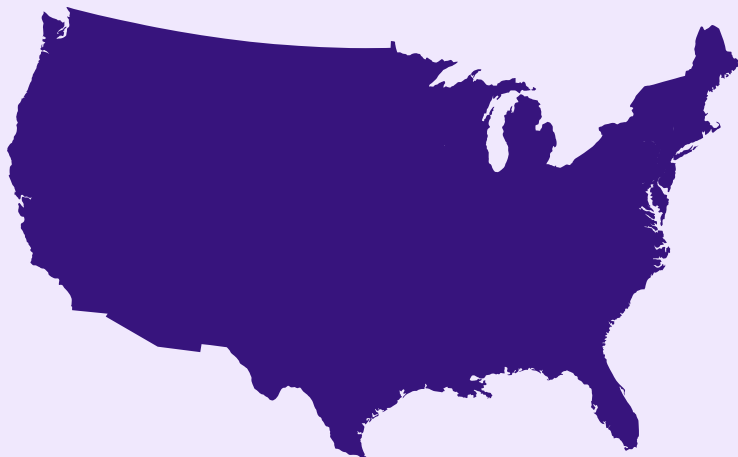
The next section highlights the industry's direct impact, showing employment, labor income, value added, and total output. It also includes two benchmark ratios: electronics manufacturing's share of state GDP (based on value added) and average labor income per worker, providing a clear view of the industry's relative importance and wage strength.

A third section expands the picture with the total impact, combining direct, indirect, and induced effects. This reveals how the industry supports activity in upstream suppliers and drives consumer spending in local economies.

Finally, each fact sheet features two key economic multipliers: one for employment and one for output. These multipliers illustrate how much additional economic activity is supported for every job or dollar generated directly within electronics manufacturing. For example, the employment multiplier is calculated by dividing the sum of indirect and induced employment by the number of direct jobs. The output multiplier uses the same method but applies it to total production value.

Together, these state-level profiles provide a clear and comparative view of how electronics manufacturing powers regional economies across the country.

United States



POPULATION (THOUSANDS) 334,915

GDP (BILLIONS \$) 27,721

EMPLOYMENT (THOUSANDS) 215,748

LABOR INCOME (BILLIONS \$) 16,159

Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

1,296

LABOR INCOME
(MILLIONS \$)

202,319

VALUE ADDED
(MILLIONS \$)

307,681

OUTPUT
(MILLIONS \$)

802,429

Direct Share of GDP
1.1%

Total Share of GDP
3.1%

Average Labor Income
\$156,102

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	1,296	1,684	2,209	5,189,339
LABOR INCOME (MILLIONS \$)	202,319	159,390	151,737	513,447
VALUE ADDED (MILLIONS \$)	307,681	263,858	281,836	853,375
OUTPUT (MILLIONS \$)	802,429	532,372	472,140	1,806,941

EMPLOYMENT
Multiplier

1.1%

LABOR INCOME
Multiplier

2.5%

VALUE ADDED
Multiplier

2.8

OUTPUT
Multiplier

2.3

Alabama

POPULATION (THOUSANDS) 5,109

GDP (BILLIONS \$) 321

EMPLOYMENT (THOUSANDS) 2,897

LABOR INCOME (BILLIONS \$) 180

Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

13.6

LABOR INCOME
(MILLIONS \$)

1,291.2

VALUE ADDED
(MILLIONS \$)

1,818.4

OUTPUT
(MILLIONS \$)

6,939.7

Direct Share of GDP
0.6%

Total Share of GDP
1.1%

Average Labor Income
\$95,221

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	13.6	8.1	7.0	28.7
LABOR INCOME (MILLIONS \$)	1,291.2	566.2	361.4	2,218.8
VALUE ADDED (MILLIONS \$)	1,818.4	957.4	730.7	3,506.6
OUTPUT (MILLIONS \$)	6,939.7	1,898.2	1,219.0	10,056.8

