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U.S. Energy Information
Administration

Short-Term Energy Outlook Supplement: Energy-weighted industrial production indices

December 2013



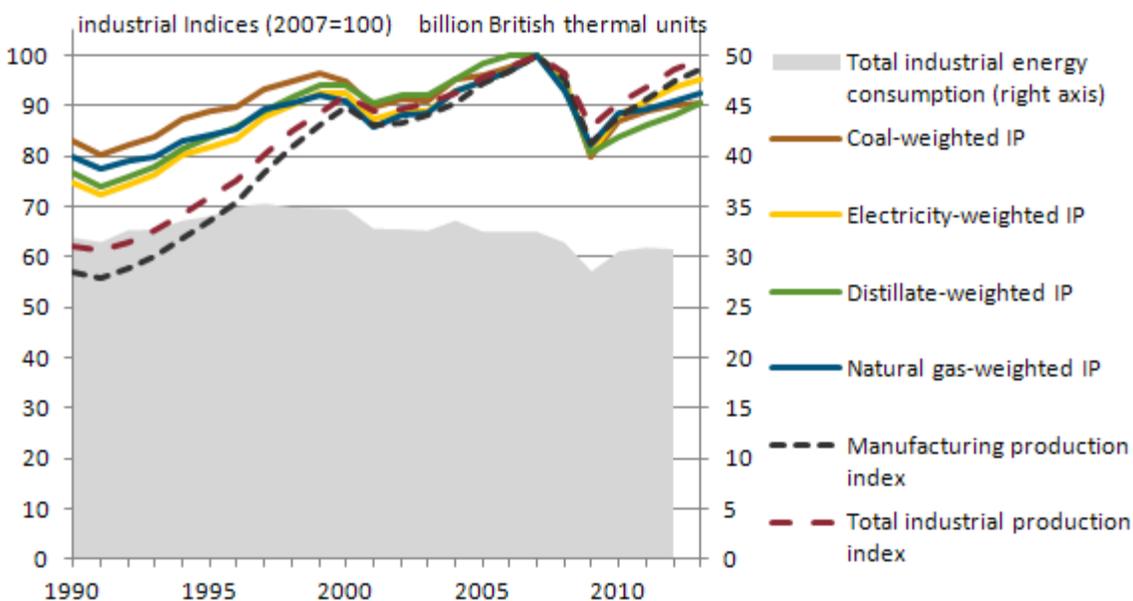
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Summary

The industrial sector uses nearly a third of all energy consumed in the United States. The manufacturing sector accounts for roughly 80% of total industrial energy consumption with the remaining 20% going to nonmanufacturing activities including construction, mining, and agriculture.¹ Indices that track total manufacturing or industrial production (IP), which are typically based on the quantity or value of output, may be used as indicators of energy consumption. However, the type of energy used within each industrial subsector may differ significantly and subsector output may grow at different rates. Rather than using a total IP index to forecast all types of manufacturing energy consumption, the U.S. Energy Information Administration's (EIA) *Short-Term Energy Outlook* (STEO) model uses a set of energy-weighted industrial production indices for coal, distillate fuel, electricity, and natural gas. These energy-weighted indices have distinct growth paths and reflect unique energy consumption patterns for the four energy sources that would have been masked by using a generic industrial or manufacturing production index (Figure 1). This report describes how the STEO energy-weighted indices are calculated and discusses some industry-level trends that play a significant role in consumption patterns for each of the sources.

Between 1990 and 2012, manufacturing production increased by 67% and total industrial production grew by 56% (Figure 1). However, growth in the less energy-intensive subsectors, such as computers and electronics, outpaced growth in more energy-intensive subsectors (Figure 2). Consequently, energy-weighted IP indices showed much lower growth, ranging from 8% for the coal-weighted index to 26% for the electricity-weighted index. In addition, rising energy prices after 2000 contributed to reductions in energy use within energy-intensive subsectors.

