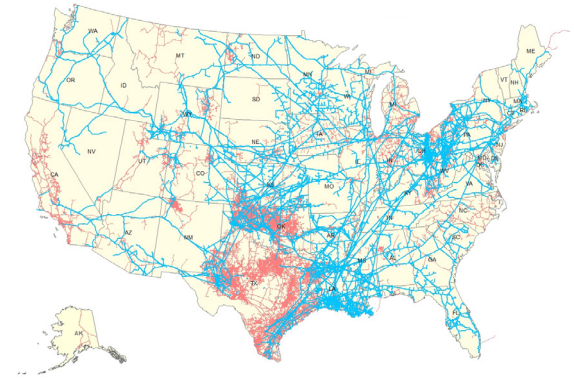
The case for energy infrastructure as a real asset

Real assets are defined as physical assets that have an intrinsic worth due to their substance and properties. Real assets typically include precious metals, commodities, real estate, land, equipment and natural resources. Tortoise defines essential assets as assets and services that are indispensable to the economy and society. In our view, midstream energy infrastructure is one of the most essential real assets, resulting in relatively inelastic demand. Midstream energy companies share some key characteristics such as, providing solid long-term performance that generally has low correlation to broad equity markets, steady cash flows and inflation protection because they own and operate the long-lived assets that make up the midstream energy infrastructure.

Midstream pipeline fundamentals	Operating characteristics
Essential assets	Critical assets that fuel our economy
Inelastic demand	Commodities used for daily needs
Recurring revenues	Fee-based, long-term contracts
Inflation protection	Long-term contracts, regulated rates
Long-lived	Economic lives > 50 years

Today, the U.S. has more than two million miles of energy pipelines, the largest network in the world. Across the U.S., natural gas is transported almost entirely by pipeline, and more than 90% of crude oil and refined petroleum products are transported by pipeline at some point. According to the BP Statistical Review of World Energy, global energy demand growth has grown 35 of the past 36 years driven by economic and population growth. Now that the U.S. is a net exporter of energy, providing low cost energy to the rest of the world, the robust and growing network of pipelines, these real assets, are even more essential across the globe. These factors lead to an estimated $100 billion of investment tied to pipeline and related projects across the U.S. from 2019-2021.

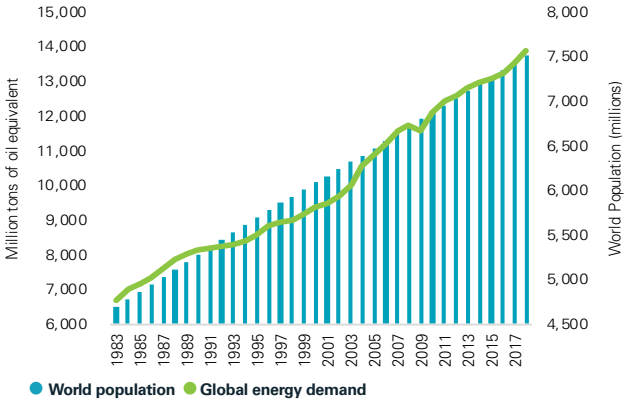
U.S. natural gas pipelines



Interstate Intrastate

Source: American Energy Mapping (AEM) 2013

Global demand growth



Source: Bloomberg, BP Statistical Review of World Energy 2019

Inflation protection and resilience in a rising interest rate environment

A pipeline attribute that aligns with those of real assets is the potential protection from inflation and rising interest rates. Pipelines typcially have long-term contracts with inflation protection from regulated rates. Tariffs on regulated pipelines often include an inflation escalator. This allows increases aligned with the Producer Price Index (PPI) offering some protection from a spike in inflation.

Pipeline transport contracts

Term	5-20 years, complemented with shorter-term contracts for remaining capacity
Tariffs	Interstate-FERC regulated | Intrastate-Public Utility Comission regulated

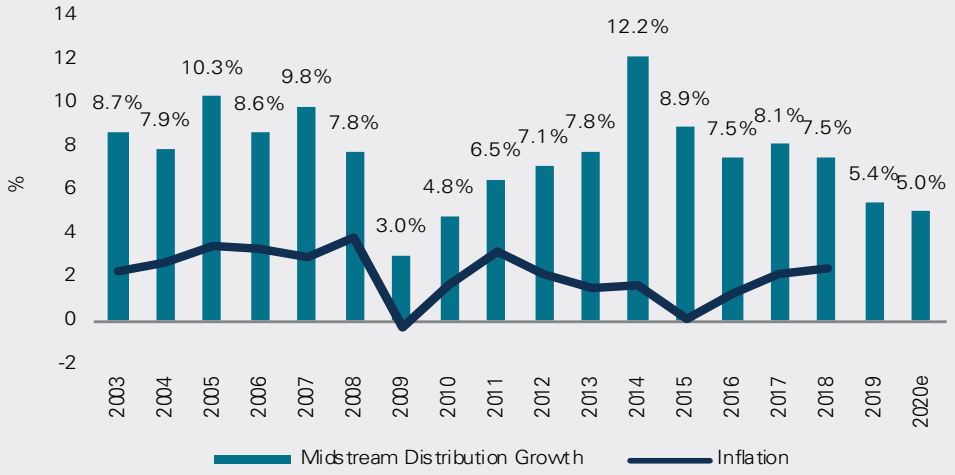
	Oil	Natural gas
Contracted service	Actual volume	Firm access to volume or interruptible volume
Tariff structure	Delivered volume	Capacity reserved and/or volume transported
Inflation escalation	PPI + 1.23[1]	Expectations built into contracts and access to regulatory rate filing proceedings

Source: Bureau of Labor Statistics, FERC. As of 12/31/2019. [1]Average PPI of the preceeding year's 12-monthly periods, effective through June 30, 2020 for certain oil pipelines.

