MarkWest History

- **1988:** MarkWest Hydrocarbon Partners, L.P. is formed (Siloam Plant Purchased)
- **1989 - 1995:** Kenova, Boldman and Cobb gas plants are constructed
- **1996 - 2001:** MarkWest Hydrocarbon Inc. IPO (MWP:AMEX) (Michigan, Langley)
- **2002:** IPO of MarkWest Energy Partners (MWE:AMEX moved to NYSE 2007)
- **2002 – 2006:** Rapid growth in Southwest; ~$1 billion in acquisitions plus organic growth
- **2008:** MarkWest Hydrocarbon and MarkWest Energy Partners merge to eliminate IDRs. Begins development in Marcellus Shale
- **2009 - 2011:** Forms JV with Energy & Minerals Group (EMG) in Marcellus rapidly expanding Marcellus footprint. Acquires EMG interest 2011; forms new JV for Utica development
- **2012 - 2015:** Reaches 5 billion cubic feet per day of processing capacity. Accelerates shale development: 30+ facilities and $7 billion in organic capital
- **2015:** Becomes 2nd largest gas processor and 4th largest fractionator in U.S. Completes strategic combination with MPLX
- **2016:** Continues expansion of G&P infrastructure in prolific resource plays such as the Permian Basin, Cana-Woodford Shale, and Marcellus & Utica Shales
One of the largest NGL and natural gas midstream service providers

- Gathering capacity of 5.4 Bcf/d
  - ~50% Marcellus/Utica; ~50% Southwest
- Processing capacity of 8.4 Bcf/d*
  - ~70% Marcellus/Utica; ~20% Southwest; ~10% Southern Appalachia
- C2 + Fractionation capacity of 553 MBPD**
  - ~90% Marcellus/Utica; ~5% Southwest; ~5% Southern Appalachia

Primarily fee-based business with highly diverse customer base and established long-term contracts

*Includes processing capacity of non-operated joint venture
**Includes condensate stabilization capacity
Raw Natural Gas Production

- Production (Wellhead)
  - This activity is done by producer customers
  - Remove water and contaminants
  - Initial Production (IP) is typically high pressure, and declines to a lower pressure over time (decline curve)
  - Estimated Unit Recoveries (EURs) determine ultimate profitability (geology of rock and production profiles)

Image source: https://cdn2.hubspot.net/hub/367855/file-1535415665-png/xmas_tree_diagram.png?t=1473735940868
Gathering and Compression

- MarkWest offers this service
- Some customers choose to provide their own gathering and some third parties gather and compress
- Gathering can be either high pressure or low pressure (inlet basis)
- ~150 psig low, ~1000 psig high
- Transport natural gas to a processing facility or other outlet (dry-gas gathering)
Processing Plants

- Recovers heavier hydrocarbons (NGLs) from high-pressure inlet gas stream
- Either ethane-plus (C2+) or propane-plus (C3+) recovery
- Liquids separated from inlet gas stream in tower, use of distillation controlling temperature and pressure
- Cryogenic process cools gas to minus 150 F in the demethanizer (50 F bottoms temperature, -150 F overhead in ethane recovery mode)
- Typical propane recovery is >99% in ethane recovery mode, and ethane recovery is ~85%
**NGL Transportation**

- **Raw Natural Gas Production**
- **Gathering and Compression**
- **Processing Plants**
- **Fractionation Facilities**
- **Mixed NGLs**
- **NGL Products**
  - Ethane
  - Propane
  - Normal Butane
  - Isobutane
  - Natural Gasoline

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**Boiling Points at 1 atm**

- **Mixed NGLs**
  - Transport liquids to fractionators
  - Propane and heavier NGLs (C3+)
  - Purity ethane (C2) is processed remotely at cryogenic plants rather than at fractionator sites and transported via pipeline
  - C3+ transported by pipelines, railcar or truck

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*Image source (modified): https://www.ihrdc.com/els/po-demo/module14/figures/fig_012.gif*
Fractionation

Fractionators

- Receive propane and heavier liquids via pipeline, truck import, or rail import
- Feed is sequenced through distillation columns designed to boil off desired product and condense the heavier components into liquid
- Separated into purity components [propane (C3), isobutane (iC4), normal butane (nC4), natural gasoline (C5+)]
- Store finished purity products in holding tanks if needed or deliver to outlet
- Transport finished purity products via pipeline, rail, truck, or barge