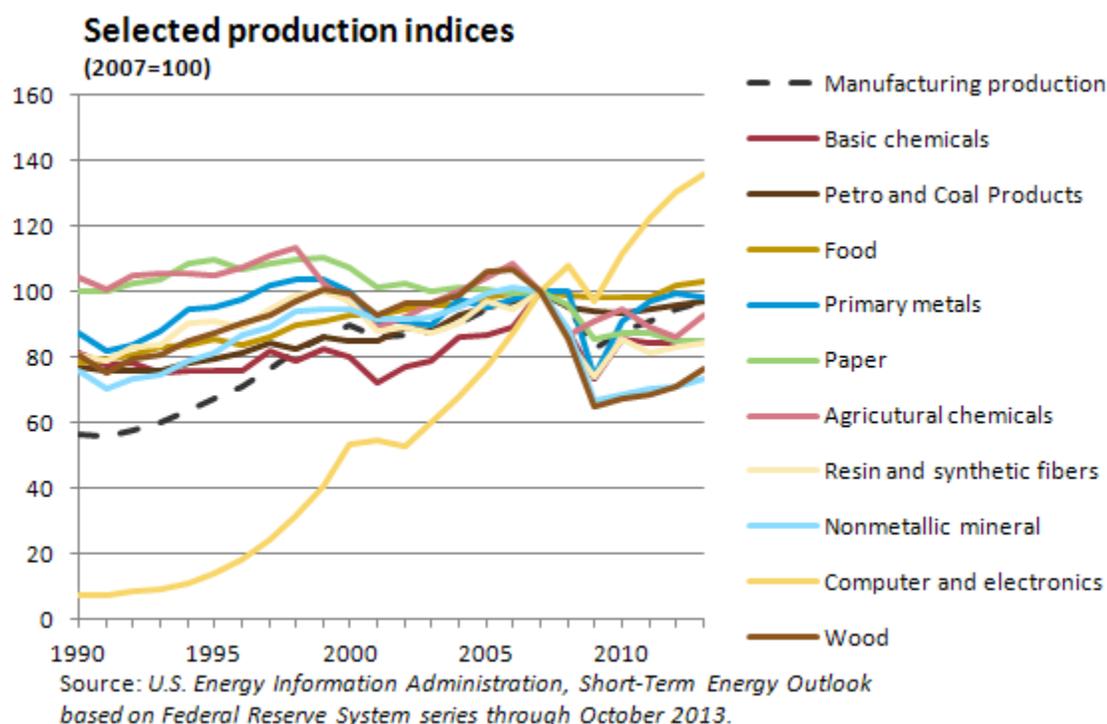
Figure 1. Industrial production indices and industrial energy consumption



¹ Estimated using manufacturing consumption from [Manufacturing Energy Consumption Survey 2010](#) divided by (Total Primary Energy plus Electricity Retail Sales) from [Monthly Energy Review](#) Tables 2.2-2.5.

Each energy-weighted index is based on the growth of individual manufacturing subsectors and their share of the total energy consumed by all manufacturing subsectors. The activities of 14 specific manufacturing subsectors, identified by [North American Industry Classification System](#) (NAICS) code, contribute to the electricity- and natural gas-weighted indices, but only eight of these contribute to the coal-weighted index and six to the distillate-weighted index. Each index reflects the growth of the underlying manufacturing subsectors and the relative importance of those subsectors to total energy consumption. Each subsector's share of energy consumption is based on data from EIA's 2010 Manufacturing Energy Consumption Survey (MECS), which is completed every four years. Because these shares are assumed to remain constant, the indices cannot capture changes in consumption patterns within an industry, such as fuel switching or changes in energy intensity.

Figure 2. Production indices of key energy consuming manufacturing subsectors



In the 1990s, total manufacturing and industrial production grew more quickly than the energy-weighted indices and total industrial sector energy consumption. This trend leveled off by 2000, when growth in total manufacturing and industrial output began to track the energy-weighted indices more closely.

From the end of the 2001 recession to the beginning of the 2007-2009 recession output in the energy-intensive sectors grew at about the same rate as total industrial output. However, energy consumption declined, which indicates some within-industry changes in energy intensity that cannot be captured by energy-weighted industrial production indices. Rising energy prices during this period contributed to energy conservation investments. For example, relatively high natural gas prices during this time period contributed to the closure of some industrial plants that used natural gas as a feedstock such as methanol and ammonia as domestic production was increasingly replaced by product imports.

All IP indices declined with the economic downturn during late 2007 through mid 2009, but gross industrial output, including non-manufacturing activities like agriculture, construction, and mining, saw a more moderate 14%-decline compared with the other indices, which ranged from an 18% decline for the total manufacturing production index and a 20% decline for the coal-weighted index.

The coal, distillate, and natural gas-weighted indices rebounded more slowly than the total industrial production and manufacturing production indices between 2009 and 2013, which grew at 16% and 18% respectively. The electricity-weighted index followed the total industrial and manufacturing IP indices more closely, with 18% growth over the four year period. The slightly lower growth of the total industrial IP index compared to the manufacturing IP index, implies relatively slower growth occurred in non-manufacturing activities. Some of the most important trends in energy consuming subsectors are discussed later in this report.

Methodology

The STEO model uses energy-consumption-weighted industrial indices for coal ($qsic_cl$), distillate fuel ($qsic_df$), electricity ($qsic_el$), and natural gas ($qsic_ng$) to reflect the mix and energy intensity of the manufacturing subsectors using each energy source. The energy weighted industrial production indices for coal, distillate fuel, electricity, and natural gas are based on energy consumption shares from the 2010 MECS (equation 1):

$$QSIC_{source} = \sum weight_{source, subsector} * IP_{manufacturing subsector} \quad (1)$$

where

- $qsic_cl$ is the coal-weighted IP index(2007=100)
- $qsic_df$ is the distillate-weighted IP index (2007=100)
- $qsic_el$ is the electricity-weighted IP index (2007=100)
- $qsic_ng$ is the gas-weighted IP index (2007=100)
- $weight$ is the subsector's share of energy consumed by all manufacturing in 2010
- IP is the subsector's industrial production index (2007 = 100)

MECS reports energy consumption for 21 separate manufacturing subsectors identified by their three-digit NAICS code. An analysis of 2010 MECS data identified 14 key energy consuming subsectors and assigned weights to these subsectors based on their consumption of a given energy source as a share of its total consumption by all manufacturing subsectors (equation 2 and Table 1).

$$weight_{source, subsector} = consumption_{source, subsector} / total consumption_{source, subsector} \quad (2)$$

A weight for *All other manufacturing* was calculated as the remainder of total MECS consumption and the sum of consumption of the subsectors identified in the table. The weights for *All other manufacturing* are multiplied by the total manufacturing production index (variable name ZOMINUS) for the purpose of calculating energy-weighted indices.

