

# Advanced Manufacturing: Iron & Steel Production in Ohio



## Ohio's Standing

- 11.0 percent of the dollar value-added by the U.S. iron and steel industry (NAICS 3311, 3312 and 33151) originated in Ohio, making the state the 3<sup>rd</sup> largest overall source for such products at \$5.72 billion according to the latest economic census.<sup>1</sup> By contrast, 3.4 percent of the U.S. Gross Domestic Product came from Ohio that year.
- The concentration of the industry in Ohio is broadly based because every specific industry is concentrated here. Concentrations ranged from 1<sup>st</sup> for pipes and tubes made from purchased steel (33121) with 16.4 percent of national value-added originating here to 5<sup>th</sup> for iron foundries (331511) with 7.9 percent of U.S. value-added.
- Ohio also ranked 1<sup>st</sup> in rolled steel shapes output from purchased steel (331221), 2<sup>nd</sup> in steel wire drawing (331222) and steel foundry production (331512-3), and 3<sup>rd</sup> in iron-steel-ferroalloy (3311) production, with shares ranging from 8.1 to 13.7 percent of U.S. value-added.

## The Variety of Production in Ohio

- 61.2 percent of industry output in Ohio during 2012 came from iron, steel and ferroalloy mills (3311, blue); only a tiny fraction of that sum was ferroalloy production.
- Among products made from purchased steel (gold slice), pipes and tubes (33121) were 14.6 percent of industry output, while rolled and drawn products (33122) were 6.4 percent.
- Among foundries (gray slice) iron products (331511) were 7.7 percent of industry output, while steel foundry products (331512-3) combined for 10.2 percent of industry output.<sup>2</sup>

## Recent Production Trends in Ohio

- The bulk of industry production (3311-2, green) has recovered from the depths of the recession, but remains below pre-recession levels after adjusting for inflation and deflation; the same may be said for the national portion of such production from Ohio.<sup>3</sup>
- About 12.6 million tons of raw steel (red) – the core of industry production – were poured in Ohio in 2014. This was 13 percent of U.S. output.

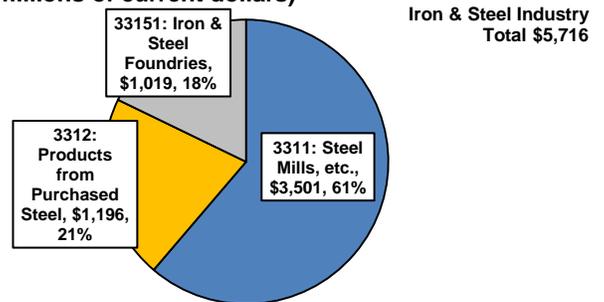
Notes: \* – Initial; 1 - Iron products have a carbon content of 1.7 to 4.9 percent by weight; steel products have a carbon content of less than 1.7 percent; 2 - Foundry products are more intricate than those of iron and steel mills; 3 – Foundry production data are not available on an annual basis.

## Ohio's Share of U.S. Output

NAICS	Groups/ Industries	Percent	Rank
<b>Iron &amp; Steel Industry Total</b>			
3311	Iron, Steel & Ferroalloys	12.7%	3 <sup>rd</sup>
3312	Products from Purchased Steel	13.2%	2 <sup>nd</sup>
33121	Pipes & Tubes	16.4%	1 <sup>st</sup>
33122	Rolling & Drawing	9.2%	2 <sup>nd</sup>
331221	Rolled Steel Shapes	10.2%	1 <sup>st</sup>
331222	Steel Wire Drawing	8.1%	2 <sup>nd</sup>
33151	Ferrous Metal Foundries	9.9%	3 <sup>rd</sup>
331511	Iron Foundries	7.9%	5 <sup>th</sup>
331512	Steel Investment Foundries	13.7%	2 <sup>nd</sup>
331513	Other Steel Foundries	10.7%	2 <sup>nd</sup>

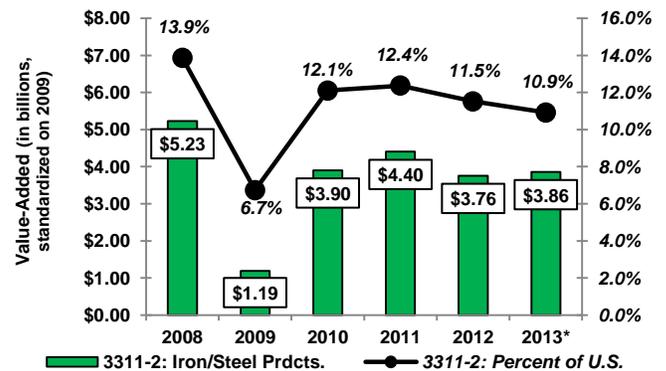
Sources: U.S. Census & Economic Analysis Bureaus (2015)

## Iron & Steel Production by Industry in Ohio\* (in millions of current dollars)

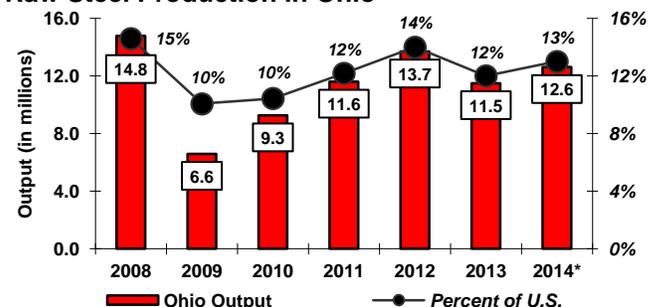


Source: U.S. Census Bureau (2015)

## Iron and Steel Mill Production Volumes in Ohio



## Raw Steel Production in Ohio



Source: U.S. Geological Survey

# Advanced Manufacturing: Iron and Steel Employment Distri- bution, Trends and Projections



## Employment by Industry in Ohio

- 24,500-plus people were employed in the iron and steel industry (NAICS 3311, 3312 & 33151) in Ohio during 2013, according to the latest County Business Patterns data from the U.S. Census Bureau.
- Close to 11,900, or 48.4 percent, worked in iron, steel and ferroalloy production (3311, blue – only 200 to 300 may have been producing ferroalloys, based on earlier data).<sup>1</sup>
- 5,600-plus – 22.9 percent – worked in establishments making products from purchased steel (3312), with more making pipes and tubes (33121, gold) than rolling shapes and drawing wire (33122, yellow).
- 7,000-plus – 28.7 percent – worked in foundries (33151, grays), with more in iron foundries (331511) than steel foundries (331512-3).

## Employment Trends in Ohio

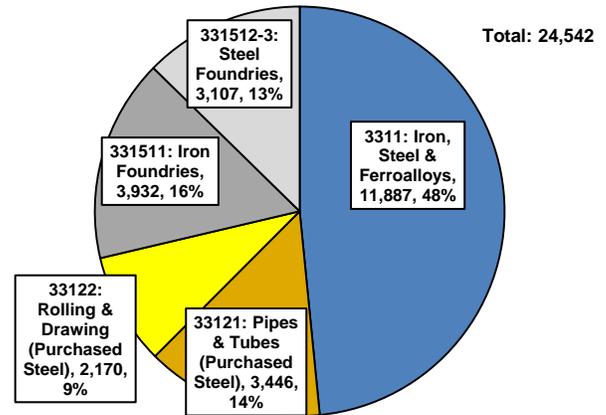
- Iron and steel industry employment has risen 5.4 percent from 23,300 in 2010 to 24,500-plus in 2013 following the beginning of economic recovery in 2009.
- The 1,700-plus jobs gained making products from purchased steel (3312) and the 300-plus jobs added in iron and steel foundries (33151) more than offset a net loss of 800-plus iron-steel-ferroalloy production jobs (3311).
- The declining percentage of U.S. iron and steel industry jobs in Ohio reflects how hard the industry was hit by the recession and the more rapid recovery in other parts of the country.
- Recent data from the U.S. Bureau of Labor Statistics show job growth in products from purchased steel and foundries of 3.9 and 8.6 percent, respectively, offsetting a 3.3 percent loss in iron-steel-ferroalloys for a net overall gain of 2.4 percent from 2013 to 2014.

## Projections for Employment in Ohio

- The Ohio Dept. of Job and Family Services Labor Market Information division (ODJFS-LMI) projects employment in iron-steel-ferroalloy production falling 1.5 percent from 10,020 in 2012 to 9,870 in 2022 (solid and striped blue, respectively); it also projects employment in products from purchased steel falling 6.5 percent from 7,650 to 7,150 (solid and striped gold) during the same period; combined changes forecast a 3.7 percent decline in the bulk of industry jobs over 10 years.<sup>2</sup>

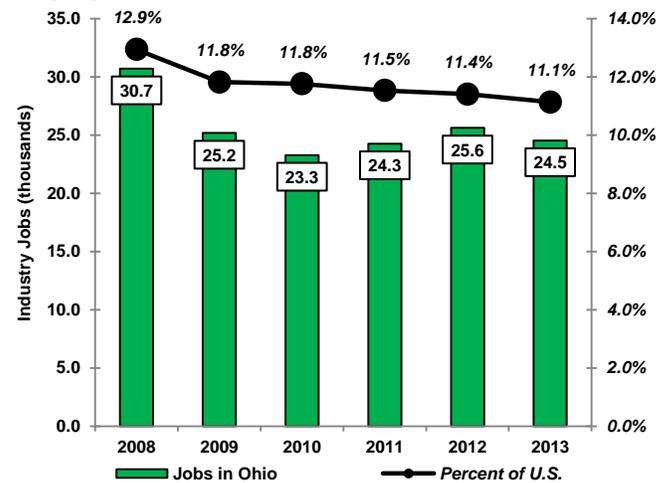
Notes: 1 – Separate statistics for ferroalloy production ended in 2011; 2 – ODJFS-LMI does not make projections for sub-groups, herein meaning ferrous foundries; 2012 figures differ from the Census Bureau due to different data collection methods and variations in classifying a few establishments.

## Employment by Industry in Ohio, 2013



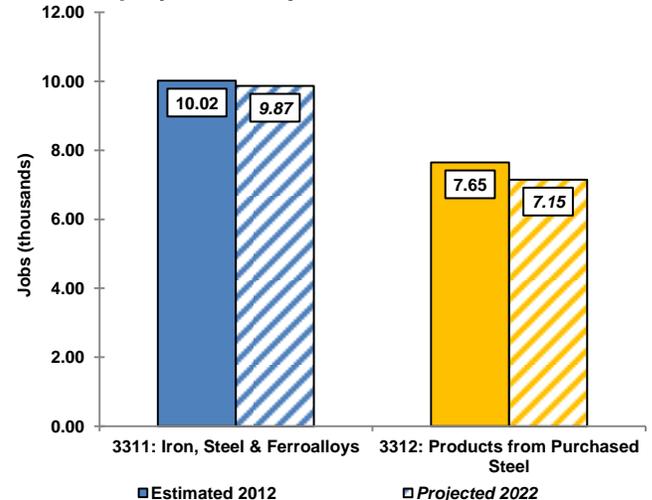
Source: U.S. Census Bureau, 2015

## Employment Trends in Ohio



Source: U.S. Census Bureau

## Ohio Employment Projected to 2022



Source: ODJFS-LMI, 2014

# Advanced Manufacturing: Iron and Steel Companies and Investments



## Companies in Ohio

- Four companies from Fortune's U.S.-1,000 or Global-500 lists employed at least 1,000 people in Ohio's iron and steel industry (NAICS 3311, 3312, 33151): AK Steel, ArcelorMittal, Timken Steel and General Motor's De-fiance foundry. Eight more Fortune companies employed between 100 and 1,000 either directly or through subsidiaries and joint ventures. The only non-Fortune company with at least 1,000 people was Republic Steel.
- AK Steel, Timken Steel and Worthington Industries have their global headquarters in Ohio.

