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Housing Impact of Shale Development in Eastern Ohio Update: October 2016

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Prepared for:
Ohio Housing Finance Agency

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Center for Economic Development

Center for Community Planning and Development

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Acknowledgments

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Dr. Lendel has conducted extensive research on energy policy and shale development. She is affiliated with the Center for Energy Policy and Applications at Cleveland State University. Dr. Lendel was a principal co-investigator on a project assessing the economic impact of the Utica Shale development on the State of Ohio in 2012. She was also a principal investigator of the recent studies on the opportunities on downstream, midstream, and upstream industries resulting from further development of Ohio Utica shale oil and gas resources in Ohio (2015) and the tri-state region, Ohio, Pennsylvania and West Virginia (2016). She is an assistant editor of Economic Development Quarterly and a Member of Editorial Board of International Shale Gas and Oil Journal.
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Sydney Martis is a second-year graduate student working towards a Master's of Urban Planning and Development and a Certificate of Economic Development. She previously graduated from The University of Akron with a Bachelor of Arts in Economics in May 2015 and served for a year as an Economic Development Specialist at The City of Akron. Sydney currently holds a position of a Graduate Research Assistant at the Maxine Goodman Levin College of Urban Affairs' Center for Economic Development where she has worked on a variety of projects that have sharpened her technical, analytical, and writing skills. Sydney is passionate about inclusive entrepreneurship, the expansion of equitable economic opportunities, and new business attraction.

About the Center for Economic Development

The Center for Economic Development at Cleveland State University's Maxine Goodman Levin College of Urban Affairs provides research and technical assistance to government agencies, non-profit organizations, and private industry. The Center has expertise in studying ecology of innovation, entrepreneurship, performance of economic clusters, industry analysis, economic analysis of cities and regions, economic impact, economic development strategy and policy, workforce development and evaluation of economic development initiatives. The Center has served as a designated Economic Development Administration (EDA) University Center since 1985. The Center's professional staff includes four full-time researchers, a system analyst, associated faculty, and several graduate research assistants.

The Center works with funders, partners, and clients at the national, state, regional, and local levels. All Center's research are summarized in publications, including working reports, journal articles, and book chapters. For more information on the Center for Economic Development, use the following link:
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- Data development and dissemination to promote the exchange of information and data and technical assistance about community planning, development, and housing issues.
- Convening and engaged learning to link the university and the community in the dynamic exchange of ideas, expertise and knowledge on issues of importance to the future of Northeast Ohio communities. Provide opportunities for students and faculty to extend classroom learning to real-world applications.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This quarterly update of the Housing Impact of Shale Drilling Study and Dashboard (Appendix 1) includes lead indicators measuring oil and gas shale development activities in the third quarter and lagged indicators measuring the housing market in second quarter of 2016. As with the first report and dashboard, the companion documents were prepared by a team of researchers from Cleveland State University's Levin College of Urban Affairs (CSU) for the Ohio Housing Finance Agency (OHFA) to monitor the impact of the Utica shale development industry on housing affordability and availability in eight counties of eastern Ohio where the core upstream and midstream activities of shale development are concentrated. The eight counties include Belmont, Carroll, Columbiana, Guernsey, Harrison, Jefferson, Monroe, and Noble.

Updates of the upstream and midstream activities are provided for all indicators developed in the initial dashboard and report: well count, potential employment, and oil price. In addition, an indicator reflecting sales tax receipts in eight counties was added to the dashboard providing a more complete picture of the impact of shale-related activity on housing. This indicator is a measure of mainly retail activities and indirectly points to an influx of non-local labor into the shale development counties. Further, the methodology used to project potentially generated labor has been revised to reflect total potential jobs generated by shale development activities during the quarter rather than newly created jobs.

The housing market update for the second quarter of 2016 uses the five indicators developed in the initial dashboard and report: number of home sales, median sale price, days on market, rent per square foot, and rental vacancy rate. The indicators of multi-family affordability and availability derived from CoStar data include an update of the first quarter 2016 data as well. Rent per square foot and vacancy rate have been revised, as has the total sample size in terms of number of buildings and units. Costar is a "live database;" as such, data is continuously updated, even retroactively, so that historical numbers will be as accurate as possible.

A PROFILE OF THE REGION

Study Area

The study area is comprised of eight counties: Belmont, Carroll, Columbiana, Guernsey, Harrison, Jefferson, Monroe, and Noble. These eight eastern Ohio counties along the Ohio River have been the site of much of the shale-related activity in Ohio since 2013.

Housing and Demographics

The eight eastern Ohio counties are home to 358,107 people and 142,158 households or about 3% of Ohio's population and households. More than two-thirds of the people and households in the region live in three counties: Columbiana, Belmont, and Jefferson.

Table 1 provides the most recent housing and population data for the region and the state. This data is from the American Community Survey's (ACS) 5-year average estimates, 2010-2014. The main findings from the table follow:

- The percentage of renters in the region (26%) is lower than the state average (33%). Within the region, Noble County has the smallest percentage of renters (18%); Jefferson County has the highest (29%).
- The regional housing stock is older than Ohio's; 36% of the study area's housing was built before 1950, compared to 27% for the state. Further, only 8% of the region's housing stock has been constructed since 2000 compared with 10% for the state.
- One indicator of housing availability is an area's vacancy rate. The region's overall vacancy rate (14.5%) is higher than the overall vacancy rate for Ohio (11%). This higher vacancy rate indicates that there is some slack in the market regionally.
- Another indicator of availability is the number of households per housing units. There are slightly fewer households per housing unit in the region (0.85) than in the state overall (0.89), which provides further evidence that there may be slack in the region's housing market.

Table 1. Housing and Population-8 Eastern Ohio Counties

County	Population	House-holds	Housing Units	House-holds per Unit	Percent Vacant Units	Percent Renters	Percent Built Before 1950	Percent Built Since 2000
Belmont	69,793	28,007	32,295	0.87	13.2%	25%	40%	7.8%
Carroll	28,539	10,922	13,636	0.80	19.9%	21.5%	26.5%	11.6%
Columbiana	106,622	42,184	46,860	0.90	9.9%	28.4%	35.7%	8.5%
Guernsey	39,794	15,564	19,127	0.81	18.6%	25.9%	34.4%	10.7%
Harrison	15,698	6,333	8,130	0.78	22.1%	22.2%	40.4%	8.8%
Jefferson	68,510	28,176	32,661	0.86	13.7%	28.8%	35.2%	4.2%
Monroe	14,590	6,056	7,525	0.80	19.5%	22.6%	35.6%	9.3%
Noble	14,561	4,916	6,037	0.81	18.6%	18%	32.4%	14.1%
8-County	**358,107**	**142,158**	**166,271**	**0.85**	**14.5%**	**26.1%**	**35.6%**	**8.3%**
Ohio	11,560,380	4,570,015	5,135,173	0.89	11%	33.1%	27.5%	10%

Source: U.S. Census Bureau, American Community[1] (2010-2014)

Table 2 provides overall vacancy rate trends for housing units in the region. The table illustrates that annual vacancy rates increased slightly, but steadily by 0.5% per year from 2012 to 2014 (13.5 to 14.5%).

[1] Population: Table S0101; Households: Table B11016; Housing Units, Percent vacant units: Table B25002; Percent Renters: Table B25106; Percent Built Before 1950 and as of 2010: Table B25034.

Table 2. Housing Units and Overall Vacancy Rates

County	Number of Housing Units		Occupied Units		Vacant Units		Vacancy Rate	
	2012	2014	2012	2014	2012	2014	2012	2014
Belmont	32,408	32,295	28,716	28,007	3,692	4,288	11.39	13.28
Carroll	13,664	13,636	11,424	10,922	2,240	2,714	16.39	19.90
Columbiana	47,025	46,860	42,476	42,184	4,549	4,676	9.67	9.98
Guernsey	19,185	19,127	15,808	15,564	3,377	3,563	17.60	18.63
Harrison	8,154	8,130	6,324	6,333	1,830	1,797	22.44	22.10
Jefferson	32,807	32,661	28,608	28,176	4,199	4,485	12.80	13.73
Monroe	7,552	7,525	6,071	6,056	1,481	1,469	19.61	19.52
Noble	6,020	6,037	4,804	4,916	1,216	1,121	20.20	18.57
8-Counties	166,815	166,271	144,231	142,158	22,584	24,113	13.54	14.50
Ohio	5,124,503	5,135,173	4,555,709	4,570,015	568,794	565,158	11.10	11.01

Source: U.S. Census Bureau, American Community Survey, 5-year files for (ending years) 2012, 2013, 2014, Table B25002

Table 3 provides information about the type of housing in the region. It shows that the region's housing stock is predominantly single family (78%). However, the share of housing classified by the Census as "other" (mobile homes, trailer parks, etc.) is more than twice that of Ohio as a whole.

Table 3. Housing Units by Type

County	Total Housing Units, 2012	Percent of Each Type				
		1-Unit	2-19	20-49	50+	Other
Belmont	32,408	77.5	12.3	1.0	1.3	7.9
Carroll	13,664	80.9	5.0	0.2	0.3	13.6
Columbiana	47,025	77.7	11.6	0.7	1.2	8.8
Guernsey	19,185	75.0	8.6	1.3	1.0	14.1
Harrison	8,154	78.8	6.1	0.3	0.0	14.8
Jefferson	32,807	79.9	11.1	1.0	1.7	6.3
Monroe	7,552	82.7	3.9	0.5	0.8	12.1
Noble	6,020	79.8	4.8	0.8	0.0	14.6
8-Counties	**166,815**	**78.4**	**9.9**	**0.8**	**1.1**	**9.8**
Ohio	5,124,503	73.1	17.7	2.1	3.1	4.0

Source: U.S. Census Bureau, ACS, 5-year file for 2012 (ending year), Table B25024

Table 4 provides an estimate of the median household income for the region in 2014. The estimated median of $42,384 was below the statewide median of $48,849.

Table 4. Estimated Median Household Income

County	Total Households	Percent in Income Range, 2014						
		0-<15	15-<25	25-<35	35-<50	50-<100	100+	Median Income
Belmont	28,007	14.1	14.7	13.1	15.3	29.4	13.4	43,045
Carroll	10,922	11.7	11.7	13.3	17.3	32.8	13.2	45,660
Columbiana	42,184	13.8	14.1	12.0	16.0	32.1	11.9	43,707
Guernsey	15,564	14.4	16.1	13.2	14.9	28.9	12.5	40,420
Harrison	6,333	14.0	14.0	15.1	16.4	28.5	12.0	41,819
Jefferson	28,176	16.8	14.2	12.1	16.5	28.5	11.8	40,816
Monroe	6,056	13.6	14.4	12.7	19.6	29.8	9.8	41,394
Noble	4,916	14.1	19.1	14.9	15.2	28.3	8.3	37,126
8- Counties	**144,231**	**15.1**	**14.3**	**13.5**	**16.6**	**30.4**	**10.2**	**42,384**
Ohio	4,570,015	13.8	11.7	11.0	14.5	30.5	18.5	48,849

Source: U.S. Census Bureau, ACS 5-year data for 2010-2014, Table S1901

Note: The eight county medians are estimates. They were calculated by weighting each county's median household income.

Employment

To place the impact of shale-related employment on the housing market in a larger context, the study looked at the 10 largest employers in each county of the study area. Total employment in the top 10 employers by county is summarized below. Detailed data on employers for each county can be found in Appendix 6.

Table 5 shows that the region's largest companies employed 26,272 people in 2014. Employment is concentrated in Jefferson, Columbiana, Guernsey and Belmont Counties.

Table 5. 2014 Employment in the Top 10 Employers by County

County	Number of Employees
Belmont	3,923
Carroll	2,175
Columbiana	5,548
Guernsey	4,145
Harrison	1,331
Jefferson	6,453
Monroe	1,399
Noble	1,298
Total	**26,272**

Baseline: Housing Affordability

The following tables provide baseline information about housing affordability in the region. This baseline data is drawn from U.S. Census estimates. However, it is important to note that the most recent estimates are from 2014. Although they are two years old, these data provide a useful context in which the dashboard's quarterly updates can be interpreted.

Table 6. Housing Affordability

	Renters			Owners		
	Percent Cost-Burdened		Pct. Point Change	Percent Cost-Burdened		Pct. Point Change
	2012	2014		2012	2014	
LIHTC-eligible	71.9%	66.7%	-5.2%	53.6%	57.6%	4%
Not LIHTC-eligible	4.6%	10.2%	5.6%	7.6%	8.9%	1.3%
Total	**40.7%**	**41.8%**	**1.1%**	**17.4%**	**19.2%**	**1.8%**

Sources: IPUMS-USA, University of Minnesota, www.ipums.org.
Note: Calculations are based on PUMA geographies that, in some cases, cover an area larger than the eight-county region. Data is weighted accordingly. (See appendix 5 for more details).

Table 6 illustrates housing affordability for low-income and all other renters and owners in the region. Households paying more than 30% of their household income for housing are considered "cost burdened". For the purpose of this study, a *low-income* household is defined as one with a household income less than 60% of the HUD Area Median Family Income (HAMFI). This definition is consistent with the standard of eligibility for the Low-Income Housing Tax Credit program (LIHTC-eligible). For a household of four living in the region in 2014, an income of 60% HAMFI would equate to approximately $33,000 per year. All other households are considered "Not LIHTC-eligible".

- In 2014, 42% of all renter households and 19% of owner households were cost burdened.[2]
- Among all cost burdened renters, the vast majority (89%) were low income. Among all cost burdened homeowners, 66% were low income.
- Not all low-income renters and homeowners are cost-burdened, but more than half of each group are. Of low income renters, 66.7% were cost burdened, compared to 57.6% of low-income homeowners.
- For low-income renters, housing became more affordable from 2012-2014, but low-income owners did not experience a similar trend. While the percent of low-income, cost-burdened renters declined by 5.2% over the two-year span (indicating an increase in affordability), low-income homeowners found the housing market becoming less affordable with a 4% increase in cost-burdened households during the same time frame.

[2] Cost burden is defined as paying more than 30% of household income toward housing.

- For all other "Not-LIHTC-eligible" households, the percent of cost-burdened renters increased by 1.1% and the percent of cost-burdened homeowners increased by 1.8% from 2012-2014.