Table 1. Manufacturing industry energy consumption weights

STEO series name	Type of Manufacturing Subsector	Coal	Distillate Fuel	Net Electricity	Natural Gas
		QSIC_CL	QSIC_DF	QSIC_EL	QSIC_NG
zo311ius	Food and kindred products	13.33%	17.39%	10.56%	10.19%
zo321ius	Wood and wood products	0.00%	17.39%	2.15%	0.61%
zo322ius	Paper and allied products	15.00%	4.35%	8.47%	7.01%
zo324ius	Petroleum and coal products	10.00%	17.39%	6.58%	16.03%
zo3251ius	Basic chemicals	13.33%	0.00%	11.20%	20.94%
zo3252ius	Resin and synthetics (including rubber, fibers, and filaments)	1.67%	0.00%	3.37%	6.22%
zo3253ius	Agricultural chemicals (including pesticides and fertilizer)	0.00%	0.00%	0.65%	6.63%
zo326ius	Plastics and rubber products	0.00%	0.00%	6.41%	1.82%
zo327ius	Nonmetallic minerals (including stone, clay, glass, and concrete products)	16.67%	17.39%	4.56%	4.78%
zo331ius	Primary metals (including iron, steel, and steel products)	26.67%	8.70%	16.42%	9.88%
zo332ius	Fabricated metal products	0.00%	0.00%	5.21%	2.86%
zo333ius	Machinery	0.00%	4.35%	2.85%	1.24%
zo334ius	Computer and electronic product	0.00%	0.00%	4.13%	0.74%
zo336ius	Transportation equipment	0.00%	0.00%	5.44%	2.25%
zomnius	All other manufacturing	3.33%	13.04%	12.00%	8.79%

Source: U.S. Energy Information Administration, [Manufacturing Energy Consumption Survey 2010](#).

Based on the calculated energy-consumption shares in Table 1 the energy-weighted industrial production indices are represented by equations 3 through 6:

$$qsic_cl = 0.1333 (IP_{Food}) + 0.1500 (IP_{Paper}) + 0.1000 (IP_{Petroleum\ and\ coal\ products}) + 0.1333 (IP_{Basic\ chemicals}) + 0.0167 (IP_{Resins\ and\ synthetic\ fibers}) + 0.1667 (IP_{Nonmetallic\ materials}) + 0.2667 (IP_{Primary\ metals}) + 0.0333 (IP_{All\ other}) \quad (3)$$

$$qsic_df = 0.1739 (IP_{Food}) + 0.1739 (IP_{Wood}) + 0.0435 (IP_{Paper}) + 0.1739 (IP_{Petroleum\ and\ coal\ products}) + 0.1739 (IP_{Nonmetallic\ materials}) + 0.0870 (IP_{Primary\ metals}) + 0.0435 (IP_{Machinery}) + 0.1304 (IP_{All\ other}) \quad (4)$$

$$qsic_el = 0.1056 (IP_{Food}) + 0.0215 (IP_{Wood}) + 0.0847 (IP_{Paper}) + 0.0658 (IP_{Petroleum\ and\ coal\ products}) + 0.1120 (IP_{Basic\ chemicals}) + 0.0337 (IP_{Resins\ and\ synthetics\ fibers}) + 0.0065 (IP_{Agricultural\ chemicals}) + 0.0641 (IP_{Plastics\ and\ rubber}) + 0.0456 (IP_{Nonmetallic\ materials}) + 0.1642 (IP_{Primary\ metals}) + 0.0521 (IP_{Fabricated\ Metals}) + 0.0285 (IP_{Machinery}) + 0.0413 (IP_{Computer\ and\ electronics}) + 0.0544 (IP_{Transportation\ equipment}) + 0.1200 (IP_{All\ other}) \quad (5)$$

$$qsic_ng = 0.1019 (IP_{Food}) + 0.0061 (IP_{Wood}) + 0.0701 (IP_{Paper}) + 0.1603 (IP_{Petroleum\ and\ coal\ products}) + 0.2094 (IP_{Basic\ chemicals}) + 0.0622 (IP_{Resins\ and\ synthetics\ fibers}) + 0.0663 (IP_{Agricultural\ chemicals}) + 0.0182 (IP_{Plastics\ and\ rubber}) + 0.0478 (IP_{Nonmetallic\ materials}) + 0.0988 (IP_{Primary\ metals}) \quad (6)$$

$$+ 0.0286 (IP_{\text{Fabricated Metals}}) + 0.0124 (IP_{\text{Machinery}}) + 0.0074 (IP_{\text{Computer and electronics}})$$

$$+ 0.0225 (IP_{\text{Transportation equipment}}) + 0.0879 (IP_{\text{All other}})$$