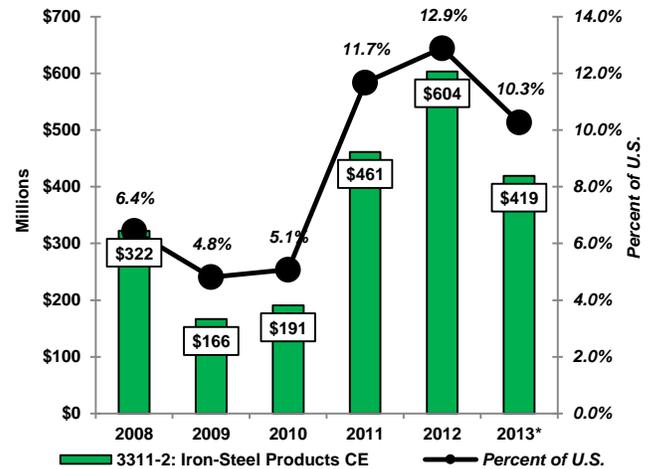
## Capital Expenditures in Ohio

- Annual capital expenditures for land, buildings and/or equipment used in manufacturing iron and steel products (3311-2) in Ohio ranged from \$166 million at the depth of the recession to \$604 million in 2012; these expenditures ranged from 4.8 to 12.9 percent of the national totals.<sup>1</sup>
- 67.4 percent of capital expenditures during this time were for iron-steel-ferroalloy production (3311), with the remaining 32.6 for making goods from purchased steel (3312).
- Ohio's portion of national capital expenditures in the combined groups averaged 8.7 percent for the 2008-2013 period. The corresponding portion of value-added in Ohio averaged 11.6 percent.
- Capital expenditures for ferrous foundry production (33151) were \$253 million in 2012, which was 28.6 percent of the corresponding U.S. total and 29.5 percent of the iron and steel industry total in Ohio.

## Major Projects in Ohio

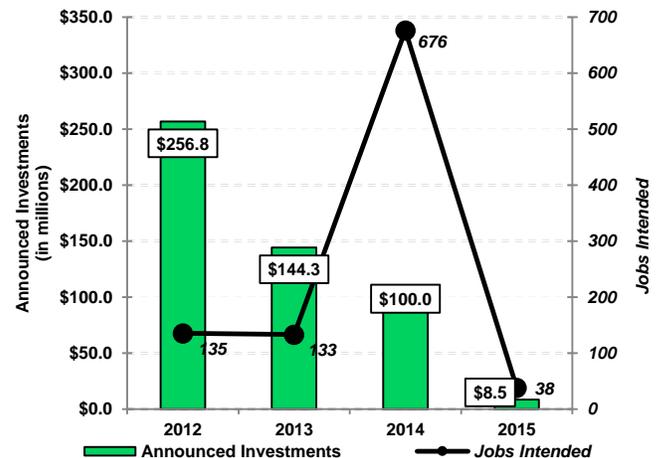
- 20 companies announced 24 major investments<sup>2</sup> for iron, steel and foundry production in Ohio from 2012 through 2015. The companies intended to invest nearly \$510 million and create 982 new jobs. 68.2 percent of the investments and 10.0 percent of the new jobs related to iron-steel-ferroalloy production (3311), while 25.4 percent of the dollars and 22.0 percent of the new jobs were for products made from purchased steel (3312); foundry production absorbed 6.4 percent of the dollars while accounting for 68.0 percent planned hiring.
- Timken announced investments totaling \$267.0 million, followed by ArcelorMittal's \$84.1 million for its plants, while Columbus Castings had planned to spend \$16.0 million.
- Columbus Steel Castings also had planned to hire 600; GKN Sinter Metals, Liberty Castings and MetalMatic each anticipated adding 50 to 82 new jobs.

## Capital Expenditures in Ohio



Source: U.S. Census Bureau

## Project Announcements in Ohio



Source: Ohio Development Services Agency

## 2015 Announcements

Company	Dollars (millions)	Jobs Intended
Charter Manufacturing	\$6.0	20
Major Metals	\$1.5	18
Precision Strip	\$1.0	n.a.

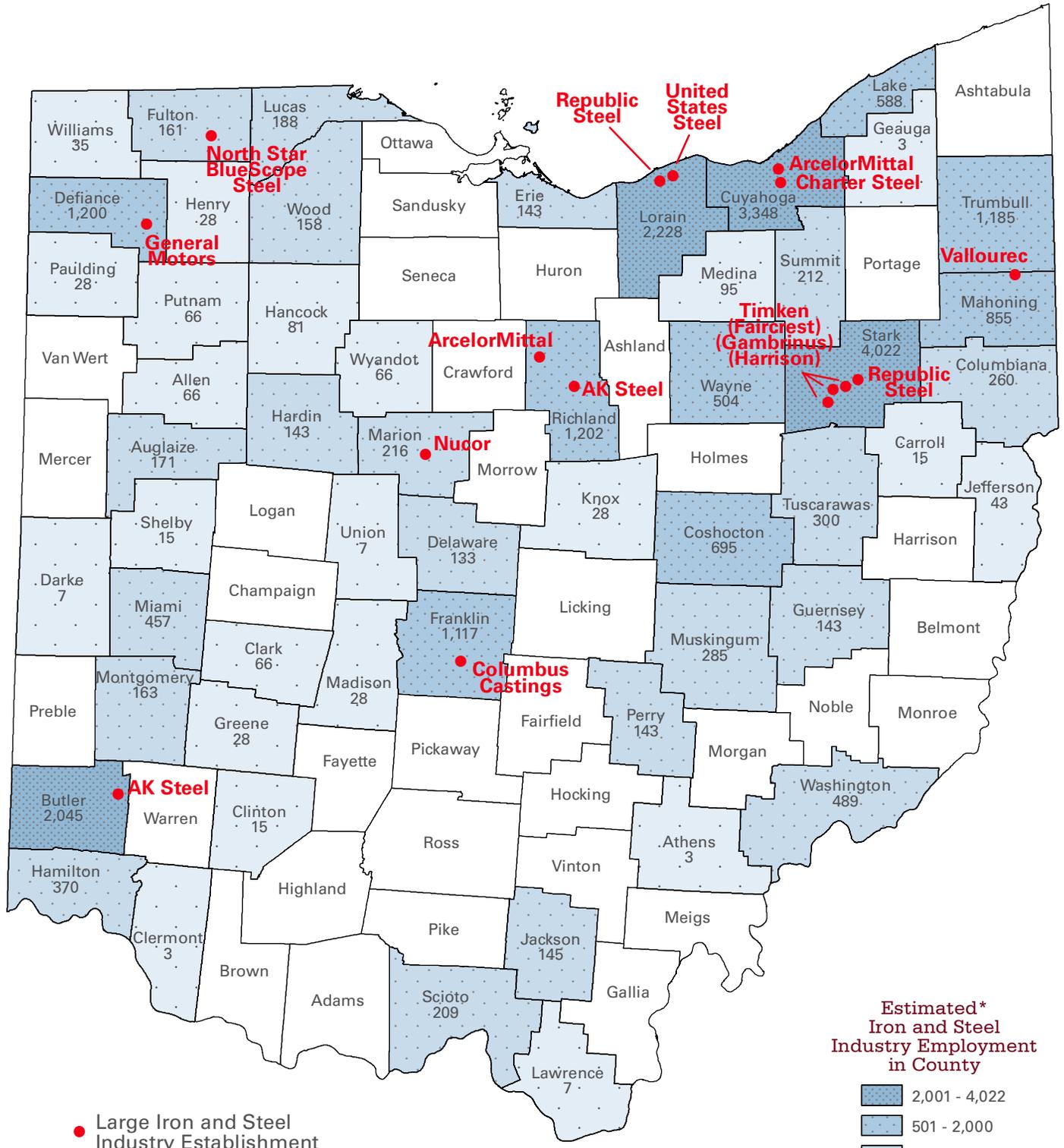
n.a. – not available.

Source: Ohio Development Services Agency, 2016

Notes: \* – Initial; 1 – Capital expenditures for any sub-group, including ferrous metal foundries, are available only from the quinquennial census of manufactures; 2 – A major investment meets one of the following minimum criteria: \$1 million, 20 or 50 new jobs (depending on the year), or an addition of 20,000 square feet; such projects often are phased-in over several years; they are not comparable with annual capital expenditures.

# Iron and Steel Industry Employment by County Statewide 24,542

# Ohio



Sources: Employment from 2013 County Business Patterns, U.S. Census Bureau; establishments from Hoover's Online

Prepared by: Ohio Development Services Agency, Office of Research (April 2016)

\*County employment figures are estimates and do not sum to the statewide total

# Advanced Manufacturing: Fabricated Metal Products in Ohio



## Contributions to Gross Domestic Product (GDP)

- The value of fabricated metal products (NAICS 332) made in Ohio rose 21.4 percent from \$8.77 billion in 2009 to \$10.65 billion in 2013 after adjusting for inflation, according to the latest data from the U.S. BEA.
- 2.2 percent of Ohio's Gross Domestic Product (GDP) came from fabricated metal products during this time.
- 3.4 percent of the value of all goods and services produced in America during 2013 originated in Ohio. By comparison, 7.6 percent of the nation's fabricated metal products came from the state – indicating the concentration of the industry here and ranking it 3<sup>rd</sup> in the U.S.

## Variations in Value-Added in Ohio

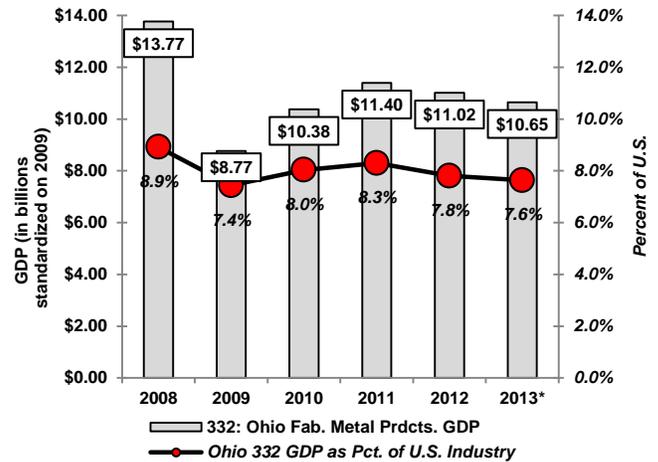
- The output of all nine fabricated metal products groups was concentrated in Ohio, given that production for each group – as measured by value-added – ranged from 5.5 to 12.2 percent of the corresponding U.S. total, while the state's total contribution to U.S. GDP was 3.4 percent.
- Ohio's overall rank of 3<sup>rd</sup> in fabricated metal production is driven principally by the concentrations in forging and stamping (3321), making cutlery and hand tools (3322), and coating and treating metals (3328) – all at least 10.0 percent of the corresponding national totals. Other drivers are manufacturing hardware and containers-boilers-storage tanks (3325 and 3326) – at 8.4 and 8.5 percent of respective national totals.
- Ohio ranks 1<sup>st</sup> in the nation in the forging and stamping, 2<sup>nd</sup> in making containers-boilers-storage tanks, cutlery and handtools, and 3<sup>rd</sup> in coating and treating metals as well as manufacturing hardware; it ranks 4<sup>th</sup> in the value-added by machine shops (3327), architectural and structural metal (3323) production, and 5<sup>th</sup> in manufacturing springs and wire-based products (3326).