Baseline: Housing Availability by Housing Value

Table 7. Housing Availability for Homeowners

		Ohio		Shale County PUMAs	
		2012	2014	2012	2014
< $100,000	Owner-occupied housing units	1,072,186	1,082,604	94,872	98,880
	Vacancy Rate	3.09	3.18	1.18	1.84
$100,000+	Owner-occupied housing units	1,944,221	1,921,393	104,461	98,795
	Vacancy Rate	1.21	0.96	1.48	0.60
All	Owner-occupied housing units	3,016,407	3,003,997	199,333	197,675
	Vacancy Rate	1.89	1.78	1.34	1.23

Source: U.S. Census Bureau, American Community Survey Public Use Microdata. Sample (PUMS), 1-year data for 2012 and 2014.

Table 7 shows the vacancy rate for homeowner occupied housing. It is broken down by housing valued at less than $100,000 and housing valued at more than $100,000. As will be noted later in the report, $100,000 is used in this analysis as a proxy for "affordable" housing. As noted above, a low income, four-person household living in the region could have a maximum income of about $33,000 in 2014. Using an industry rule of thumb - mortgage affordability is equal to about three times annual income - a low income household could therefore theoretically afford to purchase a home costing $100,000 or less.

The vacancy rate in the eight-county region for "affordable housing" increased slightly from 1.18 to 1.84 from 2012-2014 while the rate for housing priced over $100,000 decreased from 1.48 to .60 over the same period. The trend is similar for the state, although the state's vacancy rate for "affordable" housing is higher than the region's. For all units in the region, the vacancy rate is lower than the state's and declined slightly from 1.34 to 1.23 from 2012 to 2014; a similar trend is evident at the state level.

This indicates that in 2012 and 2014, the region's for-sale housing market had lower vacancy rates than the state's, especially for homes price at under $100,000.

Baseline: Federally Subsidized Housing

Table 8. Federally Subsidized Housing Units

County	Public Housing Units	Project-based Section 8 Units	RD 515 Units	RD 538 Units	County Total	LIHTC Units
Belmont	722	645	570	238	**2,175**	280
Carroll	0	155	44	82	**325**	85
Columbiana	479	375	336	96	**1,286**	340
Guernsey	181	517	634	90	**1,470**	351
Jefferson	695	637	48	218	**1,598**	642
Harrison	50	0	32	40	**122**	164
Monroe	0	9	100	0	**109**	60
Noble	28	0	144	0	**172**	48
8-Counties	**2,155**	**2,338**	**1,908**	**764**	**7,257**	**1,970**

Source: County Housing Authorities; National Historic Preservation Database, and LIHTC counts are from Bryan Grady, Research Analyst, OHFA, e-mail correspondence, May 9, 2016.

- The region has about 7,257 federally subsidized, project based rental units and another 1,970 LIHTC units.
- There are an estimated 2,500 housing choice voucher holders living in the region. [3]
- Approximately 1 in 7 renters in the region received some form of federal rent subsidy from HUD, compared to about 1 in 8 renters statewide. [4]

Trends

Trends Identified Through Interviews

Follow-up Interviews were conducted with local housing, social service and civic officials. Information gathered through these interviews was used to identify perceived trends from those 'on the ground' in the region. Some of these trends may not be revealed in the data.

As of the end of the second quarter of 2016:

- In Harrison and Carroll counties, since April 2016, the market for rental housing affordable to housing choice voucher holders appears to have "loosened up." There are now apartments available, and it seems that the rents have ceased to increase. The perception

[3] Sources: This data is derived from two sources. The first is telephone interviews with local housing authorities listed in Appendix 7. The second is the U.S. Department of Housing and Urban Development, "Housing Choice Vouchers by Tract", data current as of 6/15/2015. [http://egis.hud.opendata.arcgis.com/datasets?q=Housing%20Choice%20Vouchers%20by%20Tract&sort_by=relevance]

[4] Ohio Housing Needs Assessment, Technical Supplement to the Fiscal Year 2017 Annual Plan, DRAFT, Ohio Housing Finance Agency, May 3, 2016.

on the ground is that shale-related activity has slowed down and the pipeline workers have moved on. [5]

- A similar trend was reported for Columbiana County. Shale-related activity seems to have moved further south.[6]

UTICA SHALE DEVELOPMENT

Overview

This study assists OHFA in understanding the impact of the shale development on housing markets in core areas of the Utica play. The oil and gas industry and its suppliers are analyzed in relation to three main industry components: upstream, midstream and downstream. Upstream refers to the exploration and production end of the business: drilling, completing and producing wells. Midstream refers to oil and gas operations that take place subsequent to upstream operations: gathering, compressing, transporting, storing, treating, separating, processing and fractionation of hydrocarbons. Downstream refers to those activities that take place subsequent to midstream activities: natural gas used in power generation, propane or methane used for home or industrial heating, and methane used in fertilizer manufacturing. Downstream also includes refining operations (e.g. reforming, cracking, or distillation) and all subsequent operations within the petrochemical industry, such as compounding, distribution and conversion of petrochemicals.

Updates of three main indicators for Ohio's Utica Shale development are presented in this iteration of the dashboard and report. They illustrate key trends that potentially impact the housing market in the study area. These indicators track changes over time in the West Texas Intermediate (WTI) oil price, oil and gas well count, and quarterly potentially created jobs. WTI oil price refers to a grade of crude oil that is often used as a benchmark for oil pricing.[7] The well count is the base indicator to project potential jobs created in the counties where drilling and production activities are occurring. Potentially created employment estimates the number of jobs created primarily in upstream (drilling and production) and midstream (pipeline transportation and processing) segments. This iteration of the Dashboard estimates the cumulative number of jobs created in the core counties as a result of shale development. This estimate is different from the previous quarter which addressed only new jobs created in that quarter. Estimating the cumulative number of jobs better reflects the pressure on the local housing market.

[5] Telephone interview with Dan Gichevsky, Executive Director, Harrison County Housing Authority, October 12, 2016.

[6] Telephone interview with George Hayes, Executive Director of United Way of Northern Columbiana County, October 17, 2016.

[7] This grade is also described as "light oil" because of its relatively low density, and "sweet" because of its low sulfur content. It is the underlying commodity of New York Mercantile Exchange's oil futures contracts.

The updated dashboard also includes a new indicator, total sales tax revenue collected primarily from retail sales. This was added as a measure of consumer spending trends. Changes in this indicator over time reflect changes in retail spending activity which can, in turn, be attributed to changes in the numbers of shale industry workers in the study area.

In addition to the dashboard indicators, which are updated quarterly during 2016, the accompanying report includes industry updates that illustrate the strategy of the main players – exploration and production companies and main midstream companies. The updates in strategies of these companies depend on the progress in construction of ethane crackers in the tristate region (OH, PA, WV) and the development of the downstream petrochemical industry. Development of the downstream petrochemical sector will create a stronger market for natural gas in the region and will drive up the drilling activity and labor demand for shale-related operations.

As in the previous iteration, additional shale indicators discussed in the report track the status of horizontal well permits, number of drilling rigs, number of wells in different phases of construction and operation, volume of production, and progress in the projects conducted by the midstream operators. The dynamic of all these indicators provide additional context for the analysis of the housing indicators.

Quarters 2-3 of 2016

Industry Updates: Acquisitions and American Oil Exports

Developments in the petrochemical industry in the region are predictors of the future dynamic of upstream and midstream industries on Ohio and eight-county region. In early October, Rice Energy Inc. released its plans to acquire natural gas company Vantage Energy for $2.7 billion. This transaction includes the rights to 52,000 acres in the Utica shale region of Ohio.[8]

Dorfman Production Co. (based in Dallas) aims to sell oil and gas assets in Ohio including 339 producing wells and 13,640 gross acres located in Carroll, Columbiana, Mahoning, Portage and Stark counties.[9]

Ineos' partnership with Consol and pipeline companies is allowing the exportation of natural gas from eastern Ohio and Western Pennsylvania via the Mariner East pipeline to the Marcus Hook terminal near Philadelphia and then shipping it to the UK and Europe.[10]

[8] Rice Energy to buy Vantage Energy for $2.7 billion. Oil & Gas Journal. September 26, 2016. http://www.ogj.com/articles/2016/09/rice-energy-to-buy-vantage-energy-for-2-7-billion.html

[9] Marketed: Oeprated Producing Appalachia Assets, Dorfman. Oil and Gas Investor. September 14, 2016. http://www.oilandgasinvestor.com/marketed-operated-producing-appalachia-assets-dorfman-1356806

[10] UK imports of US natural gas 'geopolitically imperative', says Ineos executive. IB Times. Sepember 18, 2016. http://www.ibtimes.co.uk/uk-imports-us-natural-gas-geopolitically-imperative-says-ineos-executive-1581912

Upstream Development: Activity and Oil Price Rises

The price for crude oil is continuing to recover and is up about 7% more than it was one year ago, although the crude oil price in the third quarter of 2015 had dropped to $44.75 per barrel. As of September 30, 2016, the WTI oil price had risen to $47.72. The price is still hovering just below $50 per barrel, which is considered by many producers and market analysts as a threshold price at which investment in shale development will become profitable across of majority of producing companies.

Nationally, the average rig count at the end of the third quarter of 2016 has increased by 20 percent since the end of the second quarter of 2016, but is down 47 percent from the third quarter of 2015. However, the count for Utica rigs has grown since the second quarter of 2016.

Permitted wells generate very little "per-well" job count, but lead to the drilling phase. The drilling phase, also known as well construction, is the most labor intensive in upstream development. Quarter 3 of 2016 saw growth in "permitted", "drilling" and "producing" wells as shale-related activity continues to increase.

Midstream is moving forward: NEXUS seen as competition to Canadian producers

Natural gas pipeline company NEXUS Gas Transmission, LLC has legal authority to conduct land surveys for the NEXUS pipeline project. Ohio Ninth District Court of Appeals affirmed a 2015 Medina County Court of Common Please ruling. The surveys will be conducted to develop preliminary construction plans for the 250-mile natural gas pipeline.[11]

Canadian upstream producers are feeling competition from the proposed Nexus pipelines connecting Utica Shale to customers in Michigan, Illinois (Chicago area) and Ontario (Canada). To remain competitive, TransCanada is proposing to reduce the transportation tolls on its Mainline to attract Western Canada producers.[12]

Downstream

The Houston-based energy company, EmberClear Corp. wants to build a 1,000-megawatt, natural gas-fired power plant in an industrial park located in Cadiz, Ohio. This proposed facility will bring over $900 million in capital investments to Harrison County.[13] Specific dates have not been set but the time line for this project may be about 18 months to get through regulatory permitting activities before a construction time line can be released.

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[11] Ohio Court of Appeals affirm authority to conduct land surveys for natural gas pipeline project. Bricker & Eckler. September 15, 2016. http://www.bricker.com/insights-resources/publications/ohio-courts-of-appeals-affirm-authority-to-conduct-land-surveys-for-natural-gas-pipeline-project

[12] TransCanada Plan to View with U.S. Gas Stirs Fear of 10-Year Toll. Bloomberg. September 21, 2016. http://www.bloomberg.com/news/articles/2016-09-21/transcanada-plan-to-vie-with-u-s-gas-stirs-fear-of-10-year-toll

[13] 1,000 megawatt gas-fired power plant planned for Cadiz. Times Reporter. September 23, 2016. http://www.timesreporter.com/news/20160923/1000-megawatt-gas-fired-power-plant-planned-for-cadiz

South Field Energy LLC has received authorization by the Ohio Power Siting Board to begin construction on a natural gas-fired power plant near Wellsville, Ohio in Columbiana County. Construction is to begin in January 2016 and commercial operations will start four years later, January 2020. Total cost of this project is $1.1 billion.[14]

Shale Dashboard Indicators

New Well Count

As of the third quarter of 2016, 84 new wells were drilled in eight-county region. This is a 25% growth from the second quarter of 2016, however, 14% lower than the second quarter of 2015. Tracking the count of wells helps to estimate creation of potential jobs in the study area and, in turn, to assess a pressure on the housing market as the largest number of employees in the upstream industry is related to construction of wells.

Potential Employment

While different phases of well construction require a different number of employees, potential jobs are generated primarily by drilling, drilled and producing wells. The process of permitting a well generates very little employment and cannot be assessed on a per-well bases. Cumulative potential employment generated by drilling, drilled and producing wells in eight counties was at 6,316 at the end of the third quarter of 2016. This employment was almost a 34% decrease from cumulative potentially created employment at the end of the second quarter of 2016. Despite the increase in new well count in the third quarter compared to the second quarter, many of the new wells are in the permitted stage which do not create any new employment. The third quarter of 2016 potential employment is about 54% lower than in the third quarter of 2015.

WTI Oil Price per Barrel

The WTI oil price of $47.72 points to a continued recovery from a significant decline during the end of 2015 - beginning of 2016 time period. It is 7% higher than in the third quarter of 2015. Compared to the second quarter of 2016, WTI oil price decreased by 4%.

Sales Tax Activity

Sales tax revenue is finally showing a slight increase after 6 straight quarters of decline. The revenue generated from sales tax allocation in quarter 3 of 2016 is $16,810,408. This is up 1% from the previous quarter but is still down 13% from the same quarter last year.