EMPLOYMENT
Multiplier

2.1

LABOR INCOME
Multiplier

1.7

VALUE ADDED
Multiplier

1.9

OUTPUT
Multiplier

1.4

Alaska

POPULATION (THOUSANDS) 733

GDP (BILLIONS \$) 70

EMPLOYMENT (THOUSANDS) 472

LABOR INCOME (BILLIONS \$) 37



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

0.2

LABOR INCOME
(MILLIONS \$)

19.8

VALUE ADDED
(MILLIONS \$)

26.7

OUTPUT
(MILLIONS \$)

92.5

Direct Share of GDP
0.04%

Total Share of GDP
0.06%

Average Labor Income
\$116,471

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	0.2	0.1	0.1	0.3
LABOR INCOME (MILLIONS \$)	19.8	4.7	5.4	30.0
VALUE ADDED (MILLIONS \$)	26.7	7.4	10.1	44.2
OUTPUT (MILLIONS \$)	92.5	14.5	15.9	122.9

EMPLOYMENT
Multiplier

1.8

LABOR INCOME
Multiplier

1.5

VALUE ADDED
Multiplier

1.7

OUTPUT
Multiplier

1.3

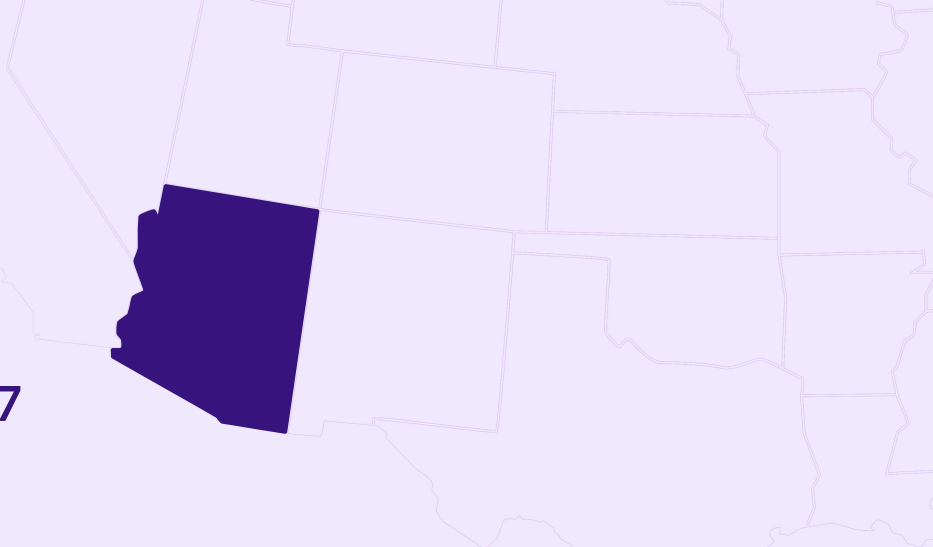
Arizona

POPULATION (THOUSANDS) 7,431

GDP (BILLIONS \$) 530

EMPLOYMENT (THOUSANDS) 4,377

LABOR INCOME (BILLIONS \$) 304



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

32.5

LABOR INCOME
(MILLIONS \$)

5,446.6

VALUE ADDED
(MILLIONS \$)

9,402.5

OUTPUT
(MILLIONS \$)

25,084.3

Direct Share of GDP
1.8%

Total Share of GDP
3.5%

Average Labor Income
\$167,588

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	32.5	31.9	37.9	102.4
LABOR INCOME (MILLIONS \$)	5,446.6	2,740.3	2,403.6	10,590.5
VALUE ADDED (MILLIONS \$)	9,402.5	4,491.8	4,626.2	18,520.5
OUTPUT (MILLIONS \$)	25,084.3	8,663.1	7,461.5	41,208.8

EMPLOYMENT
Multiplier

3.1

LABOR INCOME
Multiplier

1.9

VALUE ADDED
Multiplier

2.0

OUTPUT
Multiplier

1.6

Arkansas

POPULATION (THOUSANDS) 3,068

GDP (BILLIONS \$) 181

EMPLOYMENT (THOUSANDS) 1,776

LABOR INCOME (BILLIONS \$) 102



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

5.8

LABOR INCOME
(MILLIONS \$)