## The Variety of Production in Ohio

- Fabricated metal production is so varied that no one group is close to the majority of output. The largest portion of total output came from machine shops, etc. at 23 percent. They were followed by other products – 18 percent, architectural and structural metals – 15 percent, forged and stamped products – 14 percent, and coated and treated metals, etc. – 12 percent. Output from each of the four remaining groups comprised less than 10 percent of the total. (Dark slices are even more concentrated in Ohio; light slices are less concentrated; mid-tones are nearly proportional with the industry overall.)

Notes: \* – Initial; ^ – The BEA starts with the Census Bureau's value-added data, but subtracts additional costs in deriving GDP figures, which explains the different values and percentages for 2013.

## Fabricated Metal Products: GDP Values from Ohio



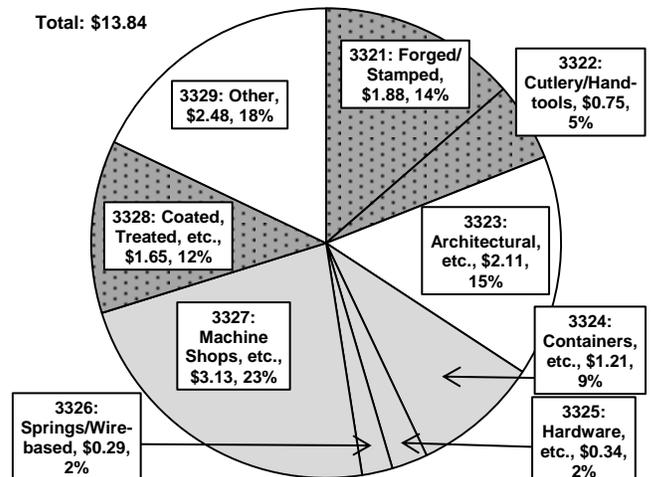
Source: U.S. Bureau of Economic Analysis (BEA), 2015

## Ohio's Share of U.S. Fabricated Metal Products Output, 2013\* (based on value-added^)

NAICS Code	Industry/ Group	Percent of U.S.	Rank
332	Fabricated Metal Products	7.5%	3 <sup>rd</sup>
3321	Forged/Stamped	12.1%	1 <sup>st</sup>
3322	Cutlery/Handtools	12.2%	2 <sup>nd</sup>
3323	Architectural/Structural	5.5%	4 <sup>th</sup>
3324	Containers, etc.	8.4%	2 <sup>nd</sup>
3325	Hardware, etc.	8.5%	3 <sup>rd</sup>
3326	Springs/Wire-based	6.8%	5 <sup>th</sup>
3327	Machine Shops, etc.	7.3%	4 <sup>th</sup>
3328	Coated, Treated, etc.	10.0%	3 <sup>rd</sup>
3329	Other	5.9%	4 <sup>th</sup>

Source: U.S. Census Bureau, 2015

## Fabricated Metal Products by Group in Ohio, 2013\* (billions of value-added^)



Source: U.S. Census Bureau, 2015

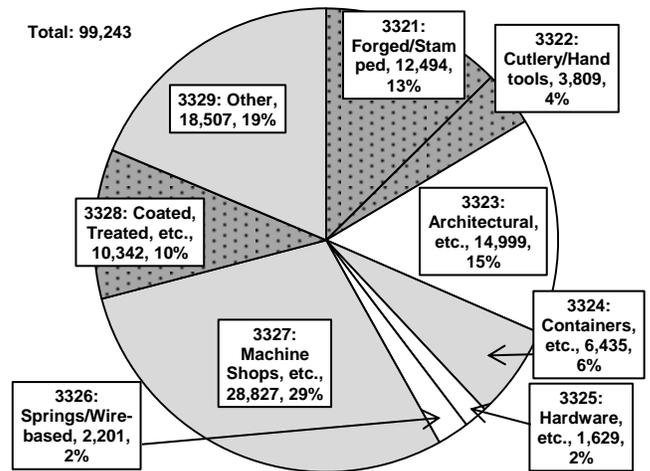
# Advanced Manufacturing: Fabricated Metals Employment Distribution, Trends and Projections



## Ohio Employment by Group

- 99,200-plus people were employed in fabricated metal production (NAICS 332) in Ohio during 2013, according to the latest Census Bureau figures.
- Two groups combined for nearly one-half of industry employment here: those at machine shops (3327 – which do boring and grinding work as well as making nuts, bolts and screws, etc.) comprised 29 percent of the industry total; those in other fabricated metal production (3329 – e.g., foils, ladders, plumbing fixtures, safes, steel wool, valves, small arms and ammunition, etc.) were 19 percent of the total.
- Other groups employing at least 10,000 were forging or stamping metal products (3321), making architectural and structural products (3323) such as building sections and panels, concrete reinforcement bars, doors, ornaments and windows, or treating and coating metals (3328); together they comprised an additional three-eighths of industry jobs.

## Employment by Group, 2013 (Darker slices – more concentrated employment)

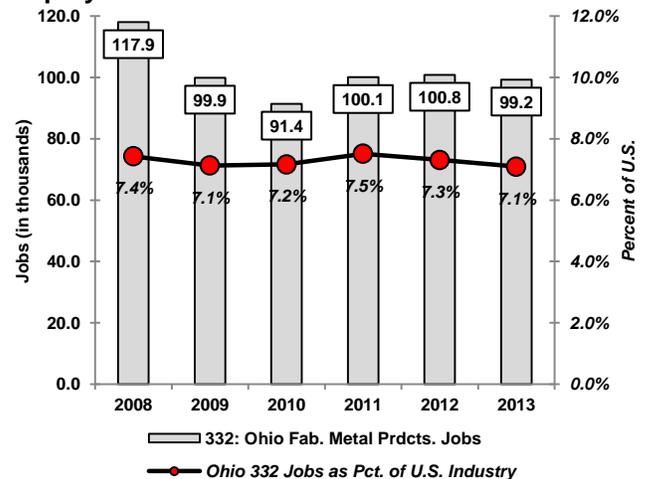


Source: U.S. Census Bureau, 2015

## Employment Trends in Ohio

- Employment in fabricated metal production has risen 8.6 percent from 91,400 in 2010 to 99,200 in 2013 as the economy expanded. Of the 7,800-plus added jobs, 3,800 were in machine shops, and 1,300-plus were in architectural – gains of 15 and 10 percent, respectively.
- Four more groups added jobs with the recovery: forging and stamping, containers (3324), hardware (3325) and coating and treating combined for 3,200-plus.
- The relatively steady percentage of U.S. industry jobs in Ohio during 2008-2013 may indicate changes here were largely part of changes seen across the nation.
- More current data from the U.S. Bureau of Labor Statistics indicate industry employment in Ohio grew 0.7 percent from 2013 to 2014.

## Employment Trends in Ohio



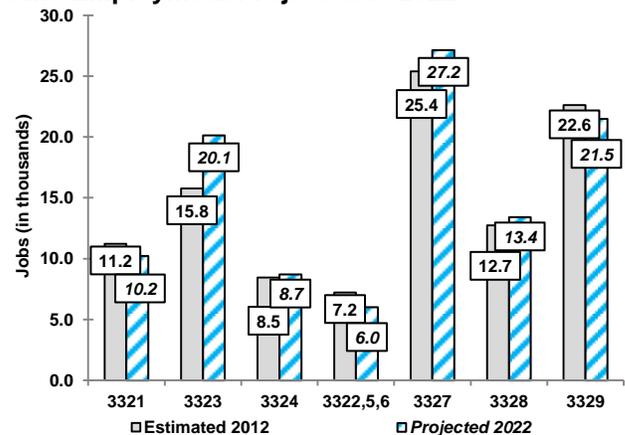
Source: U.S. Census Bureau

## Projections for Employment in Ohio

- The Ohio Dept. of Job and Family Services' Labor Market Information division (ODJFS-LMI) forecasts total industry employment rising from 3.6 percent from 103,420 in 2012 to 107,160 in 2022 (blue stripes).\*
- Net gains are projected in four specific groups: architectural (3323), containers (3324), machine shops (3327) and coating-treating (3328); architectural and machine shops may gain 4,400 and 1,800 jobs – growing 27.6 and 7.0 percent, respectively.

Note: \* - Census Bureau and LMI jobs figures for 2012 differ because the two use different methods of data collection and may differ in classifying a few establishments; LMI does not make projections for groups with less than 5,000 jobs.

## Ohio Employment Projected to 2022\*



Source: ODJFS-LMI, 2014

# Advanced Manufacturing: Fabricated Metal Products Companies and Investments



## Companies in Ohio

- Seven companies from *Fortune's* U.S.-1,000 and Global-500 lists each employ more than 500 people in Ohio's fabricated metal products industry (NAICS 332): Alcoa, Ball, GE's Unison, L-3, Parker-Hannifin, Timken and Worthington Industries. Parker-Hannifin, Timken and Worthington Industries have their world headquarters here. *Fortune* companies employing smaller numbers (some in subsidiaries) include Alliance, ArcelorMittal (sic), Berkshire-Hathaway, Continental, Crane, Crown Holdings, Curtiss-Wright, Dover, Emcor, General Dynamics, Johnson Controls, and Thyssen-Krupp. Non-*Fortune* companies believed to have at least 500 people include Sanwa's Wayne-Dalton and Todco, Superior Metal Products' American Trim, and Swagelok.

## Capital Expenditures in Ohio

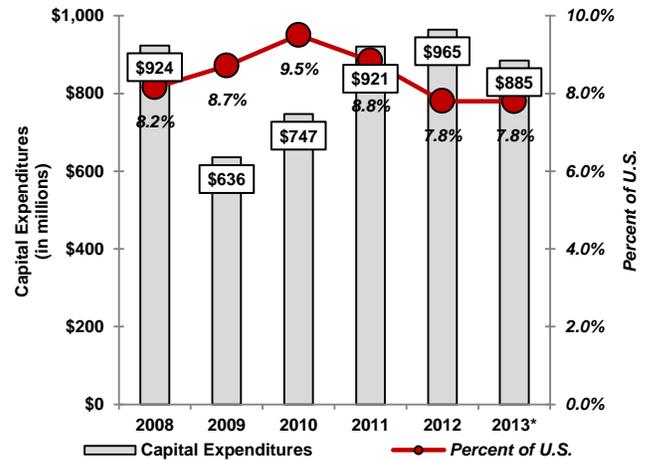
- Between \$636 and \$965 million was spent each year by the fabricated metal products industry from 2008 through 2013 for land, buildings and/or equipment in Ohio. These expenditures ranged between 9.5 and 7.8 percent of the national total for those years.
- 29.4 percent of capital expenditures during this time went for the production by machine shops, etc. (3327), followed by 18.2 percent for other products (3329) and 17.6 for stamping and forging (3321).
- Ohio's portion of national capital expenditures in the industry averaged 8.4 percent during the 2008-2013 period. The corresponding portion of value-added in Ohio averaged 7.8 percent, consistent with the industry maintaining production here.