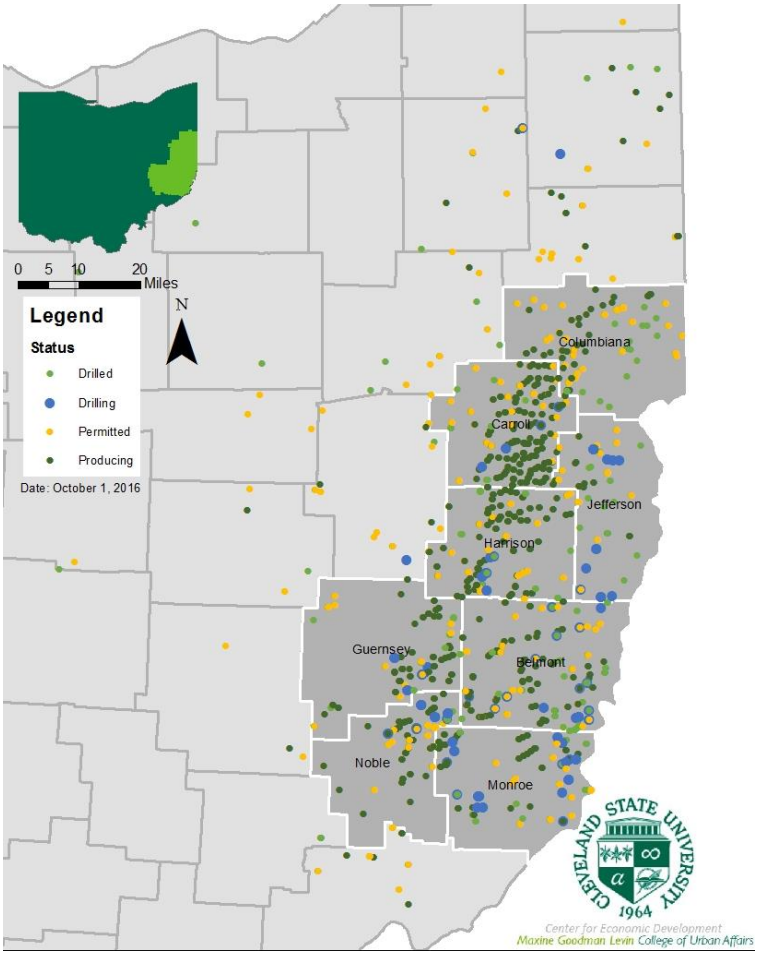
More details about the methodology used to calculate these four indicators and their relevance to overall Utica Shale activities are provided in following sections.

[14] Power Siting Board Oks Columbiana Energy Plant. Business Journal Daily. September 26, 2016. http://businessjournaldaily.com/power-siting-board-oks-columbiana-energy-plant/

UTICA UPSTREAM ACTIVITIES

Data collected from the Ohio Department of Natural Resource's Division of Oil and Gas (ODNR) as of October 1, 2016 (at the end of Quarter 3) provided a total Utica well count of 2,259 since December 2010. The total count of wells in the eight eastern Ohio counties as of October 1, 2016 is 2,124 which accounts for 94% of the total Utica well count in Ohio. Figure 1 shows the Utica wells, corresponding well status, and well location in Ohio within the eight eastern Ohio counties (dark grey).

Figure 1. Utica Well Status, October 1, 2016



Source: Ohio Department of Natural Resources

Of the 2,124 wells within the eight counties, 389 have the well status of permitted, 119 are in the process of drilling, 260 wells have been drilled but are not yet producing, and 1,356 wells are in the producing phase (Table 9).

Table 9. Cumulative Number of Wells in 8 Eastern Ohio Counties, Quarter 2 & 3, 2016

	Well Status	
	As of June 25, 2016	As of October 1, 2016
Permitted	371	389
Drilling	107	119
Drilled	289	260
Producing	1,283	1,356
Total	**2,050**	**2,124**

Source: Ohio Department of Natural Resources

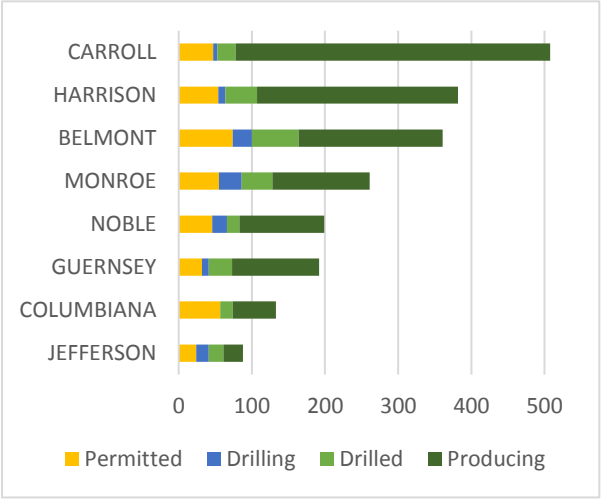
Among the eight eastern Ohio counties, Carroll County has the highest number of total wells and the most producing wells in Ohio with a total of 508 and 430, respectively (Table 10). Belmont County leads in the number of drilled wells (64). It is also a place of the largest number of permitted wells (74), which points to a future area of most active development in the eight eastern Ohio counties. Figure 2 further illustrates these numbers, detailing wells by stage in construction and production phases.

Table 10. Well Status, October 1, 2016

County	Drilled	Drilling	Permitted	Producing	Total
Carroll	25	6	47	430	508
Harrison	43	10	54	275	382
Belmont	64	26	74	197	361
Monroe	42	31	55	133	261
Noble	17	20	46	116	199
Guernsey	32	9	32	119	192
Columbiana	17		57	59	133
Jefferson	20	17	24	27	88
Grand Total	**260**	**119**	**389**	**1,356**	**2,124**

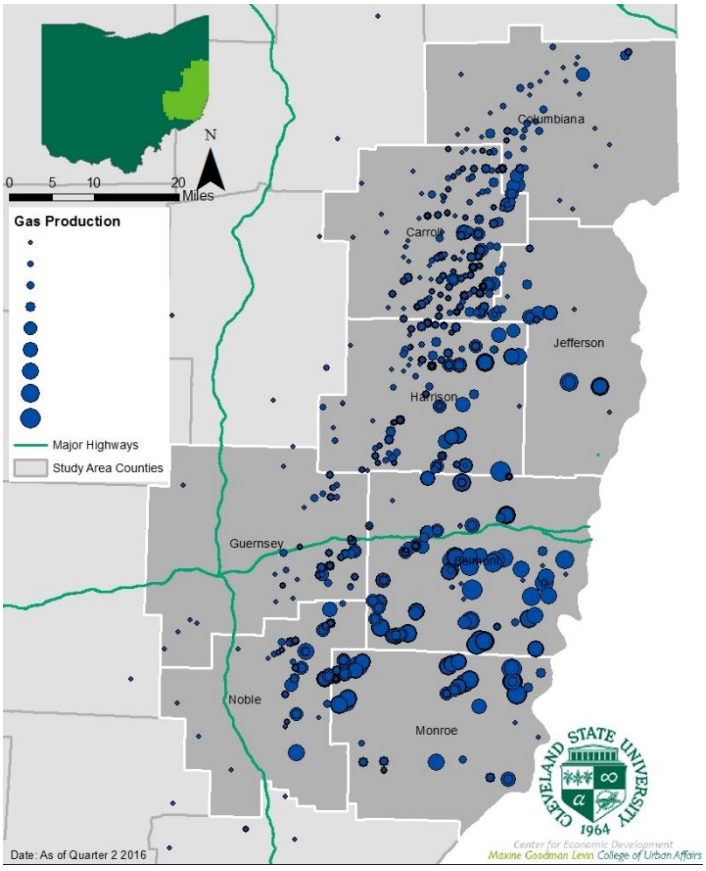
Source: Ohio Department of Natural Resources

Figure 2. Well Status, October 1, 2016



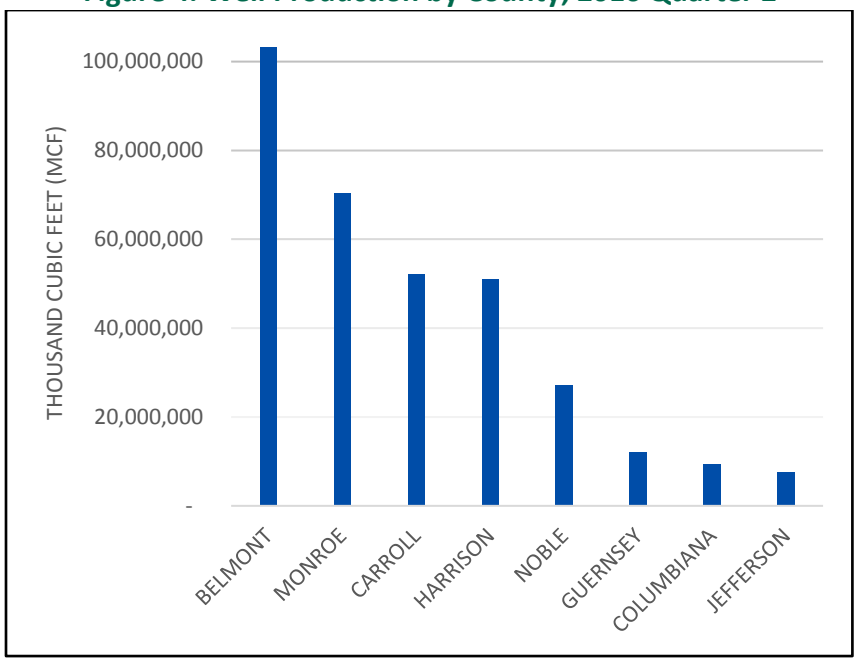
Source: Ohio Department of Natural Resource

Figure 3. Well Gas Production, 2016 Quarter 2



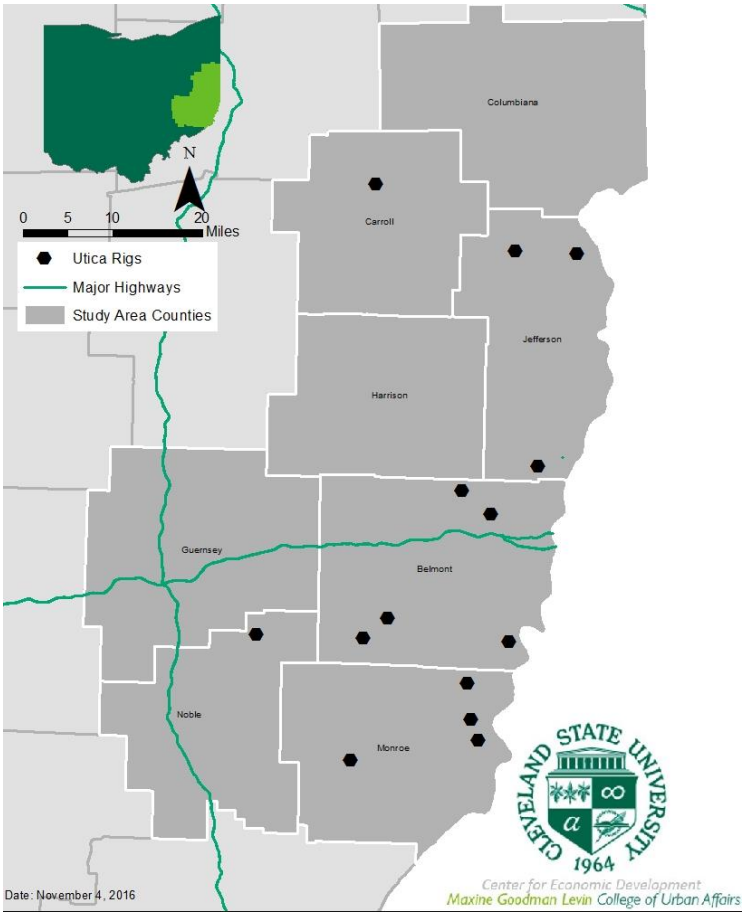
According to the ODNR second quarter of 2016 data, the eight-county study area wells have collectively produced 332,475,843 MCF of gas which accounts for 99.5% of Utica gas production in Ohio. Figure 3 - Well Gas Production - illustrates the gas production of the Utica wells with the larger circles indicating wells with proportionally higher gas production. Belmont County is the largest producer of gas at 103,209,082 MCF, while Jefferson County has the lowest gas production in the study area of only 7,591,409 MCF (Figure 4).

Figure 4. Well Production by County, 2016 Quarter 2



Source: Ohio Department of Natural Resources

Figure 5. Ohio Utica Rigs, November 4, 2016



The number of drilling rigs have been a part of a common metric for estimating future oil and gas production. While the shale development and new methods of product extraction altered the direct relationship between number of rigs, drilling wells, and volume of produced oil and gas, it is still an indicator of investment and upstream development pointing to further development of upstream and midstream infrastructure, and subsequent increase in regional employment.

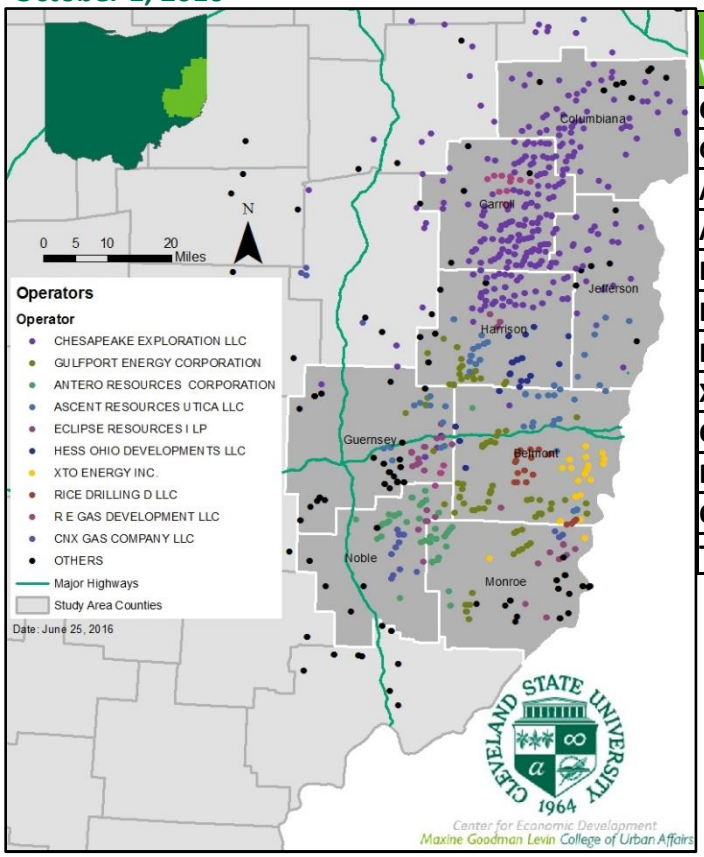
According to Baker Hughes, there are 14 total Ohio Utica rigs as of November 4, 2016 (Figure 5). This is up from two rigs in Quarter 2 of 2016. Belmont County has the highest number of rigs with five, Monroe County has four rigs, Jefferson has

three, and both Noble and Carroll have one rig each. These rigs have a drilling productivity of about three weeks of drilling per well which amounts to about 16 wells per rig annually.

While monitoring the new well count in the Utica Shale development, it is important to track activities of companies considered as main players in the oil and gas industry in Ohio. The 2,124 Utica wells in the 8 eastern Ohio counties are operated by 38 different companies.