499.9

VALUE ADDED
(MILLIONS \$)

898.4

OUTPUT
(MILLIONS \$)

2,908.1

Direct Share of GDP
0.5%

Total Share of GDP
0.9%

Average Labor Income
\$86,638

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	5.8	3.2	2.9	11.9
LABOR INCOME (MILLIONS \$)	499.9	242.0	143.0	885.0
VALUE ADDED (MILLIONS \$)	898.4	458.1	292.8	1,649.3
OUTPUT (MILLIONS \$)	2,908.1	881.1	493.8	4,283.0

EMPLOYMENT
Multiplier

2.1

LABOR INCOME
Multiplier

1.8

VALUE ADDED
Multiplier

1.8

OUTPUT
Multiplier

1.5

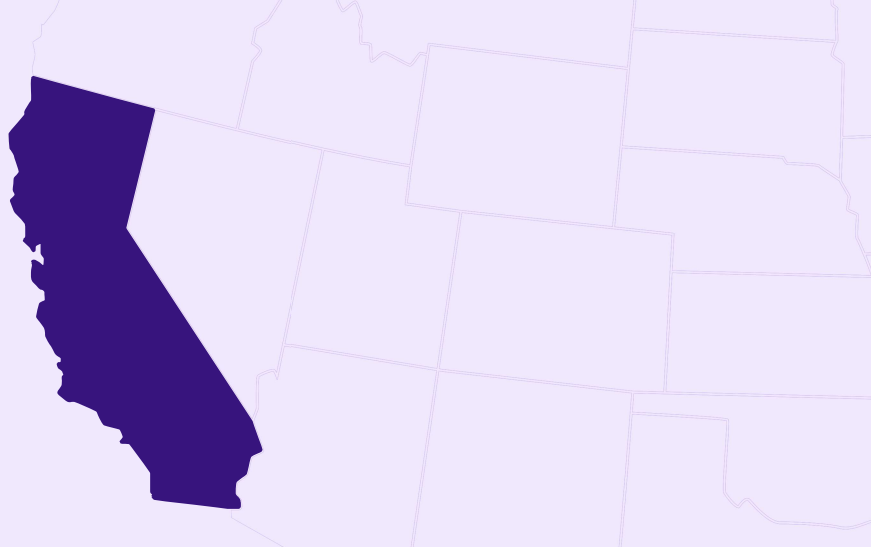
California

POPULATION (THOUSANDS) 38,965

GDP (BILLIONS \$) 3,880

EMPLOYMENT (THOUSANDS) 25,548

LABOR INCOME (BILLIONS \$) 2,269



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

260.5

LABOR INCOME
(MILLIONS \$)

66,094.1

VALUE ADDED
(MILLIONS \$)

106,751.0

OUTPUT
(MILLIONS \$)

216,068.3

Direct Share of GDP
2.8%

Total Share of GDP
5.1%

Average Labor Income
\$253,681

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	260.5	239.5	353.6	853.7
LABOR INCOME (MILLIONS \$)	66,094.1	26,389.4	26,242.8	118,726.3
VALUE ADDED (MILLIONS \$)	106,751.0	41,696.7	49,844.6	198,292.3
OUTPUT (MILLIONS \$)	216,068.3	71,596.6	76,491.1	364,155.9

EMPLOYMENT
Multiplier

3.3

LABOR INCOME
Multiplier

1.8

VALUE ADDED
Multiplier

1.9

OUTPUT
Multiplier

1.7

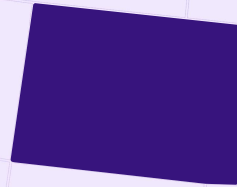
Colorado

POPULATION (THOUSANDS) 5,878

GDP (BILLIONS \$) 536

EMPLOYMENT (THOUSANDS) 4,276

LABOR INCOME (BILLIONS \$) 336



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

22.1

LABOR INCOME
(MILLIONS \$)

3,410.7

VALUE ADDED
(MILLIONS \$)

3,977.3

OUTPUT
(MILLIONS \$)