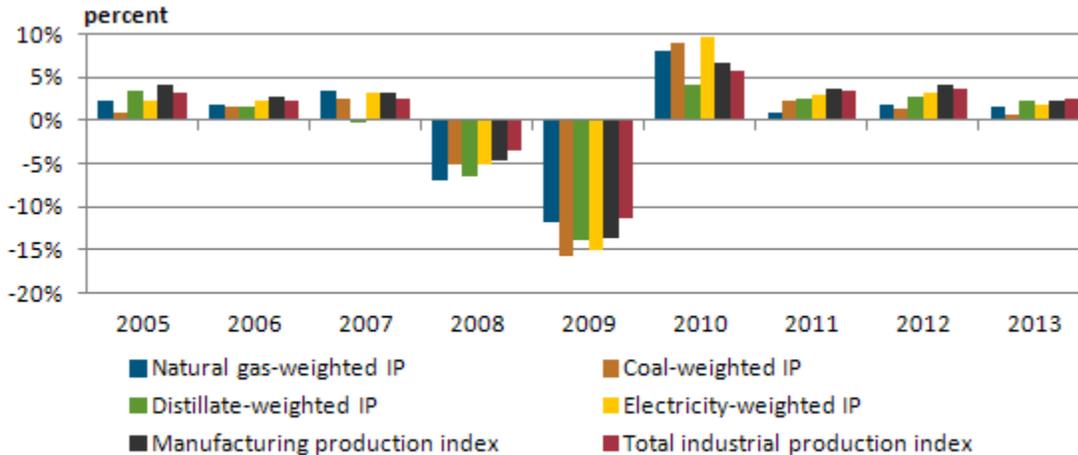
Trends in Manufacturing Energy Consumption

U.S. manufacturers used over 14 quadrillion British thermal units (Btu) of energy as a fuel in 2010, and another 6 quadrillion Btu was used as a feedstock (raw material). Nearly all manufacturers use energy as fuel for heat, power, or electricity generation. The primary metals, chemicals, and petroleum and coal subsectors account for 99% of the energy consumed as a feedstock.

EIA's MECS showed a 17% [decline in total manufacturing energy consumption](#) between 2002 and 2010. Over the same period, total manufacturing output grew by 1%, indicating a reduction in the amount of energy used per unit of manufacturing output. This decline in energy intensity reflects a combination of improvements in energy efficiency and changes in the mix of manufacturing output. By using constant industry-level weights based on the 2010 MECS, the STEO methodology incorporates changes in the mix of manufacturing but not changes in products or energy efficiency within an industry.

Different growth paths between the four energy-weighted IP indices are the result of patterns and relative importance of the individual energy-consuming industries that contribute to each index (Figure 3).

Figure 3. Annual change in industrial production indices, 2005-2013



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*.

Manufacturing Coal Consumption

About 89% of coal consumed in the industrial sector is used in manufacturing. According to MECS 2010 data, seven subsectors consumed 97% of the coal used for manufacturing (Figure 4). Primary metals manufacturers consume the most coal (27%), with five other subsectors using at least 10% of total consumption: non-metallic mineral products (17%), paper (15%), basic chemicals (13%), food (13%), and petroleum and coal products (10%). Over one-third of the coal consumed by manufacturers is used as a feedstock, mostly in the primary metals subsector. About 94% of the coal consumed by the primary metals subsector is used as a raw material to make coke for iron and steel production. The amount of coal consumed by primary metals manufacturers declined 20% between 2002 and 2010.

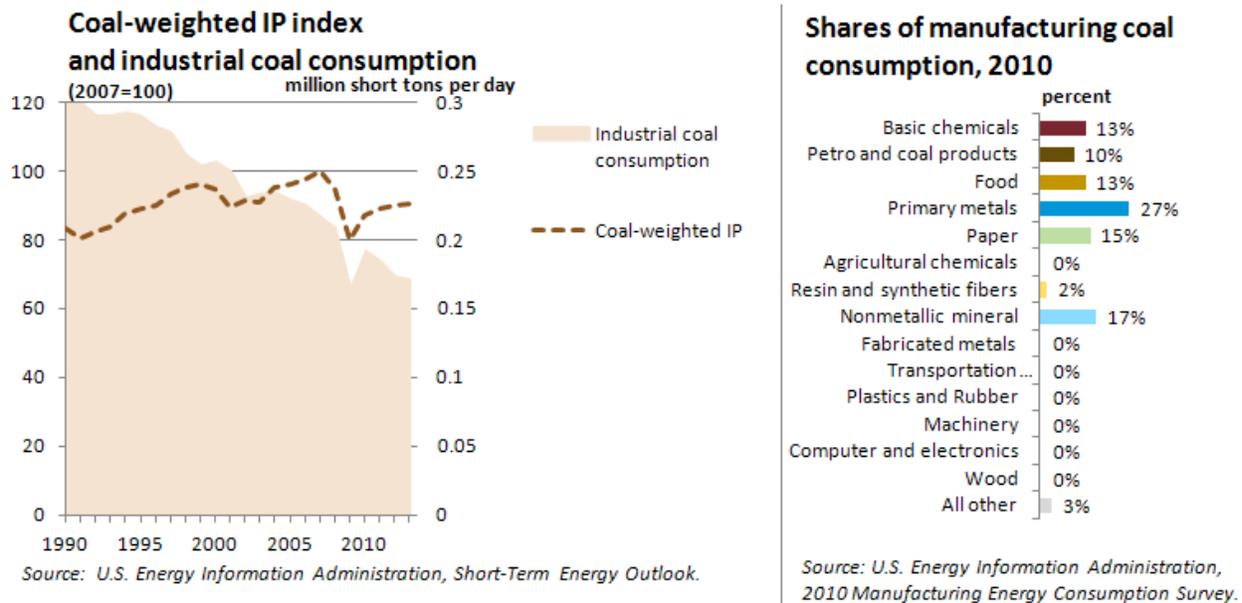
According to MECS, manufacturers consumed 29% less coal in 2010 than in 2002, a drop of 24 million short tons (Table A2). Coal consumption declined in all subsectors with the exception of food (NAIC 311), which was virtually flat. Over the same period, the coal-weighted IP index declined by only 5%, as activity in some important coal-consuming subsectors (including chemicals, nonmetallic minerals, and food) actually increased. In the primary metals subsector, coal consumption declined by 20% (4 million short tons) between 2002 and 2010, while the primary metals IP index declined by 0.3%. About half of this decline occurred in the iron and steel industry where some manufacturers moved away from blast furnaces that use coke made from coal toward electric arc furnaces that do not require coal as a feedstock.²