## Major Projects in Ohio

- 118 companies announced 128 major investments<sup>2</sup> for fabricated metal products manufacturing in Ohio from 2012 through 2015. The companies intended to invest a total of \$565.0 million and create more than 3,900 new jobs. 26.7 percent of the dollars were intended for stamping and forging, with 20.6 percent for coating, engraving, heat treating, etc. (3328).
- Ball Corp. intended to invest the largest amount - \$46.5 million, followed by Alcoa at \$37.0 million and Clopay at \$30.0 million; 11 more companies announced investment plans totaling \$10 to \$25 million.
- Process Equipment planned to hire 317 people during this time, followed by Six C Fabrication at 250 and Clopay at 205; six more companies each planned to add between 100 and 200 jobs.

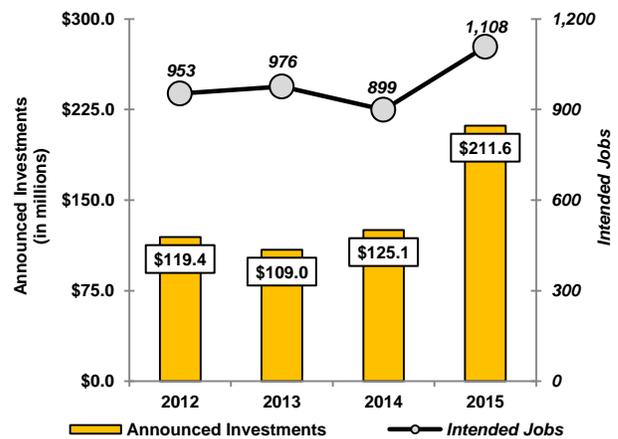
Notes: \* – Initial; ^ – A major investment meets one of the following minimum criteria: \$1 million, 20 or 50 new jobs

## Capital Expenditures in Ohio



Source: U.S. Census Bureau

## Project Announcements in Ohio



Source: Ohio Development Services Agency

## Top Announcements in 2015

Company	Dollars (millions)	Jobs Intended
Alcoa	\$37.0	70
Ball Corp.	\$32.0	100
Clopay	\$30.0	205
A-Brite	\$18.0	104
Worthington Industries	\$10.0	52
De NorTech	\$10.0	n.a.
Reifel Industries	\$5.0	50
Oldcastle BuildingEnvelope (sic)	\$3.0	50

n.a. – not available.

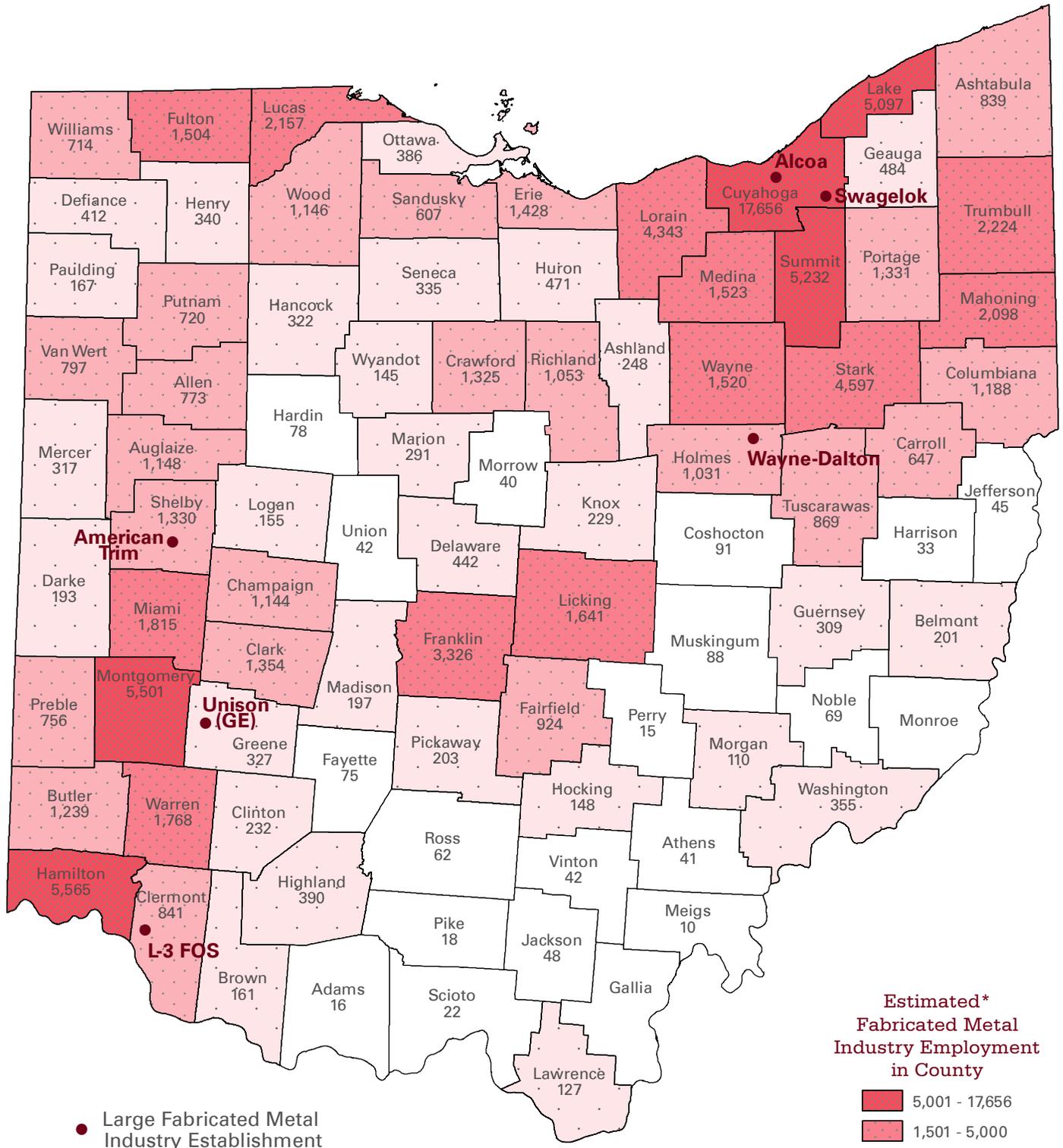
Source: Ohio Development Services Agency, 2016

(depending on the year), or an addition of 20,000 square feet; such projects often are phased-in over several years; they are not comparable with annual capital expenditures.

# Fabricated Metal Industry Employment by County

Statewide 99,243

# Ohio



Sources: Employment from 2012 County Business Patterns, U.S. Census Bureau; establishments from Hoover's Online

Prepared by: Ohio Development Services Agency, Office of Research (March 2016)

\*County employment figures are estimates and do not sum to the statewide total

# Advanced Manufacturing: Machinery Production in Ohio



## Contributions to Gross Domestic Product (GDP)

- The value of machinery (NAICS code 333) produced in Ohio rose 33.2 percent from \$5.71 billion in 2009 to \$7.60 billion in 2013 after adjusting for inflation, according to the latest data from the U.S. BEA.
- 1.4 percent of Ohio's Gross Domestic Product (GDP) came from machinery production during this time.
- 3.4 percent of the value of all goods and services produced in America during 2013 originated in Ohio. By comparison, 5.4 percent of national machinery production came from the state – indicating the concentration of the industry here and ranking it 5<sup>th</sup>.
- Ohio's rank of 5<sup>th</sup> in machinery production is due to the concentration of consumer and supplier industries here, particularly primary and fabricated metals, printing, furniture, food processing, transportation and electrical equipment, and manufacturing chemical, coal, petroleum, rubber and plastic products.

## Variations in Value-Added in Ohio<sup>1</sup>

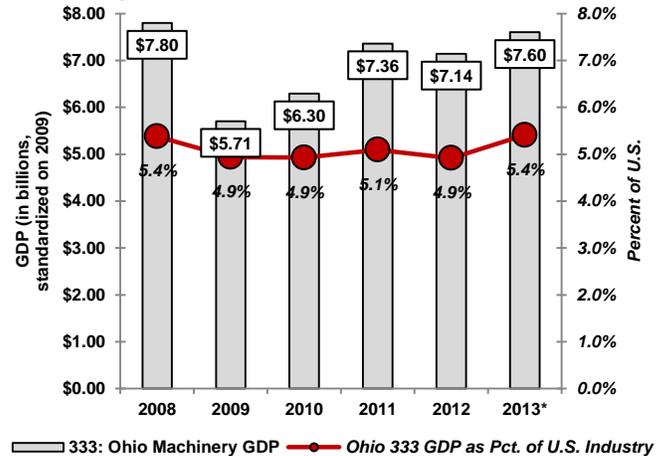
- The machinery industry's overall concentration in Ohio, with 5.9 percent of national value-added, is driven by the high concentration of two groups: metal-working machinery (3335, for cutting and forming, as well as molds, special tools, dies, rolling mills, etc.) with 11.4 percent of U.S. output and ranking Ohio second; and other general purpose machinery (for packaging, welding and soldering, as well as pumps, compressors, dispensers, elevators, escalators, conveyors, overhead cranes and hoists, power-driven hand tools, machinery incorporating fluid power, etc.) with 9.0 percent of U.S. output but ranking Ohio first.
- The machinery industry's concentration in Ohio also is maintained by the concentration of three groups here: industrial (3332), commercial and service (3333) and HVAC/CR (3334) production; percentages of national output from Ohio ranged from 5.6 to 6.6, ranking the groups third or fourth in the U.S.

## The Variety of Production in Ohio

- Metal-working and general purpose machinery production, the most concentrated groups, combined accounted for 58.4 percent of industry output in Ohio during 2013.
- 25.4 percent of production was goods used by businesses in specific industries: agriculture, construction, mining, etc., or various commercial and service enterprises (3331-3).

Notes and abbreviations: \* – Initial; 1 – The BEA starts with Census Bureau value-added data, but subtracts additional costs in deriving the GDP figures, helping to explain the difference between the value-added and GDP figures for 2013; 2 – HVAC/CR – Heating, Ventilation, Air Conditioning/Com-

## Machinery Production: GDP Values from Ohio



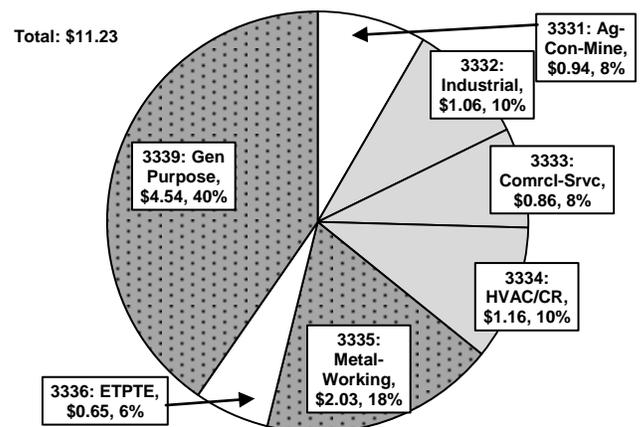
Source: U.S. Bureau of Economic Analysis (BEA), 2015

## Ohio's Share of U.S. Machinery Production, 2013\* (based on value-added<sup>1</sup>)

NAICS Code	Industry/ Group <sup>2</sup>	Percent of U.S.	Rank
333	Machinery	5.9%	6 <sup>th</sup>
3331	Agricultural/Construction/Mining	1.8%	14 <sup>th</sup>
3332	Industrial	6.0%	3 <sup>rd</sup>
3333	Commercial/Service	6.6%	4 <sup>th</sup>
3334	HVAC/CR	5.6%	3 <sup>rd</sup>
3335	Metal-Working	11.4%	2 <sup>nd</sup>
3336	ETPTE	3.1%	10 <sup>th</sup>
3339	Other General Purpose	9.0%	1 <sup>st</sup>

Source: U.S. Census Bureau, 2015

## Machinery Production by Group in Ohio, 2013\* (billions of value-added<sup>1</sup>)



Source: U.S. Census Bureau, 2015

mercial Refrigeration; ETPTE – Engines, Turbines & Power Transmission Equipment. (Transmissions and gasoline engines for motor vehicles, as well as electric power generating and transmitting equipment, are not part of the machinery industry.)