Although Chesapeake Exploration LLC mostly has wells in the northern of the eight eastern Ohio counties, it continues to be the largest well operator in Ohio with a total of 786 wells in a phase of development. Gulfport is the second-largest player in Utica upstream operating 294 wells. Antero Resources, Ascent Resources Utica and Eclipse Resources operate between 132 and 201 well. The other top five well operators each have a cumulative number of wells between 52 and 90. Approximately 90% of all Utica wells are operated by the top 10 companies (Table 11).

Figure 6. Main Utica Upstream Companies, October 1, 2016



Source: Ohio Department of Natural Resources

Table 11. Main Utica Upstream Companies

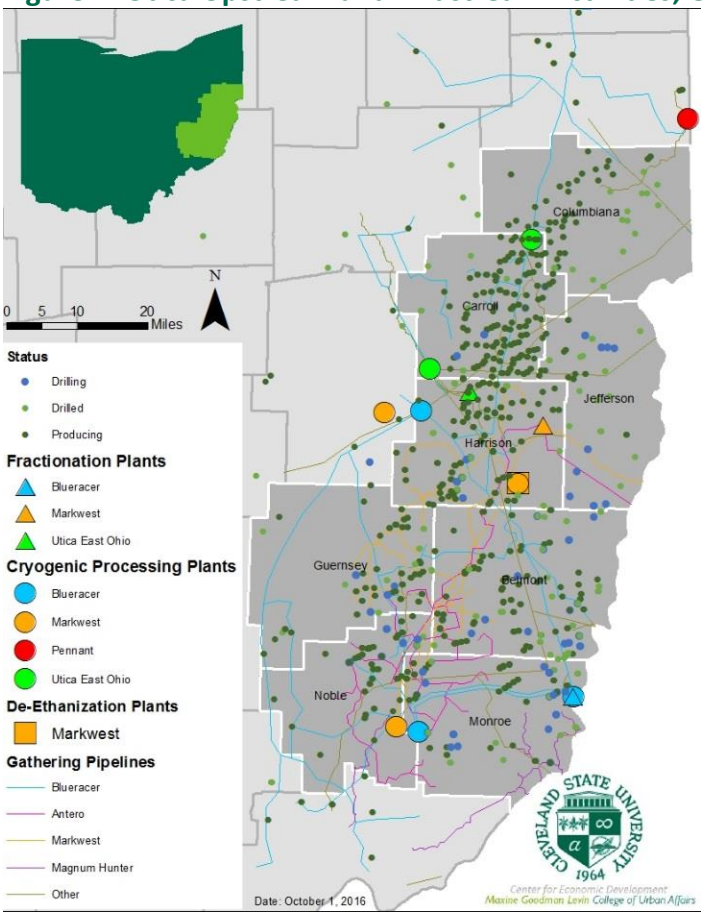
Well Operators	Number of Wells
Chesapeake Exploration LLC	786
Gulfport Energy Corporation	294
Antero Resources Corporation	201
Ascent Resources Utica LLC	191
Eclipse Resources LP	132
Hess Ohio Developments LLC	90
Rice Drilling LLC	61
XTO Energy Inc.	58
CNX Gas Company LLC	56
R E Gas Development LLC	52
Others	203
Total Number of Wells in 8 Counties	**2,124**

Figure 6 shows all the Utica wells color-coded by their respective well operator. The largest concentration of wells can be seen in Carroll, Columbiana, Harrison and Jefferson County, and their operator is Chesapeake Exploration LLC.

UTICA MIDSTREAM ACTIVITIES

Investor presentations and interviews of the main well operators are the source of data on Utica midstream activities throughout the eight eastern Ohio counties. Midstream activities are very capital intensive. The construction of pipelines and processing gas plants generate a large number of short-term jobs, filled mostly by transient workers. The construction companies for the gas plants and pipelines are usually drawn from a national pool. The maintenance of pipelines and the operation of the processing plants generate a small number of permanent jobs for local operators and maintenance staff.

Figure 7. Utica Upstream and Midstream Activities, October 1, 2016



Source: Ohio Department of Natural Resources;
Investor Presentations
Note: Permitted Wells are Omitted

Figure 7 shows a network of 1,800 miles of pipelines that connect plants across eastern Ohio. In the eight eastern Ohio counties, there are about 1,200 miles of pipelines which make up about 90% of the total number of pipelines. These pipelines include transmission lines that transport condensate, ethane, and NGL.

In October of 2016, Marathon's pipeline division, MPLX, has officially opened its new Cornerstone Pipeline, a 50-mile pipeline connecting a refinery in Canton, Ohio from a raw gas processing plant operated by Markwest in Cadiz which is located in Harrison County. Additional pipelines- the Leach Xpress, Nexus Gas Transmission and Rover Pipeline will boost the takeaway capacity of the eight eastern Ohio counties by the end of 2018.

SHALE DEVELOPMENT AND JOB CREATION

Jobs Created by Shale Activities

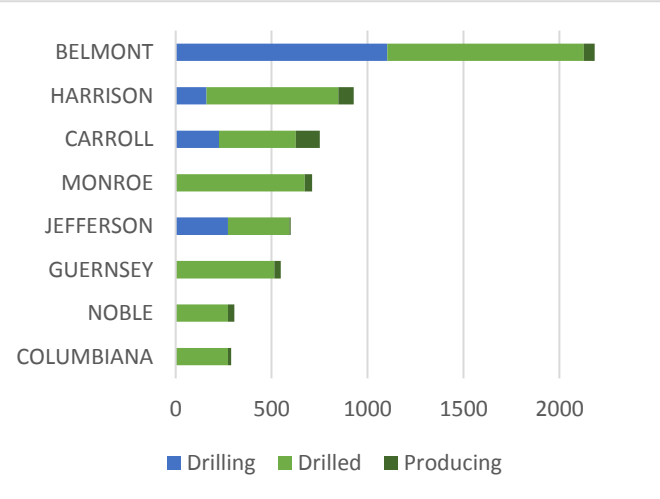
The CSU research team developed a multiplier to estimate the number of jobs potentially created from shale development. The methodology behind developing this multiplier can be found in the Appendix 2.

Table 12. Potentially Created Jobs in 8 Eastern Ohio Counties, October 1, 2016

County	Drilling	Drilled	Producing	Total
Belmont	1,103	1,024	57	2,184
Harrison	160	688	80	928
Carroll	226	400	125	751
Monroe	0	672	39	711
Jefferson	272	320	8	600
Guernsey	2	512	35	548
Noble	0	272	34	306
Columbiana	0	272	17	289
Total	**1,763**	**4,160**	**393**	**6,316**

Source: Ohio Department of Natural Resources; Center for Economic Development

Figure 8. Count of Jobs per Well Status per County, October 1, 2016



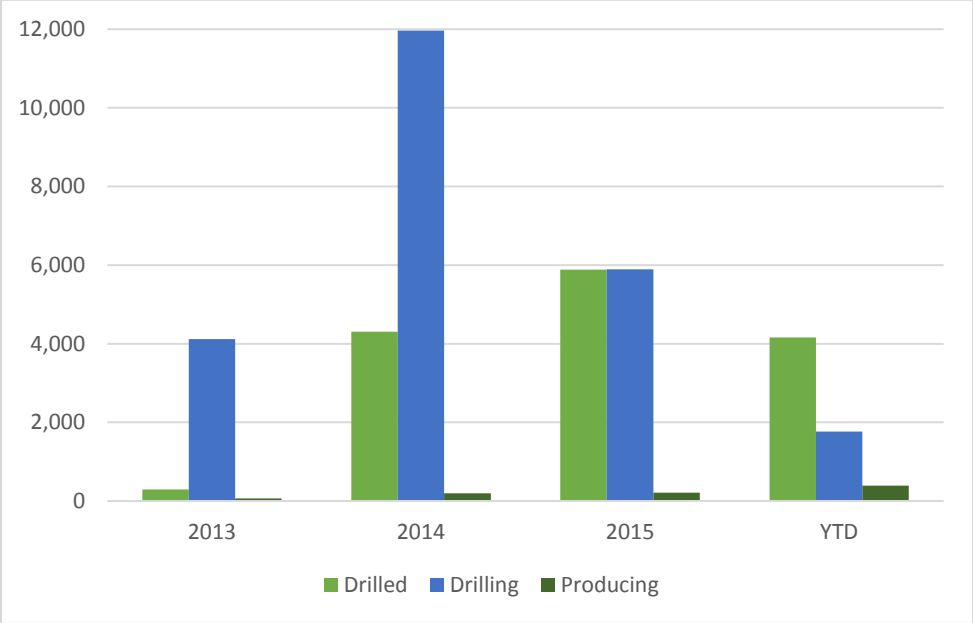
The number of jobs presented in Table 13 is "quarterly," not annualized. If 12 jobs in well completion services are created within one month, the quarterly count of jobs will indicate 4 of full-time equivalent (FTE). If 180 jobs required for fractionation were involved during 2 weeks, 30 FTEs will be reported on a quarterly basis. The estimate of quarterly jobs better reflects possible short-term demand on the housing market in specific counties, especially during the process of well completion. This process usually takes from one to two weeks with a short-term influx of up to 200 employees completing different incremental tasks. In addition, some of the top producers in Utica have created local divisions of their companies to provide fracturing and completion services. These subsidiary companies or divisions hire mostly local employees and do not create a demand for housing in the local housing market.

In upstream development, the largest number of jobs is generated during the "drilling" phase of well construction. These jobs are also generally short term (three to four weeks) and while many members of drilling crew are out-of-state workers they may or may not create pressure on local housing markets. The impact varies by company. Many companies bring in drilling crews from places traditionally regarded as "oil" states. These employees work a four-shift schedule and usually stay in temporary housing provided at the drilling site. Drilling phase includes construction of vertical and horizontal segments of a well and completion. After a well is drilled, fractured and completed, it is connected to a gathering pipeline system and its status is changed to a producing well. Typically, a well could be drilled and wait for fractionation and completion depending on an availability of a gathering pipeline or a fractionation and completion crew. Once

the well is completed and starts producing, it requires only maintenance, which does not generate many jobs. Permitted wells also do not yield a large number of jobs that can be assessed on a well basis; therefore, the count of these jobs are omitted in the analysis.

Different job multipliers are associated with each stage of well development.[15] Potential jobs for the eight-county region were estimated based on a count of wells per well status in each county (Table 13). Belmont and Harrison counties have the highest number of total jobs created and the largest number of wells currently in the drilled phase. These data are illustrated in Figure 9. Although the jobs are potentially created in a county where a well is drilled, this job can be taken by a transient worker who may live in temporary housing, by a local resident or a resident of a nearby county within reasonable commuting distance from the drilling site.

Figure 9. Potentially Created Jobs from Utica wells in Eastern Ohio Counties, September 30, 2016



Source: Ohio Department of Natural Resources; Center for Economic Development

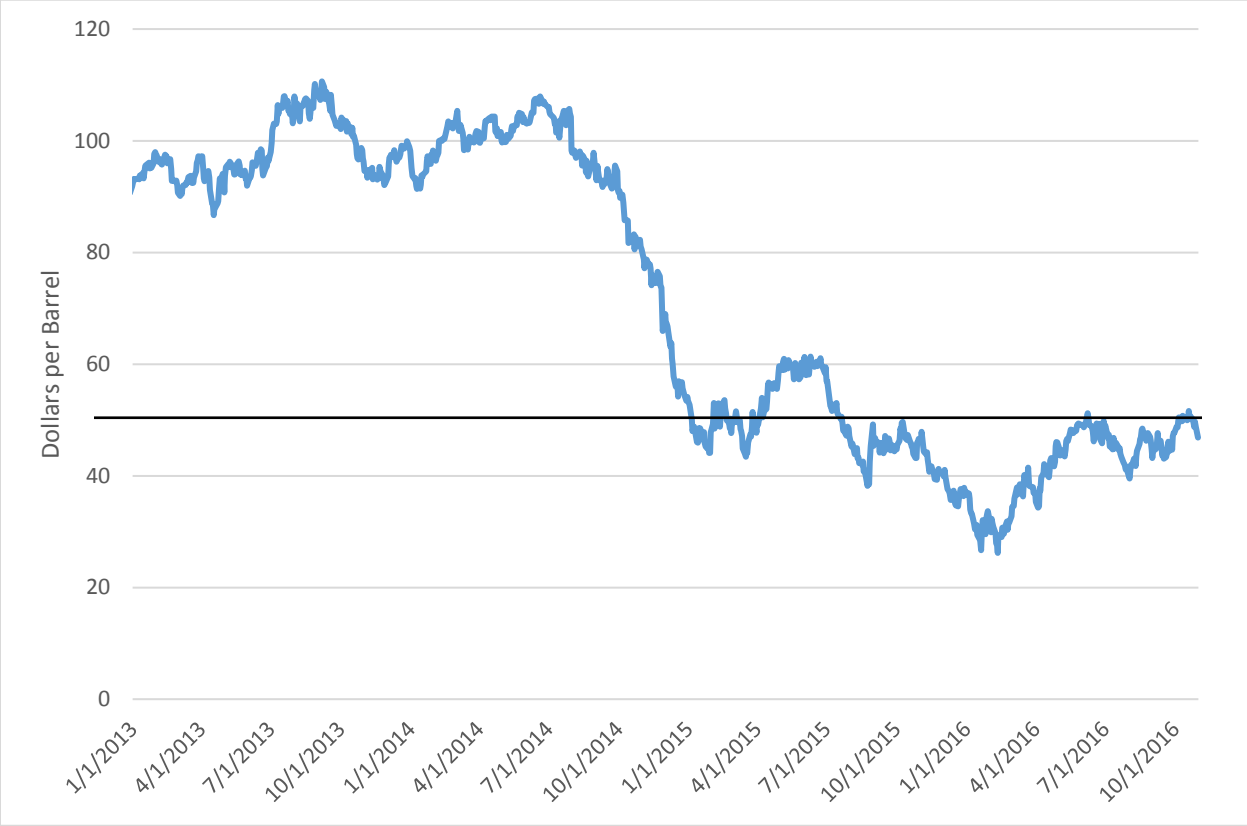
Figure 9 also shows the dynamic of potentially created jobs from the beginning of shale development in eastern Ohio, 2013, to the present. As shown in the figure, the number of jobs from shale development in the eight-county region grew significantly from 2013 to 2015. Yet, the halt in production and drilling at the end of 2015 and in 2016 has greatly reduced the number of potential jobs generated by Utica development. However, employment is expected to pick up again as drilling activities resume through the rest of 2016.