The coal-weighted IP index has not always performed well as an indicator of coal demand (Figure 4). During the economic expansion from 2001 through 2007 the coal-weighted IP index increased by 11.6% while coal consumption in the industrial sector fell by 13.2%. The decline in coal consumption was relatively evenly spread between coke plants (12.9% decline), combined heat and power (CHP) cogeneration (12.5%), and other industrial non CHP (13.8%). MECS reported declines from 2002 through 2006 in coal use across the major coal-using industries with the exception of non-metallic mineral product manufacturers (NAICS 327). The negative correlation between the coal-weighted IP index and industrial sector coal consumption suggests that structural changes within the industries, including adoption of electric arc furnaces by the iron and steel industry, overwhelmed the stimulus of growth in the output of those industries during this period.

During and after the recession, however, the coal-weighted IP index and industrial coal consumption were positively correlated. The two had similar declines between 2007 and 2009 with the IP index falling 20.1% and consumption falling 23.6%. Although the two measures remained positively correlated between 2009 and 2013, the growth in the coal-weighted IP index was a much stronger 13.4% compared to 3.2% growth in coal consumption.

² American Iron and Steel Institute, [Steelworks](#), December 2013.

Figure 4. Coal-weighted IP index, industrial coal consumption, and subsector shares of manufacturing coal consumption



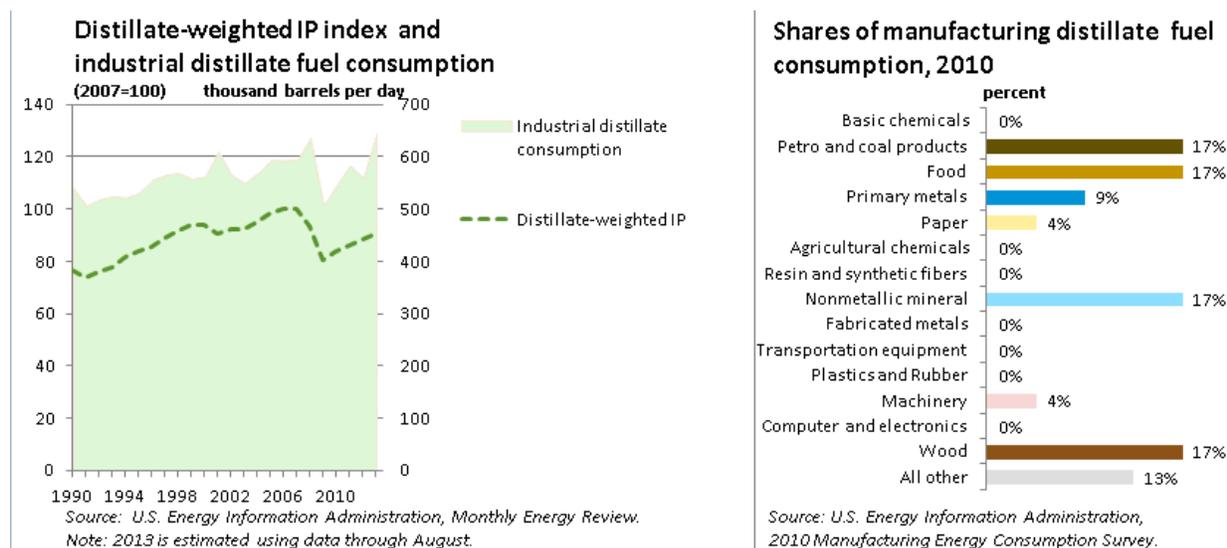
Manufacturing Distillate Consumption

The industrial sector consumes about 15% of the distillate fuel used in the United States. About 10% of the distillate fuel consumed in the industrial sector is used for manufacturing.^[1] Non-manufacturing consumption, which includes construction, agriculture, and mining, accounted for the other 90% of the distillate fuel used in the industrial sector. Consequently, although the distillate-weighted IP index has generally moved in the same direction as total industrial distillate consumption (Figure 5), the distillate-weighted IP has limited value as an indicator of distillate fuel consumption because of manufacturing's small share of the total.