# Advanced Manufacturing: Machinery Employment Distribution, Trends and Projections



## Ohio Employment by Group

- 72,300-plus people were employed in machinery manufacturing (NAICS 333) in Ohio during 2013, according to the latest County Business Patterns data from the U.S. Census Bureau.
- 42,200-plus, or 58.4 percent, worked in the two most concentrated groups: metal-working and general purpose machinery (3335 and 3339). Employment in the other five groups ranged between 4,100 and 7,800, or 5.8 to 10.8 percent of the industry total here.
- 17,900-plus – 24.8 percent – worked in the three groups focused on specific industry products (3331-3).

## Employment Trends in Ohio

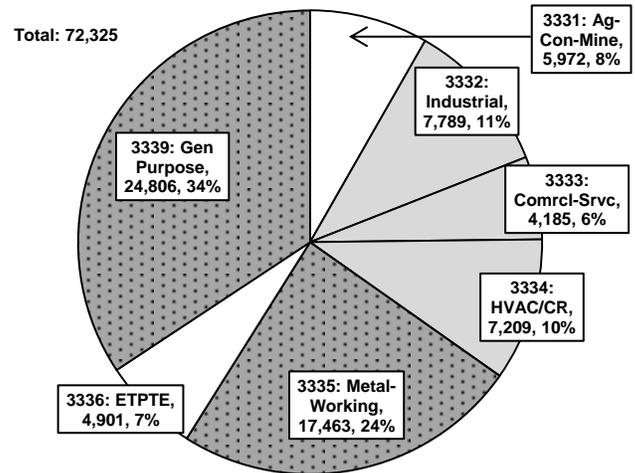
- Machinery industry employment rose 19.1 percent from a recession low of 60,700 to 72,300 in 2013. 5,300 of the 11,600 added jobs were in the general purpose group, an increase of 27.2 percent. Over 1,000 jobs each have been added in the ag-construction-mining, commercial/service, and metal-working groups.
- More jobs were added in the more-general cluster of industry groups than in the industry-focused cluster (3334-3339 vs. 3331-3333), but the growth rate of the latter was slightly greater than the former – 22.0 vs. 18.2 percent from 2010 to 2013.
- The percentage of U.S. machinery industry jobs in Ohio fluctuated between 6.5 and 6.8 percent, indicating that changes in Ohio were mostly part of national changes.
- The most recent machinery industry employment data from the U.S. Bureau of Labor Statistics (BLS) show a 2.8 percent increase from 2013 to 2014.

## Projections for Employment in Ohio

- Despite the recent employment gains, the Ohio Dept. of Job and Family Services' Labor Market Information division (ODJFS-LMI) projects industry employment declining 11.0 percent from 74,020 to 65,850 over the 2012-2022 decade.<sup>2</sup> The only exception to the broadly-based decline is the projected 7.6 percent growth in the general purpose group from 23,180 to 24,950.<sup>3</sup>

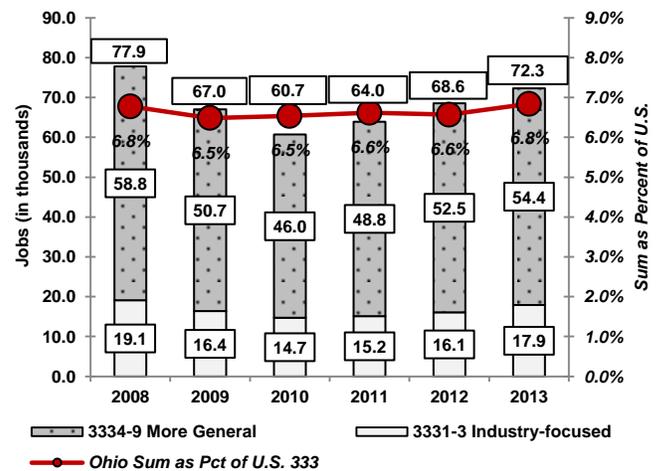
Notes and abbreviations: 1 – HVAC/CR – Heating, Ventilation, Air-Conditioning/Commercial Refrigeration; ETPTE – Engines, Turbines & Power Transmission Equipment. (Transmissions and gasoline engines for motor vehicles, as well as electrical power generating and transmitting equipment, are not part of the machinery industry.) 2 – Census Bureau and LMI jobs figures for 2012 differ because the two use different data collection methods and may differ in classifying a few establishments. 3) ODJFS-LMI does not make projections for industry groups with less than 5,000 workers; hence combined figures for 3333, 6 are obtained by subtraction.

Employment by Group<sup>1</sup> in Ohio, 2013  
(Darker slices are more concentrated)



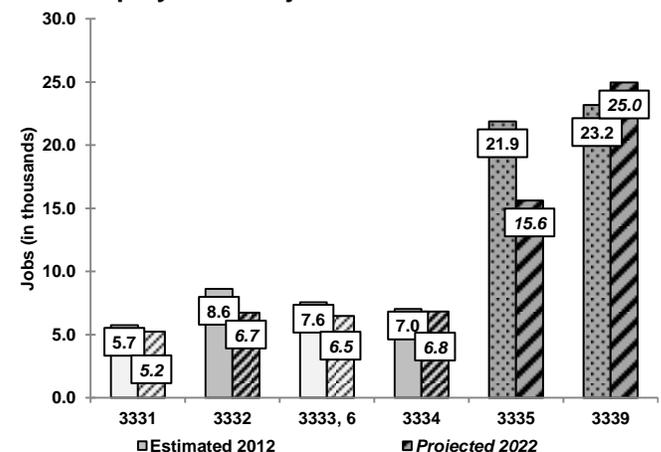
Source: U.S. Census Bureau, 2015

## Employment Trends in Ohio



Source: U.S. Census Bureau

## Ohio Employment Projected to 2022



Source: ODJFS-LMI, 2014

# Advanced Manufacturing: Machinery Companies and Investments



## Companies in Ohio

- 10 companies from Fortune's U.S.-1,000 and Global-500 lists employ at least 500 people in Ohio's machinery industry (NAICS 333): Berkshire-Hathaway, Daimler's Detroit Diesel, Emerson Electric, General Motors-Isuzu<sup>1</sup>, Illinois Tool Works' Hobart Brothers, Kennametal, Lincoln Electric and Parker-Hannifin (including a joint venture with General Electric). Lincoln Electric and Parker-Hannifin have their world headquarters here. 21 more Fortune companies employ 25 to 499. Non-Fortune companies employing at least 500 people include Atlas Industries, Crown Equipment, Dayton Progress, Gorman-Rupp, Henny Penny, Intelligrated, Milacron, MTD and Nordson.

## Capital Expenditures in Ohio

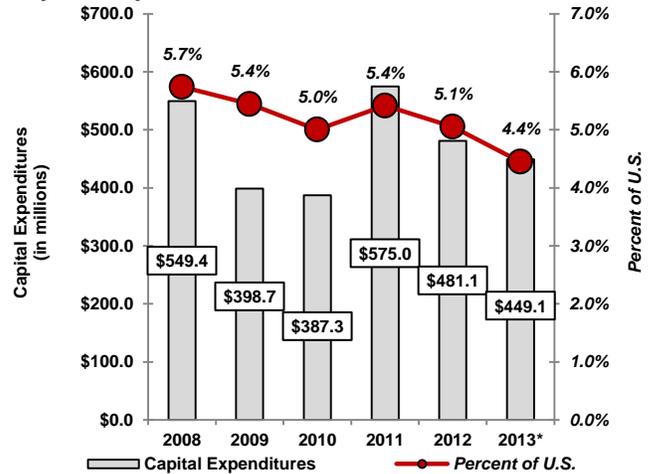
- Between \$387 and \$575 million was spent each year by the machinery industry from 2008 through 2013 for land, buildings and/or equipment in Ohio. These expenditures ranged from 4.4 to 5.7 percent of the national totals for the years.
- 27.4 percent of capital expenditures during this time went for the production of general purpose machinery (3339), followed by 24.3 percent for metal-working machinery production (3335).
- Ohio's portion of national capital expenditures in the industry averaged 5.2 percent for the 2008-2013 period. The corresponding portion of value-added in Ohio averaged 5.6 percent, consistent with the industry maintaining production here.

## Major Projects in Ohio

- 101 companies announced 121 major investments<sup>2</sup> for machinery production in Ohio from 2012 through 2015. The companies intended to invest a total of \$579.1 million and create more than 3,500 new jobs. 32.4 percent of the dollars and 36.9 percent of the jobs related to general machinery production (3339).
- General Motors and Isuzu announced the largest investment in the time period: \$60.0 million for their DMAX plant. They were followed by Lincoln Electric at \$54.5 million, Emerson Electric at \$36.0 million and Nidec Minster at \$33.6 million. Ten more companies planned investing at least \$10 to \$25 million each.
- Milacron planned to hire 274 people during this time, followed by Lincoln Electric at 240 and Intelligrated at 238. Five more companies each planned to add 100 to 199 jobs.

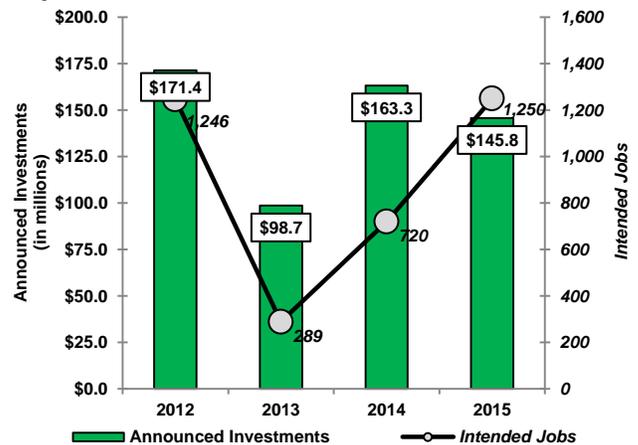
Notes: \* – Initial; 1 – Isuzu is not on Fortune's lists, but the two are joint venture partners in DMAX, a diesel engine plant (all diesel engines are classified as machinery regard-

## Capital Expenditures in Ohio



Source: U.S. Census Bureau

## Project Announcements in Ohio



Source: Ohio Development Services Agency

## Top Announcements in 2015

Company	Dollars (in millions)	Jobs Intended
Nidec Minster	\$33.6	n.a.
Lincoln Electric	\$30.0	40
Automation Tool & Die	\$15.0	20
Intelligrated	\$12.0	238
Milacron	n.a.	274
BriskHeat	\$0.8	103
Ariel	\$6.6	100

n.a. – not available.

Source: Ohio Development Services Agency, 2016

less of their end use); 2 - a major investment meets one of the following minimum criteria: \$1 million, 20 or 50 new jobs (depending on the year), or an addition of 20,000 square feet; such projects often are phased-in over several years, and are not comparable with annual capital expenditures.



