Ohio’s Shale Resources and Midstream Development

Ohio University Shale Webinar
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Of the seven US shale regions, Appalachia currently accounts for 41.48% of natural gas production.

Source: US EIA DPR, Aug. 2017
Drilling productivity per rig in Appalachia still robust as month over month production continues to rise

Source: EIA, Drilling Productivity Report, March 2017

Source: US EIA DPR, Aug. 2017
As of September 9  | Utica/Pt. Pleasant
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Current Rig Count | 24
Permits Issued Recently | 16
Total Permits | 2604
Total Wells Drilled | 2118
Total Wells Producing | 1678
Utica Permits Issued/
Ohio Horizontal Rig Count

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Ohio Annual Shale Production

- **2011**: 2,561,524 bbls, 46,326 mcf
- **2012**: 12,831,292 bbls, 635,876 mcf
- **2013**: 3,627,734 bbls, 120,119,054 mcf
- **2014**: 1,001,117 bbls, 453,054,944 mcf
- **2015**: 23,054,428 bbls, 955,610,695 mcf
- **2016**: 17,949,097 bbls, 1,370,220,834 mcf

Legend:
- **Oil (bbls)**
- **Gas (mcf)**
Core Shale-Related Industries (2016 Q1 - 2016 Q4)
$73,961

Ancillary Shale-Related Industries (2016 Q1 - 2016 Q4)
$64,975

All Ohio Industries (2016 Q1 - 2016 Q4)
$47,589

Source: ODJFS Ohio Shale Report, 4Q 2016
Projected Takeaway Capacity Growth

Source: RBN Energy
Natural Gas Takeaway Capacity

- Significant growth in takeaway capacity over the last few years – outflow capacity from the Marcellus and Utica formations (essentially projects originating in PA or OH) has increased by about 2.5 Bcf/d this year with approximately another 2.5 Bcf/d by next year.

- About 20 projects due to come online by 2020 in the Northeast – barring delays and cancellations.

- Takeaway capacity will soon exceed current production levels which will provide capacity for production increases and reduce discount between Marcellus hub pricing and that of Henry Hub and others.
Status of Ohio Pipeline Projects

Rover (ETP)
- Phase I, Part A came online September 1 – approaching 700 MMcf/d with the remainder of Phase I later this year and Phase II coming online in 2018
- Ultimately the project’s max capacity is 3.25 Bcf/d

NEXUS (Spectra/Enbridge)
- Recently received FERC approval after significant delay due to lack of a quorum at FERC
- Targeting a late 2018 in-service time = 1.5 Bcf/d

Leach Xpress/Rayne Xpress (Columbia/TransCanada)
- Under construction = 1.1 Bcf/d southbound capacity

Adair Southwest/Lebanon Expansion (Enbridge)
- Under construction = 200 MMcf/d southbound capacity
PTT Global Chemical America, Belmont County
- Recent announcement: purchased 168 acres from FirstEnergy in Dillies Bottom
- Final decision expected by the end of this year
- Thousands of construction jobs and hundreds of permanent jobs

Shell Chemical Appalachia LLC (Shell), near Pittsburgh, PA
- Expected 6,000 construction jobs, and 600 permanent employees
- Estimated to be complete by 2022

Cracker plants use ethane that is a component of natural gas to produce polyethylene, the basic building block of the plastics industry
Ohio has started to take advantage of its affordable natural gas in power generation, but to continue to grow this opportunity, more NGCCs need to come online.
Power generation provides demand outlet and drives production-related benefits

- A 1,000 MW NGCC plant uses about 0.2 bcf/day of natural gas.

- Therefore, for every 5,000 MW of NGCC capacity added, natural gas demand increases by about 1 bcf/day.

- 1 bcf/day new demand drives 1 bcf/day new production.

- According to a 2012 ICF Study, for every additional bcf/day of natural gas produced, approximately 13,000 upstream and midstream direct and indirect jobs are created.
New Power Plant Investments in Ohio

Source: Bricker & Eckler LLP

Investment: ~ $10 billion  
MW capacity: 9,887  
Direct Job creation: > 14,000

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Natural gas power generation facilities are connected to a geographically diversified pipeline system and many facilities have dual-fuel capability.
Competitive markets have driven down energy prices for OH consumers

Since 2008, average annual wholesale power prices in Ohio have decreased almost 50%.

Source: NYMEX and ICE
Market driven increased Natural Gas generation has driven CO2 emission reductions in Ohio

Source: EIA, Electric Power Monthly, Monthly Energy Review
Markets are working for Ohio consumers and businesses

- Consumers and businesses benefit when the playing field is level – when all players in the state have the same ability to bid to supply generation to serve utility load
- Competition is driving efficiency…older less efficient resources are being replaced with more efficient, less costly plants
- The relatively low cost of natural gas and Ohio’s resource advantage has been driving in-state investment
- Independent power producers building new generation and bearing the risk, not ratepayers
- Ohio is reducing its power plant emissions