12,389.0

Direct Share of GDP
0.7%

Total Share of GDP
1.8%

Average Labor Income
\$154,261

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	22.1	20.0	22.4	64.6
LABOR INCOME (MILLIONS \$)	3,410.7	2,016.3	1,486.8	6,913.8
VALUE ADDED (MILLIONS \$)	3,977.3	3,030.6	2,828.1	9,836.0
OUTPUT (MILLIONS \$)	12,389.0	5,360.3	4,515.5	22,264.9

EMPLOYMENT
Multiplier

2.9

LABOR INCOME
Multiplier

2.0

VALUE ADDED
Multiplier

2.5

OUTPUT
Multiplier

1.8

Connecticut

POPULATION (THOUSANDS) 3,617

GDP (BILLIONS \$) 350

EMPLOYMENT (THOUSANDS) 2,423

LABOR INCOME (BILLIONS \$) 205

Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

15.3

LABOR INCOME
(MILLIONS \$)

1,904.5

VALUE ADDED
(MILLIONS \$)

3,037.0

OUTPUT
(MILLIONS \$)

8,142.0

Direct Share of GDP
0.9%

Total Share of GDP
1.7%

Average Labor Income
\$124,315

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	15.3	9.6	10.5	35.4
LABOR INCOME (MILLIONS \$)	1,904.5	1,040.1	783.4	3,728.0
VALUE ADDED (MILLIONS \$)	3,037.0	1,632.8	1,444.1	6,113.9
OUTPUT (MILLIONS \$)	8,142.0	2,720.3	2,157.9	13,020.2

EMPLOYMENT
Multiplier

2.3

LABOR INCOME
Multiplier

2.0

VALUE ADDED
Multiplier

2.0

OUTPUT
Multiplier

1.6

Delaware

POPULATION (THOUSANDS) 1,032

GDP (BILLIONS \$) 98

EMPLOYMENT (THOUSANDS) 659

LABOR INCOME (BILLIONS \$) 50

Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

3.5

LABOR INCOME
(MILLIONS \$)

516.9

VALUE ADDED
(MILLIONS \$)

700.8

OUTPUT
(MILLIONS \$)

1,766.7

Direct Share of GDP

0.7%

Total Share of GDP

1.3%

Average Labor Income

\$147,686

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	3.5	1.9	2.0	7.5
LABOR INCOME (MILLIONS \$)	516.9	134.1	122.9	773.8
VALUE ADDED (MILLIONS \$)	700.8	274.3	247.5	1,222.6
OUTPUT (MILLIONS \$)	1,766.7	457.4	380.5	2,604.7

EMPLOYMENT
Multiplier

2.1

LABOR INCOME
Multiplier

1.5

VALUE ADDED
Multiplier

1.7

OUTPUT
Multiplier

1.5

District of Columbia

POPULATION (THOUSANDS) 679

GDP (BILLIONS \$) 182

EMPLOYMENT (THOUSANDS) 923

LABOR INCOME (BILLIONS \$) 125



Electronics Manufacturing Direct Economic Contribution

EMPLOYMENT
(THOUSAND PERSONS)

0.1

LABOR INCOME
(MILLIONS \$)

24.7

VALUE ADDED
(MILLIONS \$)

44.1

OUTPUT
(MILLIONS \$)

100.4

Direct Share of GDP
0.02%

Total Share of GDP
0.03%

Average Labor Income
\$190,000

Direct, Indirect, Induced Impacts

	DIRECT	INDIRECT	INDUCED	TOTAL
EMPLOYMENT (THOUSAND PERSONS)	0.1	0.0	0.0	0.2
LABOR INCOME (MILLIONS \$)	24.7	6.0	2.2	32.9
VALUE ADDED (MILLIONS \$)	44.1	9.5	3.9	57.4
OUTPUT (MILLIONS \$)	100.4	13.8	5.4	119.6

EMPLOYMENT
Multiplier

1.5

LABOR INCOME
Multiplier

1.3

VALUE ADDED
Multiplier

1.3

OUTPUT
Multiplier

1.2