# Advanced Manufacturing: Electrical Equipment, etc. in Ohio



## Contributions to Gross Domestic Product (GDP)

- The overall volume of electrical equipment, appliances and components (NAICS 335) manufactured in Ohio has fallen 31 percent since 2008 according to the latest U.S. Bureau of Economic Analysis (U.S. BEA) data,<sup>1</sup> and the percentage of U.S. output from Ohio has fallen to 6.9. Still, the industry is concentrated here and Ohio ranks 1<sup>st</sup> in output.
- The lower output appears is mostly found in two groups: electric lighting (3351) electrical equipment (3353). The former may reflect the shift away from traditional bulbs and the latter improved quality and/or efficiencies.

## Variations in Receipts in Ohio

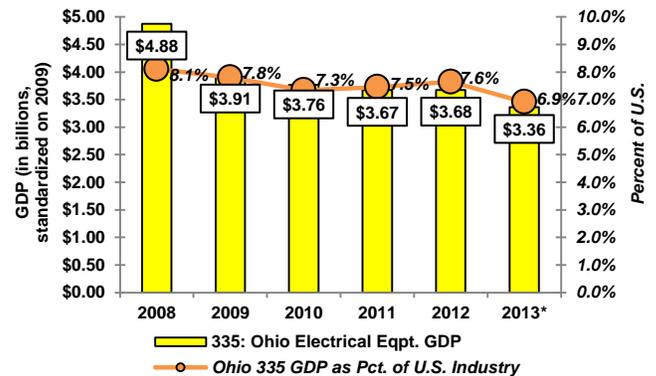
- Output from all four industry groups is concentrated in Ohio, as judged by the portion of receipts collected by establishments here.<sup>2</sup> The most concentrated is household appliances (3352): 25.7 percent of the group's national total originated here, ranking Ohio 1<sup>st</sup> in the U.S.
- Production of electric lighting equipment also is concentrated here; Ohio ranked 5<sup>th</sup> with 6.5 percent of the U.S. output. Electrical equipment output and other equipment and component manufacturing (3353 and 3359) are slightly concentrated here with 4.1 and 3.7 percent of the corresponding national totals.

## The Variety of Production in Ohio

- 54.8 percent of industry production in Ohio comes from the household appliance group, which includes items such as coffee makers, curling irons, dishwashers, electric irons, fans, garbage disposals, hair dryers, laundry equipment, refrigerators, stoves, toasters, vacuum cleaners, water heaters, etc.
- 15.6 percent of industry production in Ohio was electrical equipment – mostly for industrial use. Examples include circuit breakers, controllers and control panels, electric motors and power generators, fuses, relays, specialty transformers and distributors (except AC/DC conversion), switchboard apparatus, etc.
- 8.4 percent of industry production in Ohio was electric lighting equipment such as light bulbs and lighting fixtures either for home or commercial/industrial use.
- Other equipment and components (3359) comprised 21.3 percent of industry production in Ohio. Examples include batteries, bus bars, fiber optic cables and other communication and insulated energy wires, outlets, switches, transmission poles, wiring boxes, etc.

Notes: \* – Initial; 1 – Current dollar figures fell 49.9 percent, indicating industry *deflation*; 2 – Receipts are used because value-added data were suppressed to maintain confidentiality; receipts are much greater than GDP figures because no costs have been subtracted from the former.

## Electrical Eqpt., etc.: GDP Values from Ohio



Source: U.S. BEA, 2015

## The Changing Distribution of Receipts<sup>2</sup> in Ohio

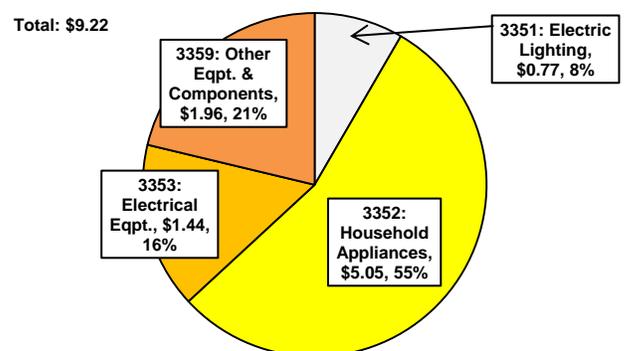


## Ohio's Share U.S. Industry Receipts, 2013\*

NAICS Code	Industry/ Group	Percent of U.S.	Rank
335	Electrical Eqpt., etc.	7.5%	2 <sup>nd</sup>
3351	Electric Lighting Eqpt.	6.5%	5 <sup>th</sup>
3352	Household Appliances	25.7%	1 <sup>st</sup>
3353	Electrical Eqpt.	4.1%	11 <sup>th</sup>
3359	Other Eqpt. & Components	3.7%	10 <sup>th</sup>

Source: U.S. Census Bureau, 2015

## Electrical Eqpt., etc., Output by Group in Ohio, 2013\* (receipts, in billions<sup>2</sup>)



Source: U.S. Census Bureau, 2015

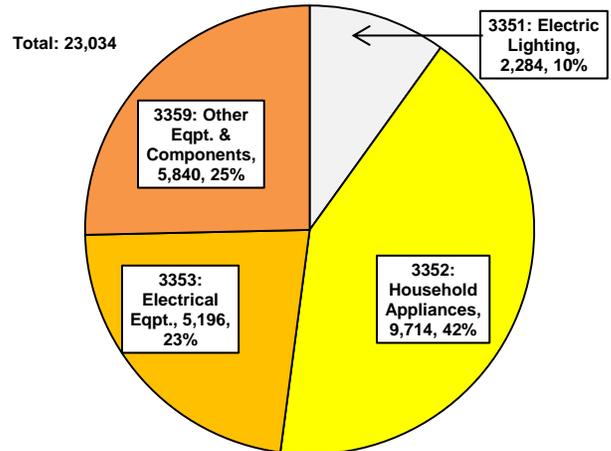
# Advanced Manufacturing: Electrical Equipment Employment Trends and Projections by Group



## Ohio Employment by Group

- 23,000 people were employed in manufacturing electrical equipment, appliances and components (NAICS 335) in Ohio according to the latest data from the U.S. Census Bureau's County Business Patterns.
- 9,700, or 42.2 percent, worked in the household appliances group (3352), followed by 5,800-plus – 25.4 percent – in other equipment and components (3359), 5,200 – 22.6 percent – in electrical equipment (3353), and close to 2,300 – 9.9 percent – in electric lighting equipment (3351).

Employment by Group in Ohio, 2013

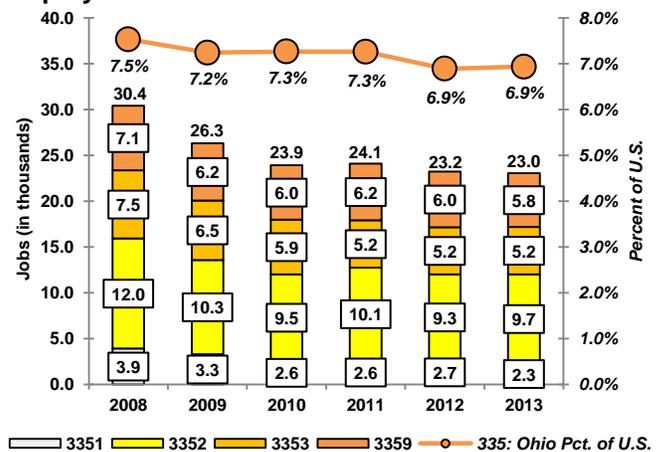


## Employment Trends in Ohio

- Overall electrical equipment industry (335) employment has continued falling since 2010, although at a much slower rate, even as production increased with during the recovery.
- The only exception to this trend is the household appliances group (3352) in which employment has risen above the recession low in 2010; however, it was not enough to offset net declines in the other three groups.
- The overall percentage of U.S. electrical equipment jobs in Ohio changed little despite the substantial changes in absolute numbers during recent years, indicating that what happened here was largely a part of what happened across the nation.
- More current data from the U.S. Bureau of Labor Statistics indicate a 1.3 percent increase in overall industry employment from 2013 to 2014.

Source: U.S. Census Bureau, 2015

## Employment Trends in Ohio

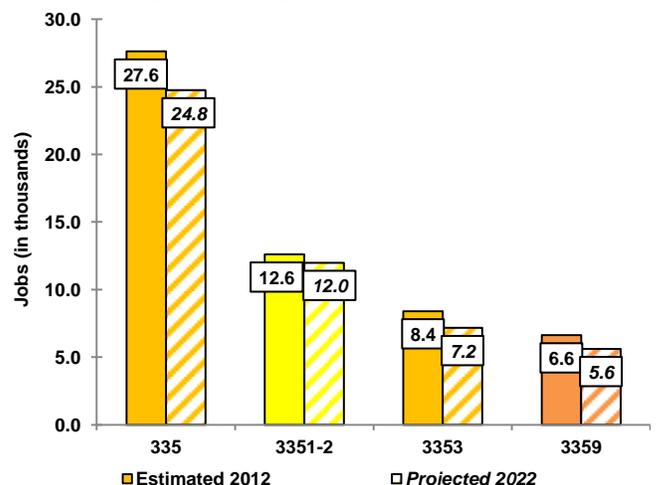


Source: U.S. Census Bureau

## Projections for Employment in Ohio

- The Ohio Dept. of Job and Family Services' Labor Market Information division (ODJFS-LMI) forecasts total industry employment declining 10.4 percent from 27,600 in 2012 to less than 24,800 in 2022; 78.3 percent of the job losses are expected in the electrical equipment group (3353) and other equipment and components (3359) groups combined – both at about 15 percent.<sup>1</sup>
- ODJFS-LMI predicts a more moderate loss in the combination of electric lighting and home appliances (3351 and 3352) – about 600 jobs, or 4.9 percent.<sup>2</sup>

## Ohio Employment Projected to 2022



Source: ODJFS-LMI, 2014

Notes: 1 – Census Bureau and LMI jobs figures for 2012 differ because the two use different methods of data collection and may differ in classifying a few establishments; 2 – Calculated by subtraction because LMI does not make projections for groups with less than 5,000 jobs (3351) and also wishes to maintain confidentiality for employers in 3352.

# Advanced Manufacturing: Electrical Equipment Companies and Investments



## Companies in Ohio

- Eight companies on Fortune's U.S.-1,000 or Global-500 lists are thought to employ at least 500 people in Ohio producing electrical equipment and appliances (NAICS 335). Whirlpool is the largest with 8,100; others include Acuity Brands' Holophane, Berkshire-Hathaway's Scott-Fetzer, Emerson Electric, General Electric, Rockwell Automation, Schneider Electric and Siemens. Ten more Fortune companies each employ 25-499 (among them Parker-Hannifin, which has its world headquarters here).
- Non-Fortune companies employing at least 500 here are thought to include Crown Equipment and LD Kichler.