[15] Detailed explanation of labor multipliers methodology is in Lendel, Iryna; Thomas, Andrew R.; Townley, Bryan; Murphy, Thomas; and Kalynchuk, Ken, "Economics of Utica Shale in Ohio: Workforce Analysis" (2015). Urban Publications. Paper 1330. http://engagedscholarship.csuohio.edu/urban_facpub/1330

WTI Oil Price Trend

Since the beginning of shale development in eastern Ohio in 2013, the WTI oil price has had many peaks and troughs. Figure 5 shows the trend of crude oil prices from the beginning of 2013 to the end of the third quarter in 2016. WTI oil price was around $100/barrel until the initial drop of prices in mid-2014. This decrease lasted until the beginning of 2015 where the price has been hovering above and below $50/barrel. The black line indicates the $50/barrel oil price rebound that would spur some investment activities. As of mid-2015, the WTI Oil price has been consistently below $50/barrel. While the current oil price is $47.72, an increase in price closer to $50/barrel is expected by the end of the year.

Figure 10. Crude Oil Prices: West Texas Intermediate (WTI), 2013-2016



Source: FRED Economic Data, U.S. Energy Information Administration
Note: Not seasonally adjusted. Daily frequency.

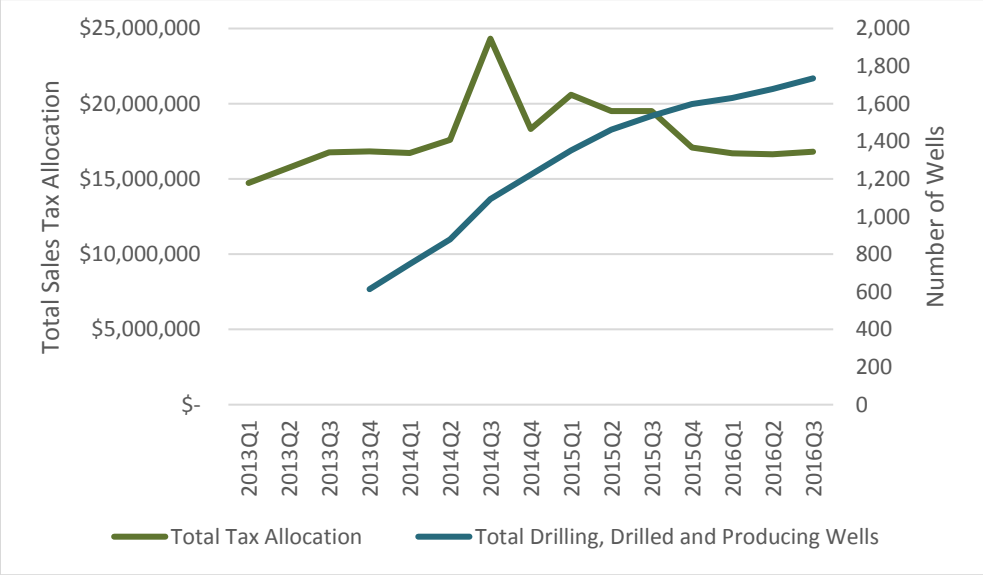
Sales Tax Activity

Sales tax revenue is an indicator of economic activity reflecting primarily retail sales. Sales tax revenue is measured by the county in which the sales transaction occurred and is reported by the Ohio Department of Taxation as "county sales tax allocation". The sales tax revenue data is presented by the month in which the tax was collected from the transaction.

Tracking the generation of sales tax over time will allow us to identify county level trends in retail sales. We can infer that any increased retail sales activity in these counties is at least partly the result of an influx of out-of-state workers. In turn, increased retail activity might suggest that out-of-state workers will create some pressure on the local housing markets.

Figure 11 displays the total tax allocation and the total number of wells. The count of wells in this section refers to drilling, drilled and producing wells, which is consistent with the job creation methodology in the previous section. The third quarter of 2016 saw a 1% increase in total sales tax revenue, however, this number is still down 13% from the third quarter of 2015. Sales tax revenue is finally recovering after being on a decline since the beginning of 2015. The peak in sales tax revenue from the second quarter of 2014 to the third quarter of 2014 is consistent with the sharp increase in the total number of wells during this period of time. Despite a decrease in sales tax revenue in 2015, from the third quarter of 2015 to the third quarter of 2016, the eight eastern Ohio counties are experiencing newly growing shale-related activity. Detailed data on the quarterly sales tax allocation by county can be found in Appendix Figure 3.1 and Appendix Table 3.5.

Figure 11. Totals Sales Tax Allocation and Number of Wells in 8 Eastern Ohio Counties, 2013-2016



Source: Ohio Department of Taxation; Ohio Department of Natural Resources

HOUSING INDICATORS, Q2 2016 UPDATE

SUMMARY

Overall, housing markets in the eight-county region appear to be strengthening as West Texas Intermediate (WTI) oil prices continue to rise and shale related activities increase. Indicators that markets are strengthening slightly include a decline in the number of days homes are on the market and a decline in rental vacancy rates. Other indicators pointing in this direction are an increase in the median home sale price in the region from $80,000 in the first quarter to $95,000 in the second quarter of 2016 which represents a 19% increase (not seasonally adjusted). Year over year, second quarter of 2016 median sales price increased by 7%. The number of home sales also picked up in the second quarter, increasing by 38% from the first quarter to the second quarter, another indicator of a stronger for-sale housing market. However, for-sale housing still remains relatively affordable with 52% of homes selling for less than $100,000. Overall, median rents also increased, but at a lower rate of 1%. Rents for market units increased by 2%.

Our data for cost burdened renters and owners is derived from census data and cannot not be updated quarterly. As noted in the first report, more than half of low-income renters and owners were cost burdened in 2014. The percentage of cost burdened renters declined since 2012, while the percentage of cost burdened homeowners increased.

HOUSING INDICATORS

We have developed five indicators to track quarterly changes in housing availability and affordability for owners and renters (See methodology in Appendix 5.) The housing indicators are reported for the eight-county region. The research team was not able to identify a source for consistent, comparative data on the quality of housing in the region. The best source available for housing quality is interviews with key informants.

Each indicator is presented as year-over-year change as well as quarter-over-quarter change. Shale activity began in earnest in 2013, so 2012 can be viewed as a "pre-shale" year. Each indicator is therefore compared to the base year 2012 whenever possible.

Figure 12. List of Housing Dashboard Indicators	**Source**
Housing Affordability	
Renters	
Multi-family rental housing cost, affordable	CoStar[16]
Multi-family rental housing cost, market	CoStar
Owners	
Median Sales Price, less than $100,000	MLS

[16] The Costar report for Quarter 2 included retroactively updated data for Quarter 1. Costar is a "live database"; as such, data is updated – even retroactively - so that historical numbers will be as accurate as possible.

Median Sales Price, greater than $100,000	MLS
Median Sales Price, all prices	MLS

Housing Availability

Renters

Multi-family rental vacancy rate, affordable	CoStar
Multi-family rental vacancy rate, market	CoStar

Owners

Number of sales, less than $100,000	MLS
Number of sales, more than $100,000	MLS
Days on the market, all prices	MLS

Affordability: Multi-family rental housing cost

Multi-family Rental Housing, St. Clairsville, Ohio

Multi-family rental housing, Belmont, Ohio

As a quarterly indicator of rental housing affordability, this study is tracking the effective rent per square foot for multi-family rentals, including both affordable, market and overall. This data is provided by CoStar Group, Inc. from a proprietary database of commercial property transactions. CoStar divides the multi-family rental market into several categories: most records fall into either "affordable", which carries some subsidy, or "market" which carries none.

It is important to note that the CoStar data has advantages and disadvantages as a source for the indicators. The biggest advantage is that it captures quarterly changes in the market. Further, the data is representative of the range of types of units available and it includes both affordable and market rate units. The biggest disadvantage is that the data reported covers only about half of the 11,000 multi-family, 3+ unit rentals in the region (ACS 2010-2014). CoStar reports include data from 167 buildings with 5,073 units. Further, the CoStar data does not include single-family rentals or duplexes for these counties.

"Effective rent" is the rent that is actually paid, accounting for any incentives, concessions or give-backs. In this case, the effective rents were slightly lower than the asking rents in every year from 2012-2016.

Table 13. Overall Multi-family Rent per Square Foot, Q1 2012-Q1 2016, updated[17]

County	Percent Change in Rent, Q1 2012-Q1 2016	Number of buildings, Q1 2016	Number of Units, Q1 2016
Belmont	23.3%	27	1,347
Carroll	8.8%	4	185
Columbiana	15.5%	54	1,704
Guernsey	0%	18	490
Harrison	13.0%	6	154
Jefferson	13.4%	17	868
Monroe	NA	2	19
Noble**	12.2%	2	41
8-County Total	**5.7%**	**167**	**5,073**
8-County Affordable	**6.2%**	**56**	**3,024**
8-County Market	**13.2%**	**80**	**1,733**

Source: CoStar (Updated as of November 1, 2016)

In the eight counties, 34% of the buildings and 60% of the units are designated as affordable. Rents in these buildings have increased by 6.2% from 2012-2016. Market rents have increased by 13.2%. The 'affordable' vs. 'market' breakdown by County was not available for this release of the study.

Across all units, rents have increased 5.7% for all eight eastern Ohio counties. Rents increased by the highest percentage in Belmont County (23.3%) and by the lowest percentage in Guernsey County, where no increase in rents was reported.

These data do not support the anecdotal reports noted above[18] of rents doubling or even tripling in some places. It may be that the cases noted in previous reports are in isolated areas and are contributing to the rent increases illustrated in Figure 6, but they are not having a measureable impact on the broader market.

Q2 2016 Update

As of the end of the second quarter of 2016, across all units, rents had increased 2.7% from the previous year (Q2 2015-Q2 2016). The quarterly increase was 1.4%. Vacancy rates had decreased slightly, by .3% percentage points from the previous year, and .2% percentage points from the previous quarter. This indicates a very slight tightening of the rental market.

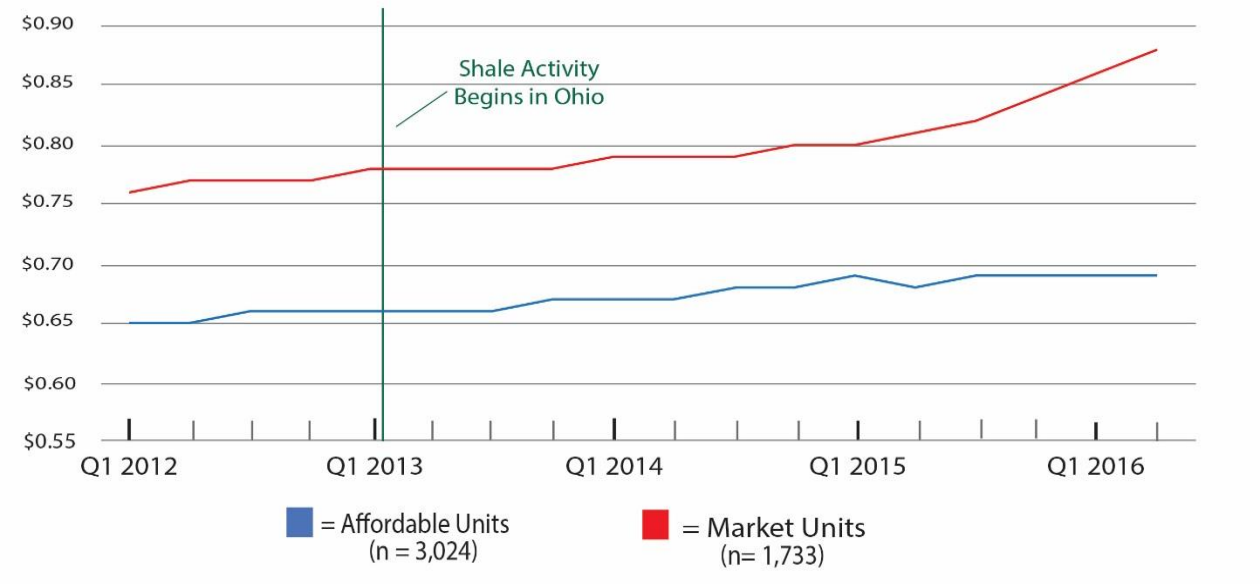
[17] The Costar report for Quarter 2 included retroactively updated data for Quarter 1. Costar is a "live database"; as such, data is updated – even retroactively - so that historical numbers will be as accurate as possible.

[18] Ohio University's Voinovich School of leadership and Public Affairs for OHFA. *The Impact of Shale Development on Housing and Homelessness in Eastern Ohio. Belmont, Carroll, Columbiana, Guernsey, Harrison, Jefferson, Monroe and Noble Counties.* March 2015, p. 2.

Figure 13 illustrates the breakdown in rent per square foot for affordable and market rents over time, through the second quarter of 2016. As the figure shows, market rents began to increase at a faster rate than affordable rents beginning in 2014, a trend that continues.

Figure 13. Affordable and Market Multi-family Rents per Square Foot, Q1 2012 – Q2 2016

Source: CoStar (Updated as of November 1, 2016)



While rents for affordable units leveled off in 2015, the effective rent per square foot for market units increased by 7.5% between the first quarter of 2015 and the first quarter of 2016, the largest increase during the study period.

Table 14. Affordable & Market Rents per Square Foot, Q1 2012-Q1 2016

	Q1 2012	Q1 2013		Q1 2014		Q1 2015		Q1 2016	
	Rent	Rent	%	Rent	%	Rent	%	Rent	%
Affordable	$0.65	$0.66	1.5%	$0.67	1.5%	$0.69	3%	$0.69	0%
Market	$0.76	$0.78	2.6%	$0.79	1.3%	$0.80	1.3%	$0.86	7.5%

Source: CoStar, Quarter 1. (Note: updated as of November 1, 2016)

Table 15. Affordable & Market Rents per Square Foot by Quarter, Q1 2015-Q2 2016

	2015				2016		% Change Q2 2015-Q2 2016	% Change Q1-Q2 2016
	Q1	Q2	Q3	Q4	Q1	Q2		
Affordable	$0.69	$0.68	$0.69	$0.69	$0.69	$0.69	1.5	0.0
Market	$0.80	$0.81	$0.82	$0.84	$0.86	$0.88	8.6	2.3

Source: CoStar, Quarter 1. (Note: updated as of November 1, 2016)

There was very little variation in affordable rents by quarter from 2015 to 2016. Market rents, however, increased by 8.6% from the second quarter of 2015 to the second quarter of 2016 and increased 2.3% from the first to the second quarter of 2016.

