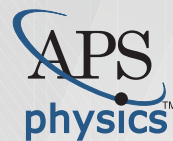


Industrial Physics: Essential to the U.S. Economy & Global Competitiveness



A recent economic analysis by TEconomy Partners concludes that physics-based industries are a major driver of the economic success of the United States both at home and around the globe.

Key Findings

Economic Impact:

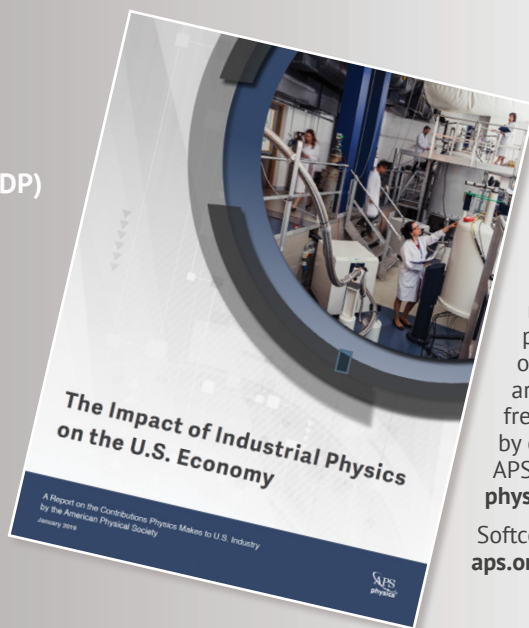
U.S. physics-based companies directly contributed approximately \$2.3 trillion to the U.S. economy (12.6% of GDP) and exported about \$1.1 trillion of goods in 2016.

Job Creation:

Approximately 11.5 million people were employed by U.S. physics-based companies in 2016, 6% of total employment.

Most Physicists Work in Industry:

Approximately 70,000 physicists joined industry from 2003-2016 or about 58% of all physics graduates.



A limited number of printed copies of this report are available free of charge by contacting APS at industrial.physics@aps.org.

Softcopy available at aps.org/industry.

Why do physics-based companies have such a strong impact on the U.S. economy?

- U.S. physics-based companies have broad influence and affect many economic sectors.
- These companies benefit from a supportive U.S. patent system.
- U.S. physics-based companies are innovative and pioneering. They attract the best and brightest talent, both home-grown and from around the world.
- There are multiple avenues for collaboration between federally supported physics research programs and U.S. physics-based industries.

What will help U.S. physics-based companies continue to thrive in the future?

- Reliable, robust support for basic and applied physics research by all federal science agencies.
- National Labs and other federal facilities dedicating resources to industrial users with a straightforward application and intellectual property review processes.
- Strong support for SBIR/STTR programs that provide critical support for entrepreneurs and nascent companies.
- A U.S. patent system that continues to encourage innovation.
- Immigration policies that ensure the best and brightest students want to study physics at U.S. institutions and provide them the ability to have a prolonged career here.

Complete List of NAICS4 Codes, Descriptions and Value Added Contributions of Physics-Based Sectors

The industry segments used in the report are the NAICS categories published by the U.S. Department of Commerce. The table below shows the top 10 industry segments that contribute to physics-based economic output. These industry segments were selected based on the percentage of their employees that are trained in physics-based knowledge (“Physics-Based Users”) using data from the U.S. Bureau of Labor Statistics. A sector with 10% or more employees trained in physics-based knowledge has 100% of its economic output counted as a contribution. No contribution is counted if fewer than 2% of employees are trained in physics, with a sliding scale in between. The values reported depend on these assumptions, and the report includes a sensitivity analysis on page 44. A complete description of the assumptions and methodology can be found on pages 38-47 of the report.

NAICS4	U.S. BUREAU OF LABOR STATISTICS OCCUPATIONAL EMPLOYMENT DATA NAICS4 DESCRIPTION	U.S. BUREAU OF LABOR STATISTICS OCCUPATIONAL EMPLOYMENT DATA		IMPLAN ESTIMATED 2016 (\$B)			
		PHYSICS-BASED USERS	PHYSICISTS	VALUE ADDED		CUMULATIVE PHYSICS-BASED VALUE ADDED	
				TOTAL	PHYSICS-BASED		
2211	Electric Power Generation, Transmission and Distribution	13.4%	0.5%	\$227.9	\$227.9	\$227.9	9.7%
3254	Pharmaceutical and Medicine Manufacturing	14.5%	6.0%	\$178.2	\$178.2	\$406.1	17.3%
3241	Petroleum and Coal Products Manufacturing	13.1%	1.8%	\$154.4	\$154.4	\$560.5	23.9%
5413	Architectural, Engineering, and Related Services	34.0%	2.2%	\$139.2	\$139.2	\$699.6	29.8%
5511	Management of Companies and Enterprises	3.0%	0.3%	\$362.5	\$107.4	\$807.1	34.4%
3364	Aerospace Product and Parts Manufacturing	20.3%	0.1%	\$104.3	\$104.3	\$911.3	38.8%
5417	Scientific Research and Development Services	18.7%	4.7%	\$93.2	\$93.2	\$1,004.5	42.8%
3344	Semiconductor and Other Electronic Component Mfg.	25.6%	0.1%	\$88.5	\$88.5	\$1,093.1	46.6%
3341	Computer and Peripheral Equipment Manufacturing	16.1%	0.0%	\$86.2	\$86.2	\$1,179.2	50.3%
2111	Oil and Gas Extraction	15.9%	4.0%	\$84.5	\$84.5	\$1,263.7	53.9%

APS contracted with TEconomy Partners for the economic analysis presented in this study. Data from various U.S. federal agencies were inputs for the IMPLAN economic model which produced these estimates of the economic outputs.