## Capital Expenditures in Ohio

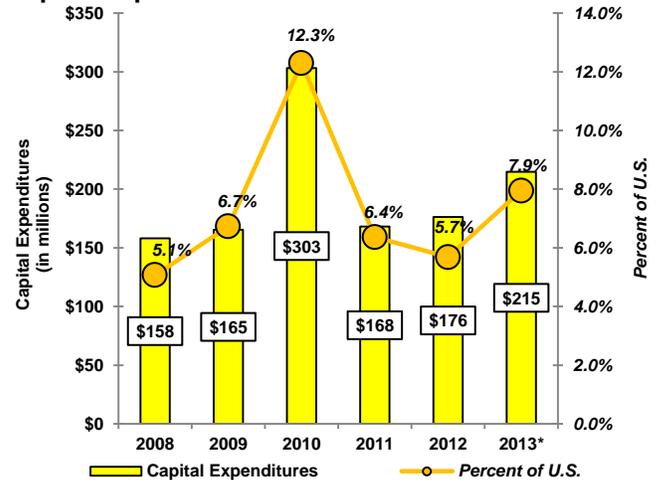
- Between \$158 and \$303 million was spent each year by the industry during 2008 to 2013 for land, buildings and/or equipment in Ohio. These expenditures ranged from 5.1 to 12.3 percent of the national totals.
- Probably the majority of capital expenditures during this time went for the production of household appliances (3352) with rest nearly evenly divided by the remaining three groups: electric lighting (3351), electrical equipment (3353) and other equipment and components (3359).<sup>1</sup>
- 7.2 percent of the U.S. industry's capital expenditures were made in Ohio during the 2008-2013 period. The corresponding portion of value-added in Ohio averaged about 7.4 percent, consistent with the industry maintaining production here.<sup>1</sup>

## Major Projects in Ohio

- 25 companies announced 32 major investments<sup>2</sup> for electrical equipment and appliance production in Ohio from 2012 through 2015. The companies planned to invest a total of \$218.7 million and create nearly 2,100 new jobs. 69.3 percent of the dollars and 82.0 percent of the jobs were intended for the household appliances group.
- Whirlpool led all companies, planning to spend \$134.1 million – 59.1 percent of the total – and add 900 jobs – 41.2 percent of the total. It was followed by VitaMix, which planned spending \$11.3 million and adding 600 jobs – 5.2 and 28.7 percent of the corresponding totals.
- AO Smith and GrafTech International also announced investments of at least \$10 million, and Royal Appliance intended to hire 212 people.

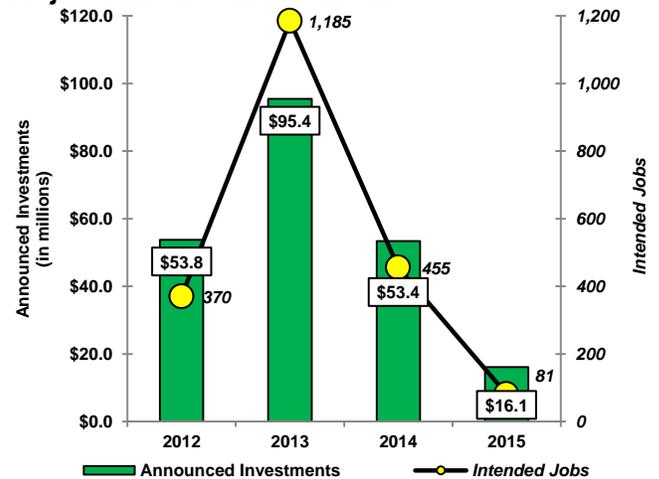
Notes: \* – Preliminary figures; 1 – Whirlpool plays such a large role in household appliances production and capital expenditures here and nationally that figures often are suppressed to maintain confidentiality; 2 - A major invest-

## Capital Expenditures in Ohio



Source: U.S. Census Bureau

## Project Announcements in Ohio



Source: Ohio Development Services Agency

## Top Announcements in 2015 (in dollars or jobs)

Company	Dollars (millions)	Jobs Intended
Whirlpool	\$8.0	n.a.
PACS Switchgear	\$3.4	30
Spectra-Tech	\$2.0	n.a.
Sherbrook Metals	\$1.5	n.a.
Quality Switch	\$1.0	n.a.
Cable Mfg. & Assembly	\$0.2	51

n.a. – not available.

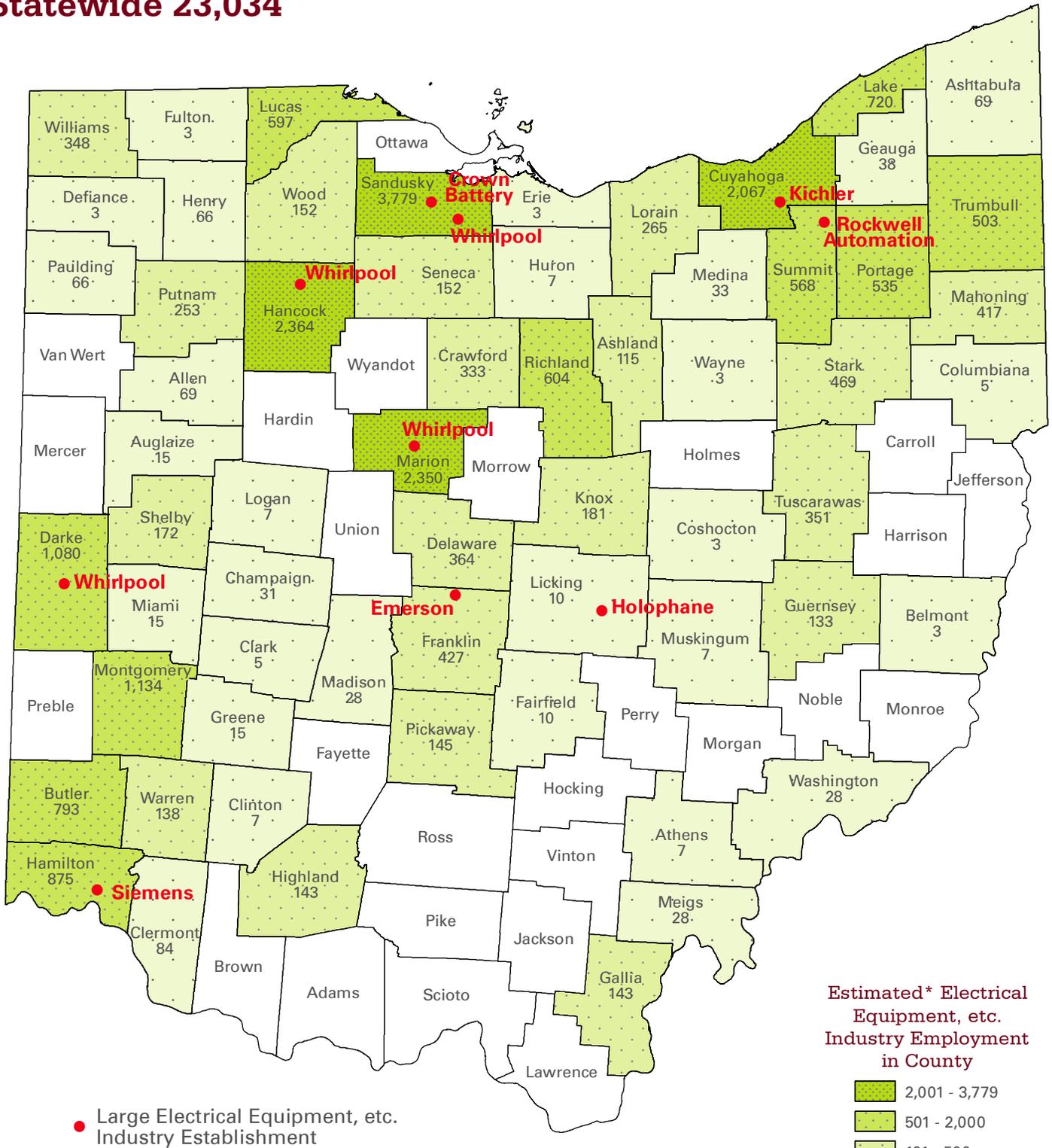
Source: Ohio Development Services Agency, 2016

ment meets one of the following minimum criteria: at least \$1 million, 20 or 50 new jobs (depending on the year), or an addition of 20,000 square feet. Such projects often are phased-in over several years, and are not comparable with annual capital expenditures.

# Electrical Equipment, etc. Industry Employment by County

Statewide 23,034

# Ohio



Sources: Employment from 2013 County Business Patterns, U.S. Census Bureau; establishments from Hoover's Online

Prepared by: Ohio Development Services Agency, Office of Research (April 2016)

\*County employment figures are estimates and do not sum to the statewide total

# Advanced Manufacturing: Paper Products in Ohio



## The Variety of Production in Ohio

- \$3.08 billion of value was added by the paper manufacturing industry (NAICS 322) in Ohio during 2012. \$2.40 billion, or 78 percent, came from converted paper product manufacturing (3222). The other \$68 million, or 22 percent, was produced by pulp, paper and paperboard mills (3221).
- The two largest constituent industries accounted for 60 percent of Ohio's paper manufacturing. Paperboard container manufacturing (32221) made up \$1.22 billion, or 40 percent, of the total value added, while paper bag and coated and treated paper manufacturing (32222) added the other 20 percent with \$628.7 million.

## Variations within the Industry in Ohio

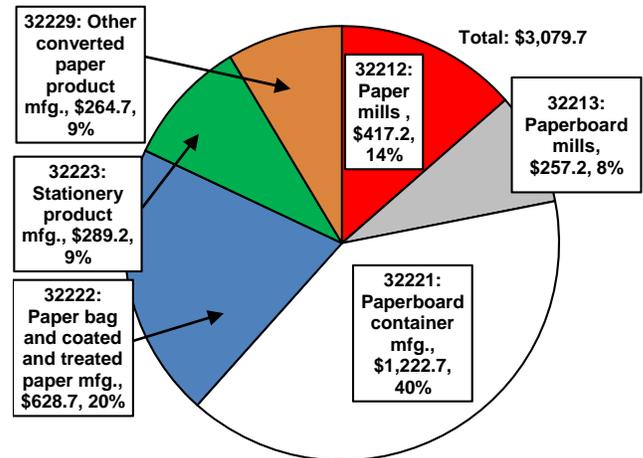
- Ohio's overall second rank with 6.8 percent of U.S. industry establishments is driven more by converted paper manufacturing (3222) than pulp, paper, and paperboard mills (3221): second ranked in the nation with 7.2 percent vs. seventh with 4.2 percent, respectively.
- Ohio's high percentage of converted paper product manufacturing establishments is driven by its higher concentrations in manufacturing paperboard containers, paper bag and coated and treated paper and stationery products establishments at 7.2, 8.1 and 7.7 percent.
- The pulp, paper and paperboard mill (3221) establishment concentration in Ohio of 4.2 percent is another factor contributing to the state's high percentage of the nation's total paper industry. 6.2 percent of American paperboard mills are in Ohio.

## Paper Industry GDP from Ohio

- \$2.10 billion of net value in paper manufacturing (322)\* came from Ohio factories according to the latest available data; this was .43 percent of Ohio's Gross Domestic Product (GDP) total, average for recent years.
- The \$2.10 billion also was 3.79 percent of the industry's national output. By comparison, total GDP from Ohio was 3.42 percent.
- Adjusting for inflation shows that though output climbed in 2014 after 2013, it still remained below pre-recession levels.

Note: \* – Total value-added for NAICS 322 in 2012 is greater than the 2012 GDP because GDP, which starts with value-added, subtracts additional costs.