Affordability: Homeowners

As a quarterly indicator of owner occupied housing affordability, this study is tracking median sales price. The data source is the Multiple Listing Service (MLS), a proprietary database provided by the Northern Ohio Regional Multiple Listing Service, Inc. (NORMLS).

The median sales price was calculated for three groups of sales: all sales, sales for less than $100,000 and sales for homes over $100,000. It is important to note that $100,000 is used in this analysis as a proxy for "affordable" housing. As noted above, a low income (as defined in this study), four-person household living in the region could have a maximum income of about $33,000 in 2014. Using an industry rule of thumb - mortgage affordability is equal to about three times annual income -a low income household could theoretically afford to purchase a home costing $100,000 or less.

Table 17 shows the median sales price in years 2013 to 2016. In 2016, the median sales price for all housing in the region was $80,000, lower than the statewide median of $109,912.[19] From the first quarter of 2013 to the first quarter of 2016, median home prices in the region increased by 18.5%. The median sales price for homes costing less than $100,000 has increased at a faster rate (23%) over the three-year period, although the total number of homes sold in this range declined.

Table 16. Single Family Median Sale Price (MSP) Q1 2013-Q1 2016

	2013	2014		2015		2016		2013-2016
	MSP	MSP	Percent Change	MSP	Percent Change	MSP	Percent Change	Percent Change
All	$67,500	$75,000	11.1%	$79,900	6.5%	$80,000	0.1%	18.5%
< $100,000	$44,600	$49,750	11.5%	$49,500	-0.5%	$54,950	11%	23.2%
$100,000+	$140,000	$145,600	4%	$153,000	5.1%	$153,500	0.33%	9.6%

Source: MLS, Quarter 1

[19] OHFA Draft Housing Needs Assessment, FY 2017, p. 93.

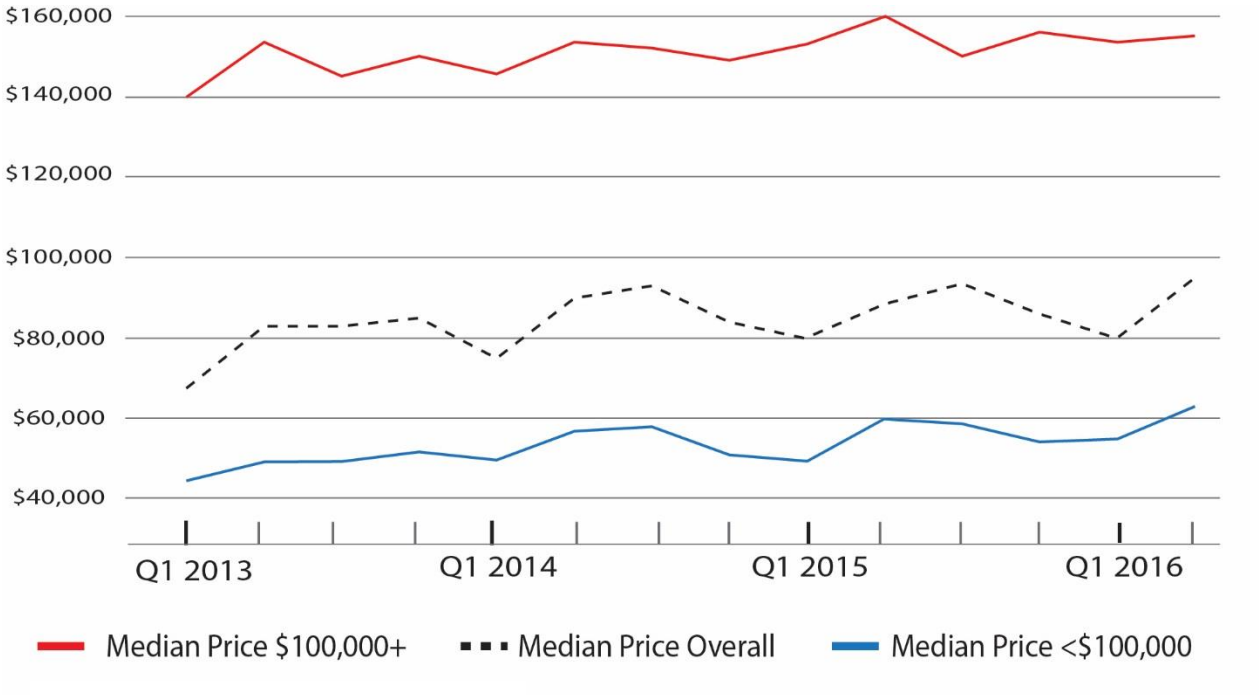
Table 17. Single Family Median Sale Price (MSP) by Quarter, Q1 2015-Q2 2016

	2015 MSP				2016 MSP		Percent Change, Q2 2015-Q2 2016	Percent Change, Q1-Q2 2016
	Q1	Q2	Q3	Q4	Q1	Q2		
All	$79,900	$88,500	$93,500	$86,000	$80,000	$95,000	7.3%	18.8%
< $100,000	$49,500	$60,000	$58,750	$54,250	$54,950	$63,000	5.0%	14.6%
$100,000+	$153,000	$160,000	$150,000	$156,000	$153,500	$155,000	-2.8%	1.3%

Source: MLS

As illustrated in Table 18, for single family homes priced at more than $100,000, the MSP declined by 2.8% from the second quarter of 2015 to the second quarter of 2016 while the MSP for homes priced at less than $100,000 increased by 5% during the same period. The MSP for all homes increased by 18.8% from the first quarter to the second quarter of 2016; increasing prices for "affordable" homes increased at a much higher rate (14.6%) than homes priced at greater than $100,000, which increased by only 1.3%. These trends are illustrated in Figure 14.

Figure 14. Single-Family MSP, 8-County Region, Q1 2013- Q2 2016



Source: MLS. Quarter 2

Housing Availability — Renters

As a quarterly indicator of housing availability for renters, this study is tracking the multi-family rental vacancy rate for affordable and market multi-family rentals. This information is derived from the CoStar data.

Table 18. Rental Housing Availability: Q1 2012, Q1 2014, Q1 2016

	Vacancy Rate		
	2012	2014	2016
Affordable	4.9%	4.7%	4.5%
Market	9.4%	9.1%	8.7%

Source: CoStar, Quarter 1 data. (Note: updated as of November 1, 2016)

Rental vacancy rates in the region were 9.4% for market rate multi-family rental units in the first quarter of 2012 and 4.9% for affordable units. The rates have remained relatively stable since 2012. The industry standard for affordable housing is 5% vacancy and Ohio, statewide, is running at just under 4%. There is sufficient slack in the market for non-subsidized units, but the low vacancy rate for affordable units indicates a shortage. Low-income families may have difficulty finding suitable, quality units, a trend which has persisted since 2012, and even before the Shale boom. A shortage of affordable, quality rental housing can be found throughout the state.

Table 19. Rental Housing Availability: Q1 2015-Q2 2016

	Vacancy Rate, 2015				Vacancy Rate, 2016		Percentage Point Change, Q2 2015-Q2 2016	Percentage Point Change, Q1-Q2 2016
	Q1	Q2	Q3	Q4	Q1	Q2		
Affordable	4.5%	4.4%	4.5%	4.6%	4.5%	4.5%	0.1%	0%
Market	9.5%	9.1%	9%	9%	8.7%	8.1%	-1%	-0.6%

Source: CoStar (Note: updated as of November 1, 2016)

Vacancy rates for both affordable and market rental housing were virtually unchanged from the second quarter of 2015 to the second quarter of 2016.

Housing Availability — Homeowners

As quarterly indicators of housing availability for homeowners this study tracks the number of sales and median days a house for sale remains on the market. These two measures are used here as a proxy for availability or housing market strength or weakness. As a general rule, the more quickly homes sell, the stronger the market. It was not possible to break out median days on the market by the two groupings of sales price so the data is presented for all housing in the for-sale market, regardless of price. This data is from the MLS.

Table 20. Single-Family Home Sales, Q2 2013- Q2 2016

	2013	2014 Annual		2015 Annual		2016 Annual		2013-2016
	Number of Sales	Number of Sales	Percent Change	Number of Sales	Percent Change	Number of Sales	Percent Change	Percent Change
Overall	589	559	-5.1%	569	1.8%	645	13.4%	9.5%
< $100,000	358	309	-13.7%	324	4.9%	335	3.4%	-6.4%
$100,000+	231	250	8.2%	245	-2%	310	26.5%	34.2%

Source: MLS, Quarter 2 data

Table 21. Single-Family Home Sales, Q1 2015- Q2 2016

	2015 Number of Sales				2016 Number of Sales		Percent Change, Q2 2015-Q2 2016	Percent Change, Q1-Q2 2016
	Q1	Q2	Q3	Q4	Q1	Q2		
Overall	385	569	671	623	468	645	13.4%	37.8%
< $100,000	250	324	354	370	282	335	3.4%	18.8%
$100,000+	135	245	317	253	186	310	26.5%	66.7%

As Table 21 shows, the number of single family home sales for homes priced under $100,000 declined by 6.4% from the second quarter of 2013 to the second quarter of 2016. The number of home sales for homes priced over $100,000 increased by 34% from the second quarter of 2013 to the second quarter of 2016.

Table 22 shows quarterly changes. By the end of the second quarter 2016, the number of home sales for all housing had increased 38% from the previous quarter, and 13% from the same quarter of 2015. This fluctuation is probably seasonal, as spring tends to be an active season for home sales. Along with increasing sale prices, this could be another indicator that housing markets are strengthening.

Table 22. Single Family Home Sales, Median Days on the Market, Q2 2013-Q2 2016

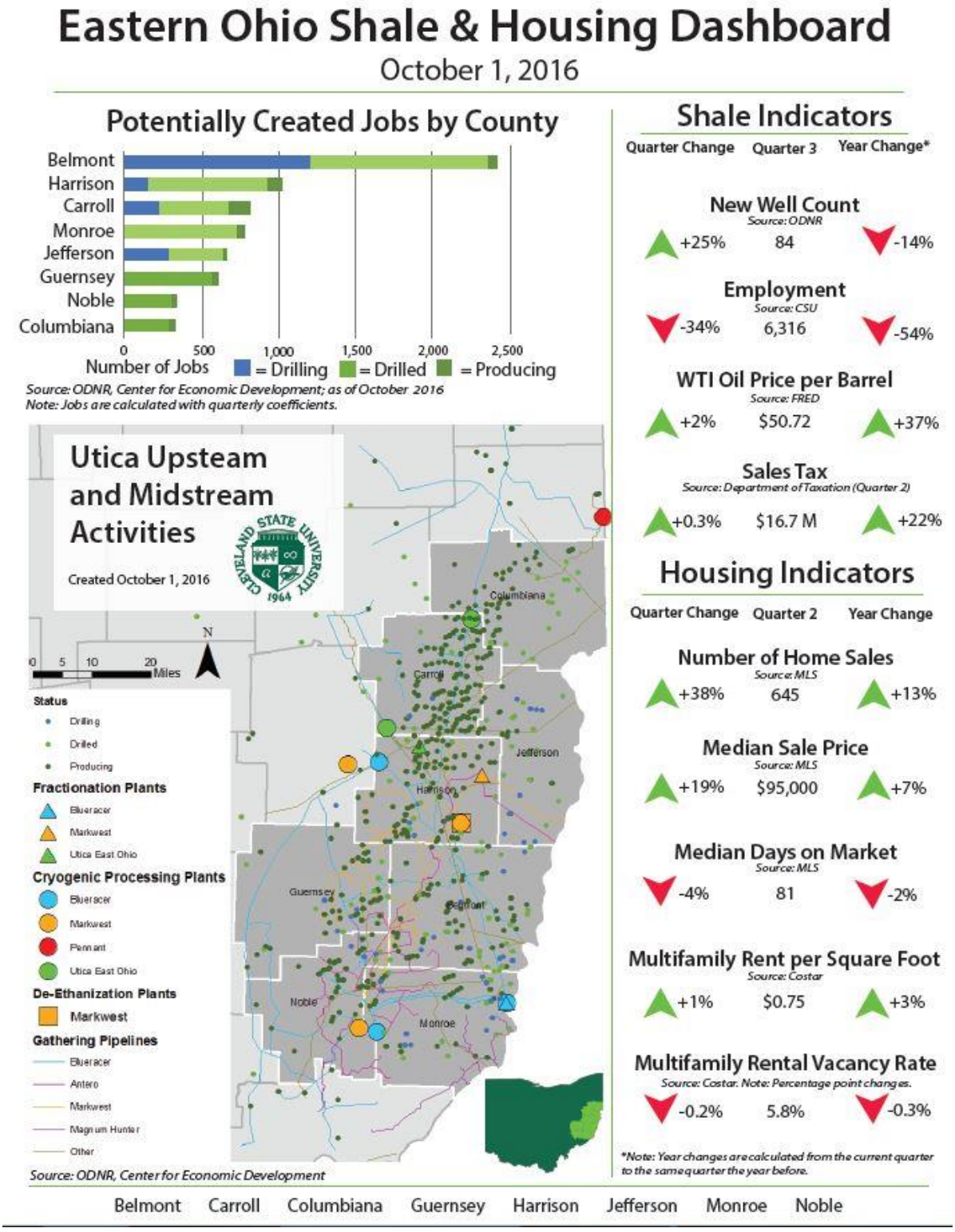
	2013	2014 Annual		2015 Annual		2016 Annual		2013-2016
	Number	Number	Percent Change	Number	Percent Change	Number	Percent Change	Percent Change
All	72	85	18.1%	83	-2.4%	81	-2.4%	12.5%

Source: MLS, Quarter 2 data

As Table 23 shows, for the second quarter of 2016, the median days on the market was 81. This is a decline of 3.5% from the previous quarter and a decline of 2.4% from the previous year, another indicator of a strengthening market.