Seven subsectors consumed 87% of distillate fuel used for manufacturing (Figure 5), according to MECS 2010. The food, petroleum and coal products, nonmetallic manufacturing (stone, clay, glass and concrete), and wood and wood products subsectors each accounted for 17% of total manufacturing distillate consumption. Although the wood and wood products subsectors are not energy-intensive, they are important consumers of distillate fuel. According to MECS, the amount of distillate fuel consumed by manufacturers declined 12%, or 3 million barrels, between 2002 and 2010. The largest declines were in the primary metals and nonmetallic mineral products subsectors, while consumption in the wood and food subsectors actually increased. While distillate fuel consumed by the primary metals subsector fell by 33% between 2002 and 2010, the IP index for this subsector declined only 0.3%, indicating some structural changes. Distillate fuel consumed by the nonmetallic mineral subsector declined by 33% between 2002 and 2010, which was much closer to the 25% decline of the related IP index. Distillate consumption by the wood and wood products subsector increased by 100% between 2002 and 2010, while the related IP index declined by 30%. At the same time, distillate consumption by the food subsector grew 33%, while the related IP index grew by only 4%.

^[1] Share is estimated using distillate fuel consumption from the MECS 2010 and 2010 total industrial consumption calculated as the sum of Industrial, Oil, and Off-Highway consumption in the [Adjusted Fuel Oil and Kerosene Report](#).

Figure 5. Distillate-weighted IP index, industrial distillate fuel consumption, and subsector shares of manufacturing distillate fuel consumption



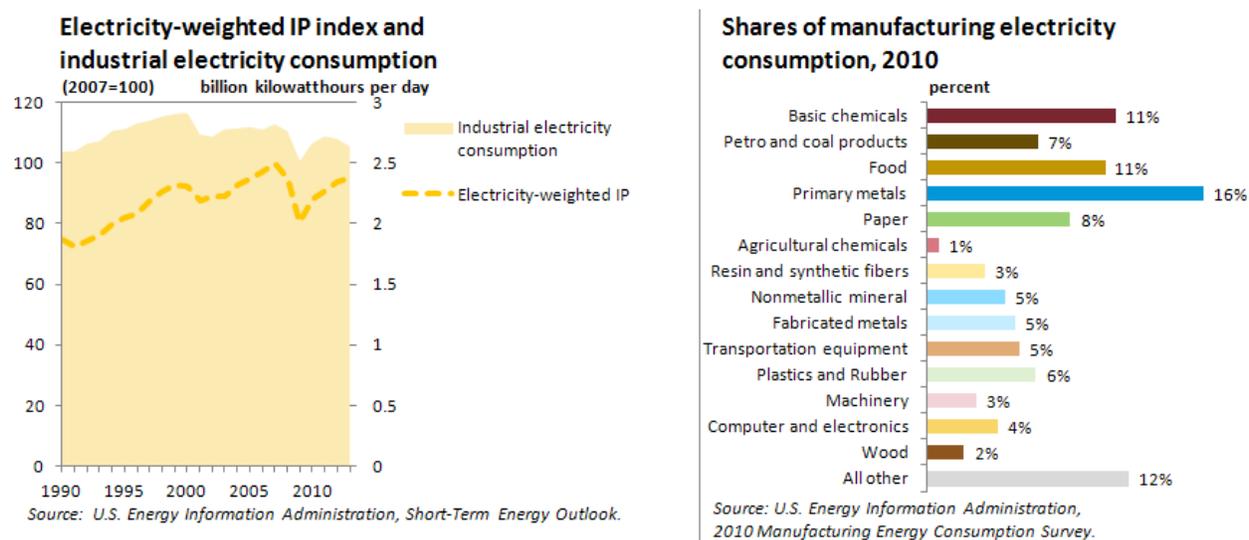
Manufacturing Electricity Consumption

The industrial sector consumes about 25% of the electricity used in the United States. Manufacturers consume roughly 75% of the electricity used in the industrial sector. According to MECS 2010, electricity use is spread between a wide array of subsectors, with the top five subsectors using just over half of the electricity used by manufacturers (Figure 6). Primary metals manufacturers (16%) account for the largest share of electricity use, followed by basic chemicals (11%), food (11%), paper (8%), and the petroleum and coal subsectors (7%).

According to MECS, the amount of electricity consumed by manufacturers declined by 14% or 117.9 billion kWh between 2002 and 2010 (Appendix Table A4). The primary metals and chemical subsectors reduced their electricity consumption the most, by 19% and 14% respectively. Over the same period, the IP index for primary metals declined by 0.3% and the IP index for the chemical subsectors increased by 11%. Electricity consumption actually increased between 2002 and 2010 in the petroleum and coal products subsector (26%) and the food subsector (12%), while the corresponding IP indices increased by 5% and 4%, respectively.