NGL Products
- Ethane
- Propane
- Normal Butane
- Isobutane
- Natural Gasoline
NGL Marketing

NGL Products
- Market purity products on behalf of producer customers
- Deliver products via:
  - Pipeline
  - Rail
  - Truck
  - Barge
- Products used in petrochemical plants, refineries and homes

Key Marketing Metrics
- 200,000 Barrels per day of NGL sales
- 36,900 Dekatherms per day of gas purchases
- 190,000 Dekatherms per day of gas sales
- 4,675 Railcar shipments per month from all facilities
- 3,350 Truck liftings per month from all facilities
- Monitor and report macro gas and NGL market conditions
- Execute hedge strategy
Segments of the Oil & Gas Industry

**Exploration and Production (Upstream)**
- Gathering, Compression, Treating, Processing, Transportation (Midstream)
- Petrochemical and Refining (Downstream)

**Oil and/or Gas Reservoir**
- 5,000 – 16,000 ft deep

**Oil Well**
- Gas
- Water
- Water Injection Well

**Separation**
- Oil, Gas, Water

**Well**
- Oil

**Compression**
- Gas
- Natural Gas (Methane)

**Gas Treating, Processing and Fractionation**
- Ethane
- Propane
- Propane, Butanes

**Oil Refineries**
- Natural Gasoline
- Butanes
- Propane

**Interstate Oil Pipelines**
- Interstate Gas Pipelines

**Petrochemical Plants**
- Home Heating/Cooking
- Electric Power
- Industrial Boilers/Furnaces
- LNG (Liquefied and shipped)
- Ammonia/Fertilizers/CNG Buses, etc
- Home Heating, Cooking
- Transportation, Industrial fuel
- Glad Baggies
- Plastics
- Styrofoam
- Alcohols
- Other Chemicals
- Unleaded Gasoline
- Diesel
- Jet Fuel
- Asphalt
- Other
MPLX in West Virginia

- Mobley
- Majorsville
- Sherwood & Smithburg
- Kenova
- Cobb
Marcellus/Utica Overview

3Q21: 3.2 Bcf/d Gathering, 6.1 Bcf/d Processing & 512 MBPD Fractionation

- **BLUESTONE COMPLEX**
- **HARMON CREEK COMPLEX**
- **MAJORSVILLE COMPLEX**
- **MOBLEY COMPLEX**
- **HOPEDALE COMPLEX**
- **OHIO CONDENSATE**
  - Joint Venture with Summit Midstream
- **CADIZ COMPLEX**
  - Joint Venture with EMG
- **SENECA COMPLEX**
  - Joint Venture with EMG
- **SMITHBURG COMPLEX**
  - Joint Venture with Antero Midstream
- **SHERWOOD COMPLEX**(a)
  - Partial Joint Venture with Antero Midstream
- **CADIZ COMPLEX**
  - Joint Venture with EMG
- **HOPEDALE COMPLEX**
- **PA**
- **OH**
- **WV**
- **Gathering System**
  - Marcellus Complex
  - Utica Complex
  - Steam Cracker (Planned)
  - NGL Pipeline
  - Purity Ethane Pipeline
  - ATEX Express Pipeline
  - TEPPCO Product Pipeline
  - Mariner West Pipeline
  - Mariner East 1 Pipeline
  - Mariner East 2 Pipeline
  - Utopia Pipeline
  - Cornerstone Pipeline
  - Falcon Pipeline (Planned)

(a) MPLX owns 100% of plants 1-6 at the Sherwood Complex, plants 7+ are owned 50/50 with Antero Midstream through a joint venture, Sherwood Midstream LLC.
MPLX - Gathering & Processing
Marcellus & Utica Operations

- **Gathering capacity**: 5.4 Bcf/d
- **Processing capacity**: 8.4 Bcf/d
- **C2+ Fractionation capacity**: 553 MBPD
- **Cond. Stabilization capacity**: 25 MBPD
Sherwood Complex: Pre-construction
Marcellus & Utica Operations

- Keystone Complex
- Mobley Complex
- Cadiz Complex
- Hopedale Complex
- Houston Complex
- Majorsville Complex
- Sherwood Complex
- Seneca Complex