## Paper Industry Production in Ohio FY 2012 (in millions of dollars, except percentages)



Source: U.S. Census Bureau, 2016

Note: 32211: Pulp mills value added data is not listed by the Census Bureau

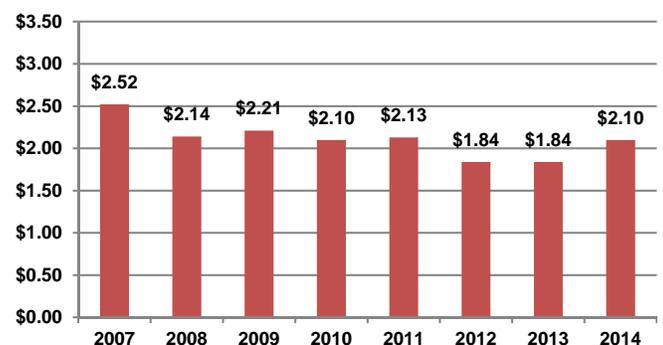
## Ohio's Share of U.S. Paper Industry Establishments in 2014

NAICS	Industry Titles	Percent of U.S.	Rank of U.S.
	Paper Industry Total	6.8%	2 <sup>nd</sup>
3221	Pulp, paper, and paperboard mills	4.2%	7 <sup>th</sup>
32211	Pulp mills	4.4%	9 <sup>th</sup>
32212	Paper mills	2.6%	15 <sup>th</sup>
32213	Paperboard mills	6.2%	4 <sup>th</sup>
3222	Converted paper product mfg.	7.2%	2 <sup>nd</sup>
32221	Paperboard container mfg.	7.2%	2 <sup>nd</sup>
32222	Paper bag and coated paper mfg.	8.1%	1 <sup>st</sup>
32223	Stationery product mfg.	7.7%	2 <sup>nd</sup>
32229	Other converted paper product mfg.	5.4%	4 <sup>th</sup>

mfg. – manufacturing

Source: U.S. Census Bureau, 2016

## Paper Products' GDP from Ohio (in billions of current dollars)



Source: U.S. Bureau of Economic Analysis, 2016

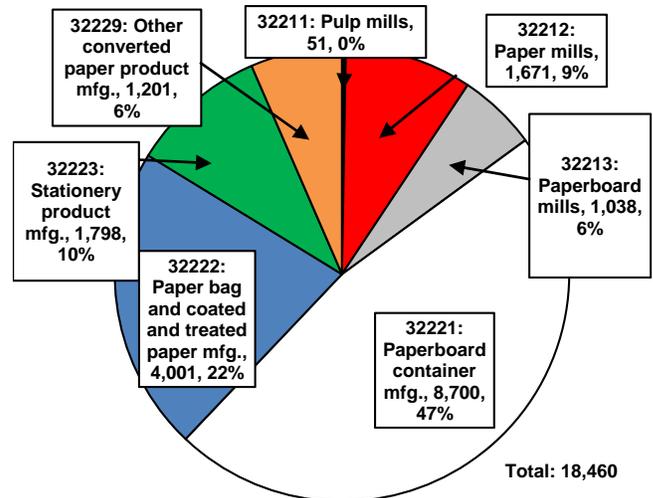
# Advanced Manufacturing: Paper Products Employment Distribution, Trends and Projections



## Distribution and Concentration in Ohio

- 18,460 people were employed by 292 paper industry establishments in Ohio during 2014. 15,700, or 85.0 percent, were employed in the converted paper product manufacturing group (NAICS 3222), with 8,700 – 47 percent – in paperboard container manufacturing (NAICS 32221) alone. 34,160, or 15.0 percent were employed in pulp, paper and paperboard mills (NAICS 3221), with 1,671, or 9.0 percent, working in paper mills (NAICS 32212).
- The national employment of some industries is more concentrated in Ohio than other regardless of size, notably: paperboard manufacturing – 6.2 percent of the U.S. total; paper bag and coated and treated paper manufacturing – 8.0 percent; and stationery product manufacturing – 9.0 percent.

## Ohio's Employment by Group

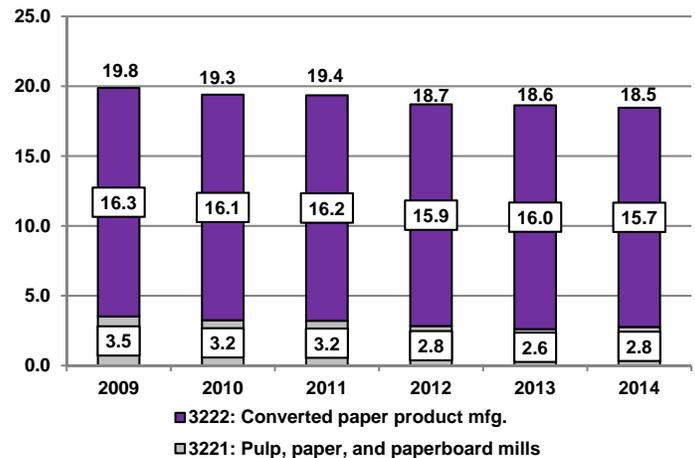


Source: U.S. Census Bureau, 2014

## Changing Employment Levels in Ohio

- Employment in paper industry production has contracted steadily since the end of the recession, and remains less than the pre-recession levels.
- The decline in total employment is due to changes in both the converted paper product manufacturing and pulp, paper and paperboard mill groups since 2009. The number of workers in both industries fluctuated over the time period, but each year they counteracted each other such that total employment in the overall paper industry declined from the previous mark.
- Corresponding employment changes seen at the national level showed similar patterns. Consequently, Ohio's share of paper industry employment fluctuated between 5.21 and 5.33 percent.

## Employment Trends (in thousands)

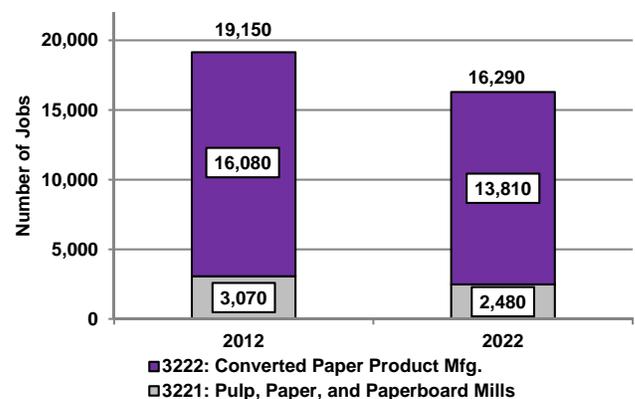


Source: U.S. Census Bureau

## Projections for Ohio Employment

- Despite the recovery of jobs from the depths of the recession, the Ohio Dept. of Job and Family Services' Labor Market Information division (ODJFS-LMI) projects paper industry employment (332) will fall 14.9 percent from 19,150 to 16,290.
- Reductions are expected to be proportionally steeper in the pulp, paper and paperboard mill group than in the converted paper product manufacturing group: 590 and 19.2 percent in the former compared with 2,270 and 14.1 percent in the latter.

## Employment Projections to 2020 (in thousands)



Source: ODJFS/LMI

Note: \* – ODJFS-LMI and the Census Bureau may classify some establishments differently; consequently, 2012 totals differ.

# Advanced Manufacturing: Paper Products Companies and Investments



## Capital Expenditures in Ohio

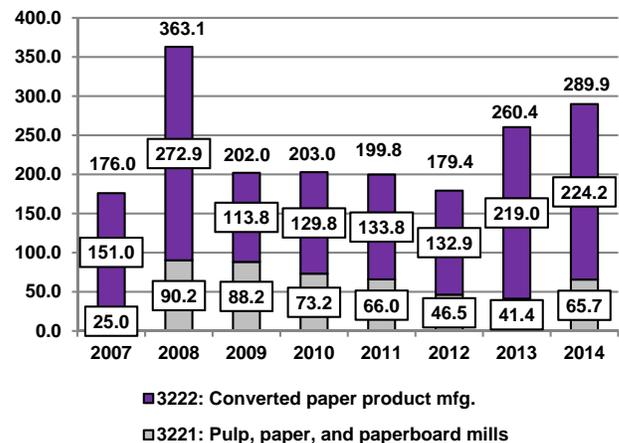
- Annual investment in Ohio's paper manufacturing industry (NAICS 322) ranged from \$176.0 to \$363.1 million. Totals during the eight years ranged from 3.0 to 5.8 percent of the corresponding national totals.
- Ohio's portion of national industry capital expenditures averaged 3.8 percent during 2007-2014. On average, 73.0 percent of the capital expenditures in Ohio were for converted paper product manufacturing (NAICS 3222) compared with 41.9 percent for the U.S.
- The Census Bureau also reported \$65.7 million spent in Ohio during 2014 by pulp, paper and paperboard mills – 1.1 percent of the U.S. total (NAICS 3221).

## Major Projects Announced

- 22 companies announced 23 major paper industry projects\* in Ohio during the last three years. The companies intended to invest a total of \$463.7 million and anticipated 1,181 new jobs upon completion.
- 22 of the 23 projects were planned for the converted paper product manufacturing group, totaling \$461.0 million and 1,081 new jobs. Mohawk Fine Paper Inc. announced the lone project planned for the pulp, paper and paperboard mill group in 2014.
- Sofidel America Corp., International Paper Co. and Pratt, LLC planned the largest investments – each at least \$44 million. Other companies planning to spend \$10 to \$43 million included Aloterra Packaging LLC, Appvion, Inc., CCL Label, Inc. and A.J.M. Packaging Corp.
- Sofidel's planned investment for 2015 was by far the largest in the industry over the past three years. The corporation announced that it was planning to spend \$260 million and anticipated the project would bring 310 new jobs to Ohio. Sofidel plans to build a new plant in Circleville, Ohio.
- A.J.M. Packaging Corp., Mohawk Fine Paper Inc., and Pratt, LLC joined Sofidel and International Paper as each anticipated hiring at least 100 people when announcing their projects.

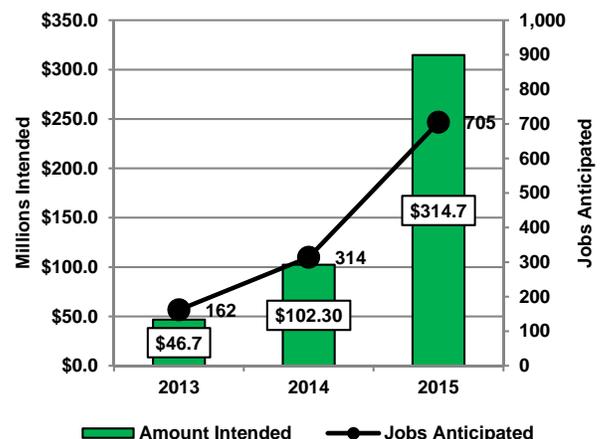
Notes: \* – A major investment involves at least \$1 million, 50 new jobs, or an addition of 20,000 square feet. Projects often are phased-in over several years; they are not comparable with annual capital expenditures.

## Capital Expenditures in Ohio (in millions)



Source: U.S. Census Bureau

## Project Announcements



Source: Ohio Development Services Agency

## The Top Seven Projects Announced in 2015

Company	Dollars (millions)	Anticipated New Jobs
Sofidel America Corp.	\$260.0	310
CCL Label, Inc.	\$25.0	80
A.J.M Packaging Corp.	\$16.6	150
Inno-Pak, LLC	\$4.8	30
Health Care Products, Inc.	\$3.6	16
Martin Partitions	\$1.7	n.a.
Sonoco Products Co.	\$1.1	n.a.
<b>Combined</b>	<b>\$314.7</b>	<b>705</b>

n.a.—not available.

Source: Ohio Development Services Agency