The electricity-weighted IP index served as a good indicator of industrial electricity consumption between 1990-2013. The two were positively correlated in 18 of the 23 years, but moved in opposite directions in 1991, 2002, 2006, 2012, and year-to-date 2013.

Figure 6. Electricity-weighted IP index, industrial net electricity consumption, and subsector shares of manufacturing net electricity consumption



Manufacturing Natural Gas Consumption

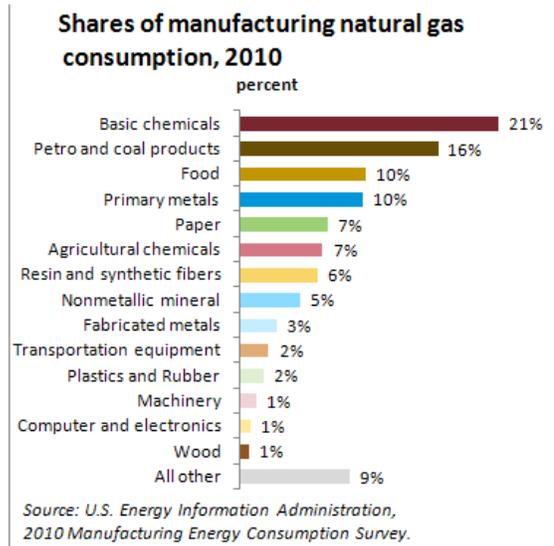
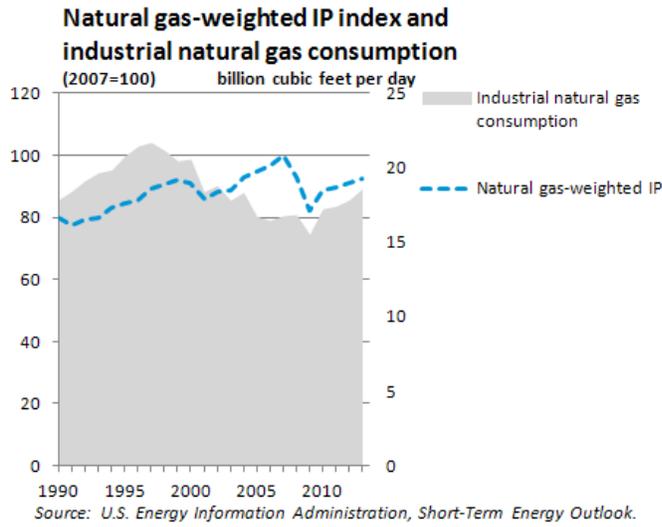
In 2012, natural gas deliveries to industrial consumers totaled 7,138 billion cubic feet (Bcf), or 28% of all natural gas consumed in the United States. Roughly 80% of natural gas consumed in the industrial sector is used in manufacturing as fuel or feedstock. According to MECS 2010, 14 subsectors consumed 91% of natural gas used for manufacturing (Figure 7). Basic chemicals (21%) manufacturing consumes the most natural gas, followed by petroleum and coal products (16%), food (10%), and primary metals (10%).

Growth of the natural gas-weighted index closely followed aggregate manufacturing output between 2000 and 2010, but grew more slowly after 2010. In the past several years, eight of the top ten natural gas-consuming subsectors grew more slowly than manufacturing production overall.

Natural gas consumption by manufacturers declined from 6,298 bcf in 2002 to 5,564 bcf in 2010, or 12%. The largest declines were in the nonmetallic mineral (NAIC 327) and primary metal (NAIC 331) subsectors. While natural gas consumed by the nonmetallic mineral subsector declined by 35% between 2002 and 2010, the IP index for this subsector declined by 25%. The natural gas consumed by the primary metals subsector declined by 20%, while the related IP index declined only 0.3%.

The natural gas-weighted IP index does not capture changes in energy intensity within an industry. For example, industrial natural gas consumption declined in 2003, 2005, and 2006 while the natural gas-weighted IP index had positive growth. This decline in natural gas consumption was partly because some methanol and ammonia manufacturing processes became uneconomic during those periods and were shut down. With the fall in natural gas prices over the past few years, some manufacturers are planning on restarting plants that use natural gas as a feedstock. This may contribute to natural gas consumption growth that will not be captured in the natural gas-weighted index.

Figure 7. Natural gas-weighted IP index, industrial natural gas consumption, and subsector shares of manufacturing consumption



Appendix

Table A1. First use of energy for all manufacturing purposes (fuel and nonfuel) by subsector, 2010

NAICS code	Type of Manufacturing Subsector	Coal (million short tons)	Distillate (million barrels)	Net Electricity (million kWh)	Natural Gas (billion cubic feet)
311	Food and kindred products	8	4	75,407	567
321	Wood and wood products	0	4	15,323	34
322	Paper and allied products	9	1	60,497	389
324	Petroleum and coal products	6	4	47,014	892
3251	Basic chemicals	8	0	79,986	1,165
3252	Resin and synthetics (including rubber, fibers, and filaments)	1	0	24,042	346
3253	Agricultural chemicals (including pesticides and fertilizer)	0	0	4,639	369
326	Plastics and rubber products	0	0	45,797	101
327	Nonmetallic minerals (including stone, clay, glass, and concrete) products	10	4	32,576	265
331	Primary metals (including iron, steel, and steel products)	16	2	117,284	550
332	Fabricated metal products	0	0	37,206	158
333	Machinery	0	1	20,386	69
334	Computer and electronic product	0	0	29,503	41
336	Transportation equipment	0	0	38,832	125
	All other manufacturing	2	3	85,674	492
	Total	60	23	714,166	5,563