APPENDICES

Appendix 1. Eastern Ohio Shale & Housing Dashboard



Belmont Carroll Columbiana Guernsey Harrison Jefferson Monroe Noble

Housing Affordability

Renters Cost Burdened >30%

	2012	2014
<60% HAMFI	71.9%	66.7%
>60% HAMFI	4.6%	10.1%

Source: IPUMS-USA, University of Minnesota, www.ipums.org

Owners Cost Burdened >30%

	2012	2014
<60% HAMFI	53.6%	57.6%
>60% HAMFI	7.6%	8.9%

Source: IPUMS-USA, University of Minnesota, www.ipums.org

Housing Availability

Multifamily Vacancy Rate

	2012	2016
Affordable	4.8%	4.5%
Market	9.3%	8.1%

Source: Costar

Owner Vacancy Rate

	2012	2014
Under $100,000	1.2%	1.8%
Over $100,000	1.5%	0.6%

Source: ACS Public Use Microdata Sample, 2012 and 2014

Housing Summary

Market Trends. Overall, housing markets appear to be strengthening as West Texas Intermediate (WTI) oil prices continue to rise and shale related activities increase.

Vacancy. Median days on the market are declining, indicating that homes are selling faster than the previous quarter. Rental vacancy rates also went down, indicating a slight tightening of the rental market.

Cost Burden.* More than half of low-income renters and owners were cost burdened in 2014. The percentage of cost burdened renters declined since 2012, while the percentage of cost burdened homeowners increased.

**Note: Cost burden data could not be updated due to data limitations.*

Sales Price. Home sales activity increased by 38% from Q1 to Q2 and median sales price increased by 19%, another indicator of a stronger for-sale housing market. Overall, median rents also increased, but at a lower rate of 1%. Rents for market units increased by 2%.

Multifamily Rent per Square Foot, Q1 2012 - Q2 2016

Prepared by the
Center for Economic Development and the
Center for Community Planning & Development

Maxine Goodman Levin College of Urban Affairs

Appendix 2. Shale Data and Methodology Notes

This report presents labor demand projections created by upstream industries, specifically those relating to the building and operation of natural gas pipelines. Projections for labor force demand in the 8 study counties are based on a number of assumptions. The methodology for projecting labor force demand uses a conceptual timeline of the overall well extraction process. The labor demand projections assess jobs in three segments of upstream operations – maintaining drilled wells, the drilling of new wells and producing wells.

The drilling phase of upstream operations generates the greatest demand for jobs. Drilling activities last for 4 to 6 weeks for a well, but during this time a drilling crew is sometimes employed for 50-60 hours a week. The production phase of the process takes the longest time – essentially the commercial life of the well and generates minimal direct employment. It can be assumed that many of the Utica shale workforce for well development will be transient residents, especially the engineering personnel. Similarly, companies coming to Ohio to drill, bring their equipment and assigned crews for drilling rigs. Companies providing drilling services commonly assign two crews to each drilling rig. Crew shifts work about 10-14 days each and travel with the rig from basin to basin. While the drilling rig crews tend to be rig-specific rather than region-specific, with time, more and more local workers can be included in the rig crews, thereby reducing company travel and relocation costs. Although the production phase is less labor intensive, local workers are typically employed. Most of these jobs are permanent and add to a pool of annual operating jobs.

The future workforce demand from the oil and gas industry in Ohio will be affected by a number of factors, including: the increased complexity of shale drilling and processing, oil and gas commodity and derivative product prices, the volumes of produced oil and gas extracted, access of main producing companies in Ohio to midstream infrastructure, companies' strategies for future upstream and midstream development, and lease acquisition and maintenance in Ohio's portion of Utica play.

Midstream refers to the building of pipeline infrastructure that connects the well field to processing plants. Midstream development also plays a role in job generation, although this report does not estimate potential job growth from these activities.

Sales tax data were collected from the Ohio Department of Taxation, Sales Tax Distributions. The sales tax revenue data were derived from the apportionment amounts within the Current and Prior Years' Sales Tax Distribution reports. These reports are inclusive of retail sales activity; business-to-business transactions are generally exempt under the current Ohio legislative code. The time period for the data were month allocated, or collected.

APPENDIX 3. SHALE QUARTERLY COMPARISONS

Appendix Table 3.1 Total Number of Wells in 8 East Ohio Counties, 2016 Quarter 2 & 3

	As of June 25, 2016					As of October 1, 2016				
County	Drilled	Drilling	Permitted	Producing	Total	Drilled	Drilling	Permitted	Producing	Total
Carroll	28	6	48	425	507	25	6	47	430	508
Harrison	55	11	54	262	382	43	10	54	275	382
Belmont	79	27	63	166	335	64	26	74	197	361
Monroe	42	28	42	129	241	42	31	55	133	261
Noble	14	15	45	114	188	17	20	46	116	199
Guernsey	36	13	31	108	188	32	9	32	119	192
Columbiana	17	0	57	59	133	17	0	57	59	133
Jefferson	18	7	31	20	76	20	17	24	27	88
Grand Total	**289**	**107**	**371**	**1,283**	**2,050**	**260**	**119**	**389**	**1,356**	**2,124**

Source: Ohio Department of Natural Resources

Appendix Table 3.2 Utica Gas Production, Thousand Cubic Feet (MCF)

	2016Q1	2016Q2
Belmont	99,235,384	103,209,082
Monroe	63,316,436	70,284,368
Carroll	56,741,243	51,996,103
Harrison	44,154,279	50,902,259
Noble	34,225,600	27,152,857
Guernsey	11,360,144	12,036,242
Columbiana	10,469,589	9,303,523
Jefferson	8,360,628	7,591,409
Grand Total	327,863,303	332,475,843

Source: Ohio Department of Natural Resources

Appendix Table 3.3 Utica Main Well Operators in Study Counties, 2016 Quarter 2 & 3

	As of June 25, 2016	As of October 1, 2016
Well Operators	Number of Wells	Number of Wells
Chesapeake Exploration LLC	779	786
Gulfport Energy Corporation	281	294
Antero Resources Corporation	190	201
Ascent Resources Utica LLC	171	191
Eclipse Resources LP	129	132
Hess Ohio Developments LLC	90	90
Rice Drilling LLC	55	61
XTO Energy Inc.	56	58
CNX Gas Company LLC	50	56
R E Gas Development LLC	52	52
Others	197	203
Total Number of Wells in 8 Counties	**2,050**	**2,124**

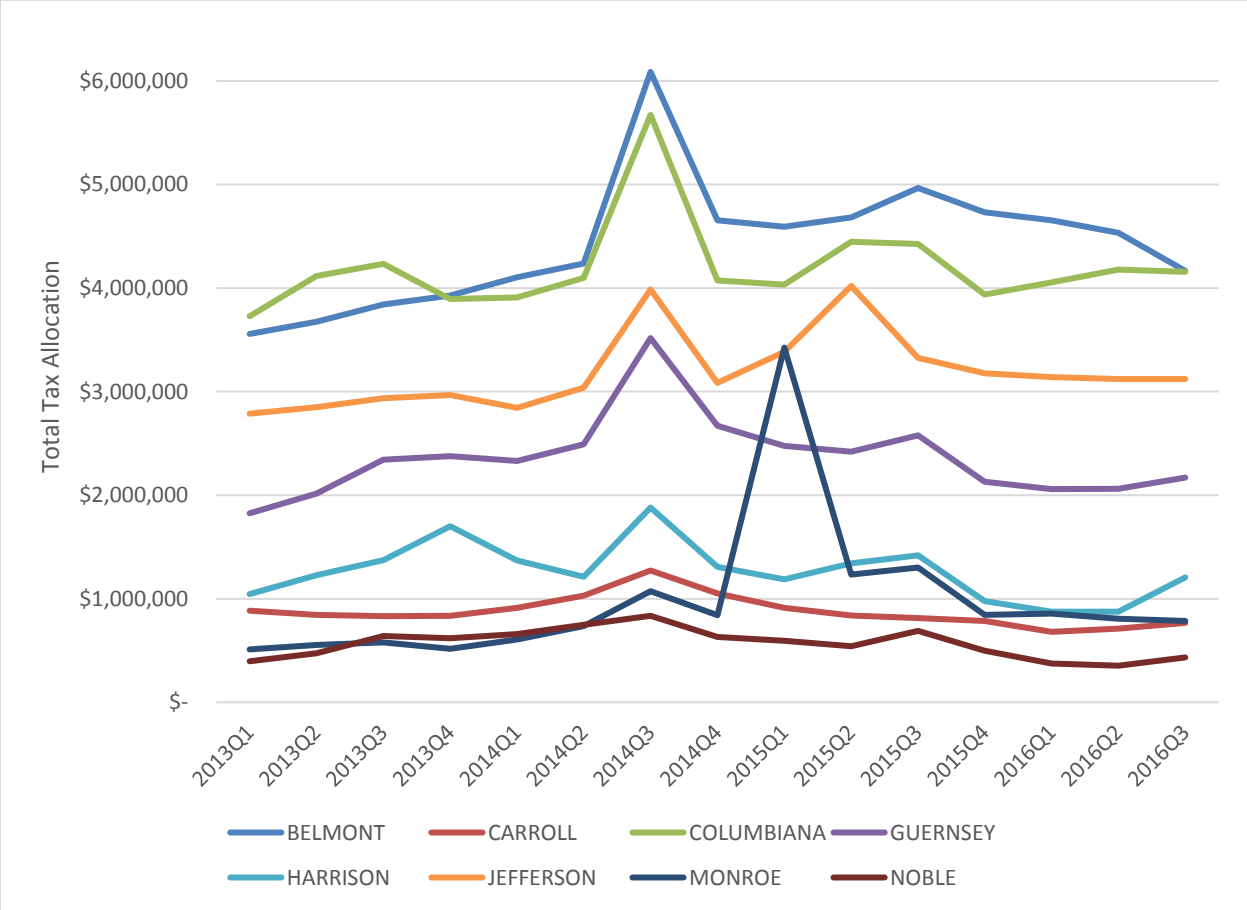
Source: Ohio Department of Natural Resources

Appendix Table 3.4 Potentially Created Jobs in 8 Eastern Ohio Counties

	As of June 25, 2016				As of October 1, 2016			
County	Drilling	Drilled	Producing	Total	Drilling	Drilled	Producing	Total
Belmont	1,146	1,264	0	2,410	1,103	1,024	57	2,184
Harrison	467	880	0	1,347	160	688	80	928
Carroll	255	448	0	703	226	400	125	751
Monroe	1,188	672	37	1,897	0	672	39	711
Jefferson	297	288	0	585	272	320	8	600
Guernsey	552	576	0	1,128	2	512	35	548
Noble	636	224	0	860	0	272	34	306
Columbiana	0	272	0	272	0	272	17	289
Total	**4,540**	**4,624**	**37**	**9,201**	**1,763**	**4,160**	**393**	**6,316**

Source: Ohio Department of Natural Resources

Appendix Figure 3.1. Total Sales Tax Allocation by County, 2013-2016



Source: Ohio Department of Taxation

Appendix Table 3.5. Quarterly Sales Tax Allocation by County

Allocation Period	BELMONT	CARROLL	COLUMBIANA	GUERNSEY	HARRISON	JEFFERSON	MONROE	NOBLE	Total Tax Allocation
2013Q1	$3,557,321.16	$883,871.16	$3,728,181.59	$1,825,143.95	$1,044,872.39	$2,787,434.99	$510,778.70	$396,043.66	$14,733,647.60
2013Q2	$3,674,881.70	$844,959.15	$4,115,952.98	$2,014,028.48	$1,228,777.62	$2,849,570.51	$554,019.31	$473,814.64	$15,756,004.39
2013Q3	$3,840,751.29	$833,016.96	$4,234,624.00	$2,342,508.91	$1,373,009.22	$2,935,886.85	$577,943.50	$639,151.94	$16,776,892.67
2013Q4	$3,929,590.87	$836,540.44	$3,894,099.13	$2,376,855.04	$1,699,725.75	$2,966,810.08	$515,877.41	$619,175.49	$16,838,674.21
2014Q1	$4,103,977.26	$911,848.85	$3,908,255.46	$2,329,727.57	$1,370,049.62	$2,843,400.62	$607,725.64	$658,869.46	$16,733,854.48
2014Q2	$4,236,784.34	$1,030,798.95	$4,097,686.07	$2,492,145.52	$1,210,596.86	$3,036,801.93	$736,029.45	$747,306.15	$17,588,149.27
2014Q3	$6,087,864.27	$1,272,928.84	$5,673,487.80	$3,516,668.70	$1,880,535.08	$3,987,627.26	$1,072,153.55	$835,132.99	$24,326,398.49
2014Q4	$4,654,208.03	$1,050,257.81	$4,073,219.33	$2,671,341.28	$1,308,150.63	$3,085,831.82	$841,489.13	$629,896.34	$18,314,394.37
2015Q1	$4,593,522.81	$912,087.82	$4,033,101.27	$2,476,114.10	$1,186,232.90	$3,385,419.06	$3,425,715.37	$593,107.11	$20,605,300.44
2015Q2	$4,681,608.43	$838,625.65	$4,446,877.62	$2,420,442.43	$1,341,578.90	$4,020,428.41	$1,233,147.19	$540,298.96	$19,523,007.59
2015Q3	$4,968,077.67	$812,740.42	$4,427,125.11	$2,577,221.41	$1,418,513.49	$3,324,300.34	$1,300,776.65	$690,892.86	$19,519,647.95
2015Q4	$4,733,165.21	$785,798.78	$3,939,024.58	$2,129,879.54	$ 976,744.30	$3,175,914.01	$844,817.08	$499,212.61	$17,084,556.11
2016Q1	$4,655,227.45	$680,438.00	$4,056,221.16	$2,057,737.06	$ 874,949.87	$3,139,909.91	$857,429.52	$374,908.07	$16,696,821.04
2016Q2	$4,533,965.71	$710,342.12	$4,178,522.45	$2,063,166.22	$876,165.14	$3,123,074.77	$807,458.25	$353,392.80	$16,646,087.46
2016Q3	$4,167,309.45	$766,866.19	$4,158,222.10	$2,170,626.75	$1,206,484.07	$3,120,838.51	$786,138.35	$433,922.33	$16,810,407.75