Source: U.S. Energy Information Administration, [Manufacturing Energy Consumption Survey 2010](#), Table 1.1

Appendix

Table A2. Coal consumption in selected manufacturing subsectors, 2002, 2006, 2010

NAICS Code	Type of Manufacturing Subsector	million short tons			percent		
		2002	2006	2010	2002-2006	2006-2010	2002-2010
311	Food	8	7	8	-13%	14%	0%
322	Paper	11	10	9	-9%	-10%	-18%
325	Chemicals	16	8	10	-50%	25%	-38%
327	Nonmetallic Mineral Products	14	14	10	0%	-29%	-29%
331	Primary Metals	20	17	16	-15%	-6%	-20%
	Other (inc petro and coal products)	15	8	7	-47%	-13%	-53%
	Total	84	64	60	-24%	-6%	-29%

Source: U.S. Energy Information Administration, Manufacturing Energy Consumption Survey 2002, 2006, and 2010

Table A3. Distillate fuel consumption in selected manufacturing subsectors, 2002, 2006, 2010

NAICS Code	Type of Manufacturing Subsector	million barrels			percent		
		2002	2006	2010	2002-2006	2006-2010	2002-2010
311	Food	3	3	4	0%	33%	33%
321	Wood	2	4	4	100%	0%	100%
322	Paper	2	2	1	0%	-50%	-50%
324	Petro and coal products	3	6	4	100%	-33%	33%
325	Chemicals	2	1	1	-50%	0%	-50%
326	Plastics and Rubber	*	1	*			
327	Nonmetallic mineral	6	5	4	-17%	-20%	-33%
331	Primary metals	3	1	2	-67%	100%	-33%
332	Fabricated metals	1	*	*	*	*	*
333	Machinery	*	*	1	*	*	*
336	Transportation equipment	1	*	*	*	*	*
	Other	3	2	2	-33%	0%	-33%
	Total	26	25	23	-4%	-8%	-12%

Source: U.S. Energy Information Administration, Manufacturing Energy Consumption Survey 2002, 2006, and 2010

Appendix

Table A4. Net electricity consumption in selected manufacturing subsectors, 2002, 2006, 2010

NAICS Code	Type of Manufacturing Subsector	million kWh			percent		
		2002	2006	2010	2002-2006	2006-2010	2002-2010
311	Food	67,521	73,440	75,407	9%	3%	12%
321	Wood	20,985	26,723	15,323			
322	Paper	65,503	72,518	60,497	11%	-17%	-8%
324	Petro and coal products	37,186	40,134	47,014	8%	17%	26%
325	Chemicals	153,104	151,595	131,932	-1%	-13%	-14%
326	Plastics and Rubber	53,181	53,404	45,797	0%	-14%	-14%
327	Nonmetallic mineral	41,393	42,976	32,576	4%	-24%	-21%
331	Primary metals	144,502	134,325	117,284	-7%	-13%	-19%
332	Fabricated metals	47,123	41,965	37,206	-11%	-11%	-21%
333	Machinery	24,563	32,394	20,386			
334	Computer and electronics	38,352	27,509	29,503	-28%	7%	-23%
336	Transportation equipment	50,508	57,169	38,832	13%	-32%	-23%
	Other	88,140	81,315	62,409	-8%	-23%	-29%
	Total	832,061	835,467	714,166	0%	-15%	-14%

Source: U.S. Energy Information Administration, Manufacturing Energy Consumption Survey 2002, 2006, and 2010

Table A5. Natural gas consumption in selected manufacturing subsectors, 2002, 2006, 2010

NAICS Code	Type of Manufacturing Subsector	billion cubic feet			percent		
		2002	2006	2010	2002-2006	2006-2010	2002-2010
311	Food	567	620	567	9%	-9%	0%
321	Wood	56	84	34			
322	Paper	490	461	390	-6%	-15%	-20%
324	Petro and coal products	854	825	892	-3%	8%	4%
325	Chemicals	2,246	1,697	2,192	-24%	29%	-2%
326	Plastics and Rubber	125	125	101	0%	-19%	-19%
327	Nonmetallic mineral	411	447	266	9%	-40%	-35%
331	Primary metals	686	609	550	-11%	-10%	-20%
332	Fabricated metals	204	234	159	15%	-32%	-22%
333	Machinery	80	82	70			
334	Computer and electronics	64	44	41	-31%	-7%	-36%
336	Transportation equipment	198	242	125	22%	-48%	-37%
	Other	317	274	177	-14%	-35%	-44%
	Total	6,298	5,744	5,564	-9%	-3%	-12%

Source: U.S. Energy Information Administration, Manufacturing Energy Consumption Survey 2002, 2006, and 2010