Source: Ohio Department of Taxation

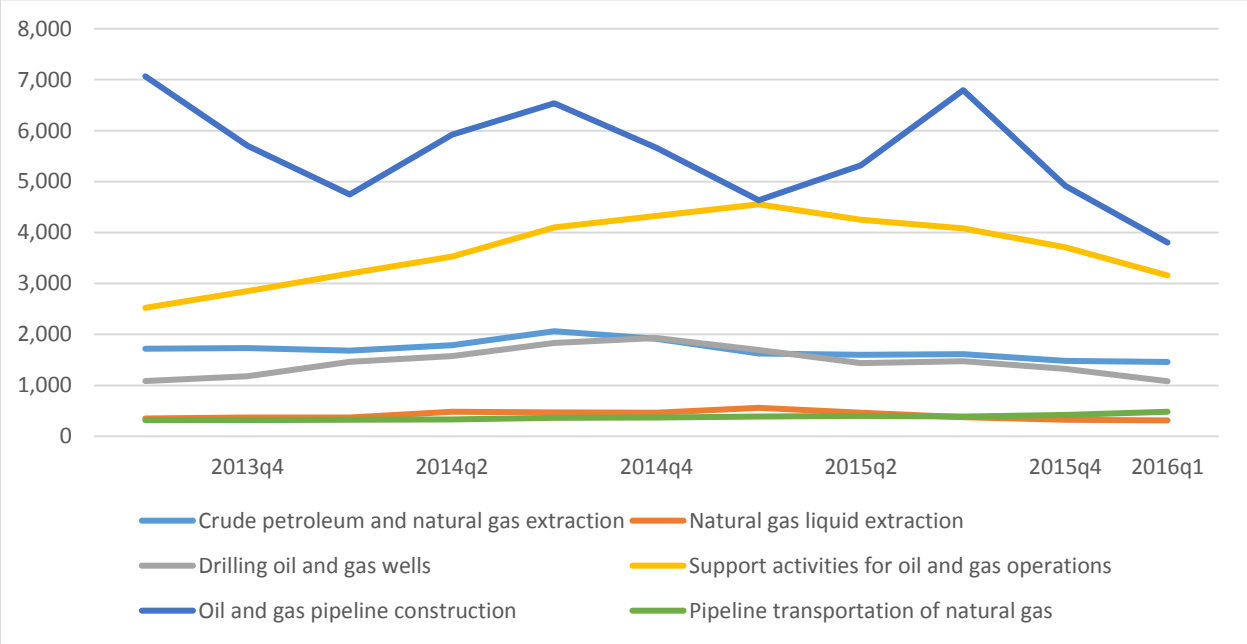
APPENDIX 4. OHIO CORE AND ANCILLARY INDUSTRY EMPLOYMENT

Appendix Table 4.1. Ohio Core Industry Employment

Core Industries	2015Q1	2015Q2	2015Q3	2015Q4	2016Q1
Crude petroleum and natural gas extraction	1,628	1,601	1,615	1,480	1,459
Natural gas liquid extraction	559	465	377	324	312
Drilling oil and gas wells	1,697	1,436	1,474	1,323	1,081
Support activities for oil and gas operations	4,554	4,252	4,083	3,713	3,158
Oil and gas pipeline construction	4,637	5,321	6,797	4,914	3,802
Pipeline transportation of natural gas	389	398	390	419	482
Totals	**13,464**	**13,473**	**14,736**	**12,173**	**10,294**

Source: Ohio Department of Jobs and Family Services

Appendix Figure 4.1. Ohio Core Industry Employment, Q1 2013 – Q1 2016



Source: Ohio Department of Jobs and Family Services

Appendix Table 4.2. Ohio Ancillary Industry Employment

NAICS	Industry	2014Q4	2015Q1	2015Q2	2015Q3	2015Q4	2016Q1
22	Utilities	17,846	18,835	19,188	19,291	19,112	19,141
23	Construction	27,697	21,286	28,364	31,071	29,031	22,782
31-33	Manufacturing	13,908	13,064	13,115	12,883	12,640	12,356
42	Wholesale Trade	26,206	26,206	26,562	26,736	26,531	25,942
48	Transportation and Warehousing	27,500	25,844	27,169	27,764	28,174	26,103
53	Real Estate and Rental and Leasing	3,219	3,250	3,326	3,374	3,180	2,978
54	Professional, Scientific, and Technical Services	38,022	36,831	37,836	37,943	37,317	37,121
56	Administrative, Support, Waste Management, Remediation Services	3,572	3,525	3,667	3,800	3,802	3,682
81	Other Services	8,147	8,028	8,117	8,051	8,244	9,177
92	Public Administration	11,922	11,166	12,938	13,539	12,040	11,337
Total		**178,039**	**168,035**	**180,282**	**184,452**	**180,071**	**170,619**

Source: Ohio Department of Jobs and Family Services

APPENDIX 5. HOUSING METHODOLOGY

IPUMS

Calculations to estimate owner and renter affordability (the housing cost burden) and the owner unit availability in the region are based on Public Use Micro-data Area (PUMA) geographies. PUMAs are statistical geographic areas defined by the census. By definition, they contain at least 100,000 people, are built on census tracts and counties and are geographically contiguous. In the study region, some of the PUMAs conform to the 8-county boundaries, while others do not. For PUMAs that include counties outside the eight-county region or multiple counties within the region, the 60% HAMFI was calculated as a household-weighted average of the county medians and was based on household size.

Owner and renter affordability (or cost burden) was calculated as the percent of households that are paying more than 30% of their household income on housing costs. Households were divided into two income categories for the purpose of this study: low-income, or those households that would be eligible for the Low-income Housing Tax Credit because they earn less than 60% of the HUD Area Median Family Income (HAMFI) and those not LIHTC-Eligible, i.e. earning more than 60% of HAMFI. The percent point change indicates the change in the percent of LIHTC-eligible households that are cost-burdened. For example, positive change reflects an increase in the proportion of households that are cost-burdened, meaning that housing has become less affordable.

Owner unit availability is the vacancy rate for owner units. The census does not assign vacant units as to being owned or rented in IPUMS, so the number of vacant owner units (vacant, for sale) was imputed by applying the same proportion of owned units for each type of housing (1-attached, boat, etc.) as exists in the owned occupied units of the same type.

CoStar

The study team purchased CoStar data to track quarterly change in the cost and availability or vacancy rate of rental housing in the region. This data is a proprietary database of commercial property transactions. While it is among the most comprehensive such systems available, it does not include all properties. For example, it only includes multi-family buildings. It does not include single family or duplex rentals. In this region, it covers an estimated one-quarter of the multi-family rentals. CoStar divides the multi-family rental market into two categories, “affordable” which carries some subsidy, and market.

It is also important to note that there is likely some overlap between the affordable units in the CoStar database and the count of project based, subsidized housing. This overlap is most likely in the number of LIHTC units.

The rental dataset received from Costar for Quarter 2 was updated from the dataset sent to us in Quarter 1. Rent per square foot and vacancy rate differed, as did the total sample size in terms of number of buildings and units. Costar is a “live database”; as such, if they get new information

or better estimates, data will be updated – even retroactively - so that historical numbers will be as accurate as possible. For this dashboard, we are using the updated Quarter 2 dataset.

Multiple Listing Service (MLS) data

The study team purchased MLS data, a proprietary database of home sales provided by the Northern Ohio Regional Multiple Listing Service, Inc. (NORMLS). This data is used in the study to provide quarterly updates on the "Owner" market including number of sales, median sales price, and number of days on the market. It is important to note that the number of condominium sales in the region is very low, so only single-family sale stats were calculated. Counts of sales, the median sale price and days on the market were calculated for three groups of sales:

- All sales
- Sales for less than $100,000 (theoretically affordable for first time homebuyers and LIHTC-eligible households or those earning $33,000 a year)
- Sales for $100,000 or greater

APPENDIX 6. TOP EMPLOYERS BY COUNTY

Appendix Table 6.1. Belmont County

Rank	Employer	Number of Employees
1	Belmont County Government	749
2	East Ohio Regional Hospital	648
3	State of Ohio	562
4	Riesbecks Food Markets	438
5	Murray Energy	367
6	Kroger Company	275
7	Belmont Community Hospital	285
8	Wal-Mart Stores Inc.	211
9	Barnesville Hospital Association	198
10	McDonald's	190

Source: Belmont County 2014 Comprehensive Annual Financial Report

Appendix Table 6.2. Carroll County

Rank	Employer	Number of Employees
1	COLFOR, INC	700
2	CARROLL COUNTY	400
3	Carrollton Exempt Village Board of Education	303
4	Atwood Lake Resort	168
5	Carroll Health Care Center Inc.	118
6	FORMTECH	113
7	Rosebud Mining	100
8	GBS FILING SYSTEM	100
9	NAPA/ Genuine Parts Co	88
10	ALUMINUM 1	88

Sources: 2014 Ohio Shale County Report, 2013 Vogt Santer Insights, LexisNexis Academic, Ohio Department of Education, and ReferenceUSA

Appendix Table 6.3. Columbiana County

Rank	Employer	Number of Employees
1	Salem Community Hospital	1,012
2	County of Columbiana	766
3	Fresh Mark, Inc	750
4	East Liverpool City Hospital	600
5	Flex-N-Gate/Ventra Salem, LLC	575
6	Wal-Mart Stores Inc	500
7	American Standard Brands	450
8	East Liverpool City School District	370
9	MAC Trailer Manufacturing Inc.	300
10	Salem City Schools	226

Data Sources: 2014 Ohio Shale County Report, 2013 Vogt Santer Insights, Auditor's office of Columbiana, LexisNexis Academic, Regional Chamber, ReferenceUSA, Ohio Department of Development's 2014 County Profile, and Ohio Department of Education

Appendix Table 6.4. Guernsey County Top

Rank	Employer	Number of Employees
1	Gurnsey County	1,013
2	Southeastern Ohio Regional Medical Center	655
3	Detroit Diesel Remanufacturing-East	493
4	Bi-Con Services, Inc.	386
5	Colgate-Palmolive	331
6	Quanex Building Products (was Edgetech I.G., Inc.)	278
7	Rolling Hills Local School District	236
8	Cambridge City School District	228
9	Federal Mogul Ignition Products	195
10	Island Aseptics	165
10	US Bridge	165

Sources: 2014 Comprehensive Annual Financial Report of Gurnsey County, Guernsey County Community Improvement Corporation and Ohio Department of Education

Appendix Table 6.5. Harrison County

Rank	Employer	Number of Employees
1	McDonough Corp/LJ Smith Inc	223
2	Harrison Hills City School District	222
3	Harrison County	154
4	Freeport Press	151
5	Harrison Community Hospital	143
6	Carriage Inn of Cadiz	117
7	Hopedale Fractionation Facility	110
8	Gables Care Center, Inc.	108
9	MarkWest	55
10	Sunnyslope Nursing Home	50

Sources: Harrison County Community Improvement Corporation, LexisNexis Academic, Ohio Department of Development 's 2014 County Profile, Ohio Department of Education and ReferenceUSA

Appendix Table 6.6. Jefferson County

Rank	Employer	Number of Employees
1	Trinity Health System	1,598
2	Arcelor Mittal Steel[20]	942
3	Wal-Mart Distribution Center	760
4	Jefferson County	667
5	Titanium Metals Corp	558
6	Franciscan University of Steubenville	475
7	First Energy Power Plant	396
8	Eastern Gateway Community College	389
9	Wal-Mart	364
10	American Electric Power	304

Source: 2014 Comprehensive Annual Financial Report of Jefferson County

[20] Arcelor Mittal Steel is located in Weirton, West Virginia.

Appendix Table 6.7. Monroe County

Rank	Employer	Number of Employees
1	Monroe County Government	550
2	Switzerland of Ohio Local Board of Education	220
3	Monroe Local Schools	179
4	Safe Auto Insurance Co.	150
5	Woodsfield Nursing Center	100
6	Riesbecks Food Markets	85
7	Slay Industries	75
8	Voith Hydro	40

Sources: 2012 Vogt Santer Insights, Ohio Department of Education, ReferenceUSA and Monroe County Department of Job and Family Services

Appendix Table 6.8. Noble County

Rank	Employer	Number of Employees
1	State of Ohio - Noble County Correctional Institution	475
2	Summit Acres	199
3	International Converter (caldwell) Inc.	171
4	Noble County Government	132
5	Caldwell Exempted School Village	124
6	GMN Tri-C	113
7	Warren Drilling Co, Inc.	85

Sources: LexisNexis Academic, Noble County Chamber, Ohio Department of Education and ReferenceUSA

APPENDIX 7. LIST OF INTERVIEWS

Andrea Dimitrovic, Housing Choice Voucher Program Manager – Cambridge Metropolitan Housing Authority, May 11, 2016

Kate Dodds, Director of United Way - Jefferson County, April 5, 2016

Bill Faith, Executive Director – Coalition on Homelessness and Housing in Ohio, May 11, 2016

Alan Fraley, Executive Director – Noble County Chamber of Commerce, May 25, 2016

Dan Gichevsky, Executive Director – Harrison County Housing Authority, May 11, 2016

Angela Goodson, Director of Info Helpline at United Way - Belmont and Monroe Counties, April 5, 2016

Cathy Grizinski, United Way 2-1-1 Information Helpline for Mahoning County, April 12, 2016

George Hayes, Director of United Way – Columbiana County, April 6, 2016

Summer Jenkins, Housing Choice Voucher Program Manager – Belmont County Housing Authority, May 24, 2016

Cathy Johnston, Advocacy Director, Coalition on Homelessness and Housing in Ohio, May 11, 2016

Stephanie Luaby, Director of United Way – Guernsey, April 6, 2016

Patricia Mader, Executive Director - Jefferson Metropolitan Housing Authority, May 23, 2016

Domenick Mucci, Mayor of Steubenville, Jefferson County Land Bank, May 3, 2016

Gary Obloy, Executive Director, Belmont Community Action Commission, April 12, 2016

Gary Ricer, Executive Director, Guernsey-Monroe-Noble (GMN) Community Action, April 18, 2016

Bob Ritchey, Columbiana Land Bank, Columbiana Planning Department, May 3, 2016

Tracy Sambuco, Executive Director – Harrison Metropolitan Housing Authority, April 28, 2016

Jackie Tracy, Public Housing Manager – Belmont County Housing Authority, May 24, 2016

Spencer Wells, Community Manager - Rental Housing Information Network in Ohio (RHINO), September 10, 2015