PPI escalator of 4.3% took affect on July 1, 2019. Fixed rate is adjusted by FERC every five years and is based on average annual change in cost of service for the pipelines reporting to FERC less the annual change in PPI for the same period.

We believe the escalator that takes effect on July 1, 2020 will be positive under preliminary release data. We also expect the escalator that takes effect on July 1, 2021 to be positive, but largely dependent on commodity price volatility in 2020.

Inflation protection and durability



Source: Bloomberg and Tortoise as of 12/31/2019. The projections above are based on industry estimates and are no guarantee of future outcomes.

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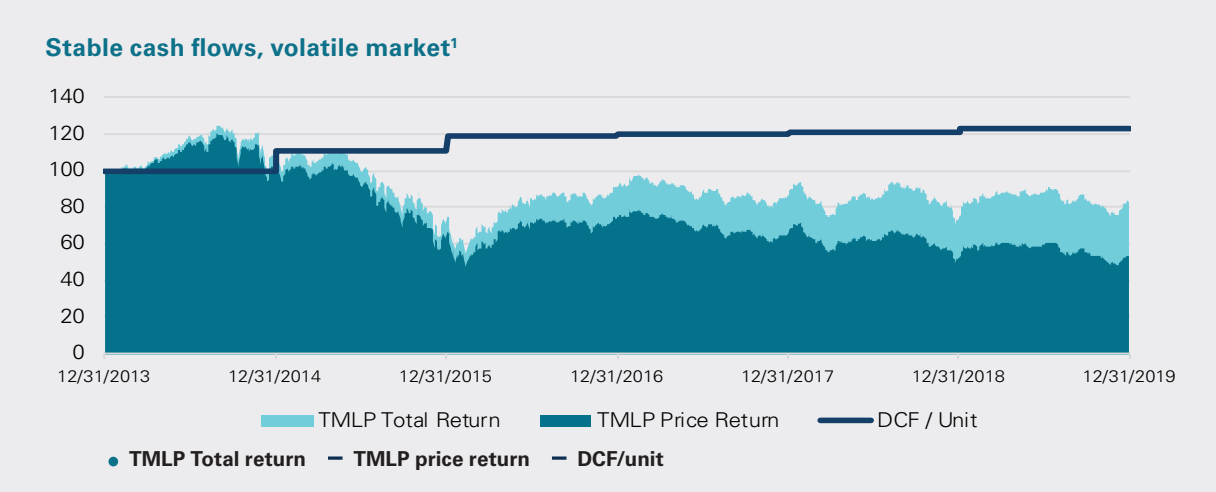
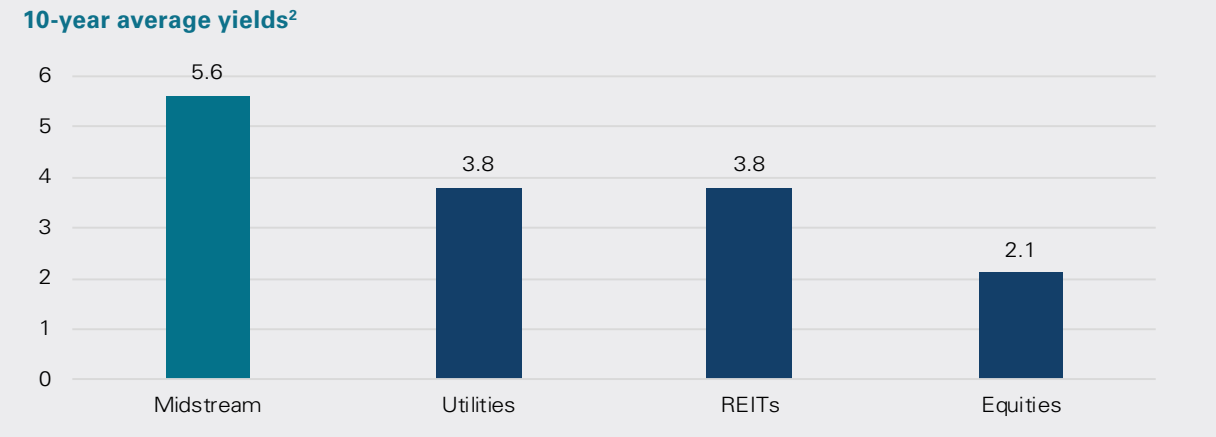
Solid long-term performance with steady cash flows

Midstream energy companies offer attractive total return potential in a defensive sector. The contract structure of the pipeline assets they own, combined with steady long-term demand growth has led to predictable and steady recurring cash flow growth over time. These fee-based cash flows have remained stable, even through volatile markets.



They also tend to offer attractive, sustainable yields with growth potential that is attractive relative to other yield-oriented securities.



Midstream energy also has a low correlation to broad equity and fixed income markets, providing potential portoflio diversification.

10-year correlation vs. midstream energy

	Midstream
Utilities	0.43
REITs	0.52
Equities	0.66
Crude oil	0.54
Bonds	-0.18

Source: [1]Bloomberg and Tortoise as of 12/31/2019. [2]Bloomberg, NAREIT (REITs yield) and Tortoise as of 12/31/2019.
DCF = distributable cash flow. Pipelines = Tortoise North American Pipeline Index℠ (TNAP). MLPs = Tortoise MLP Index® (TMLP), Midstream = 50% TMLP, 50% TNAP C-corporation sub-index. Utilities = S&P Utilities Select Sector Index. REITs = FTSE NAREIT All Equity REITs Index. Equities = S&P 500® Index. It is not possible to invest directly in an index. **Past performance is no guarantee of future results.**

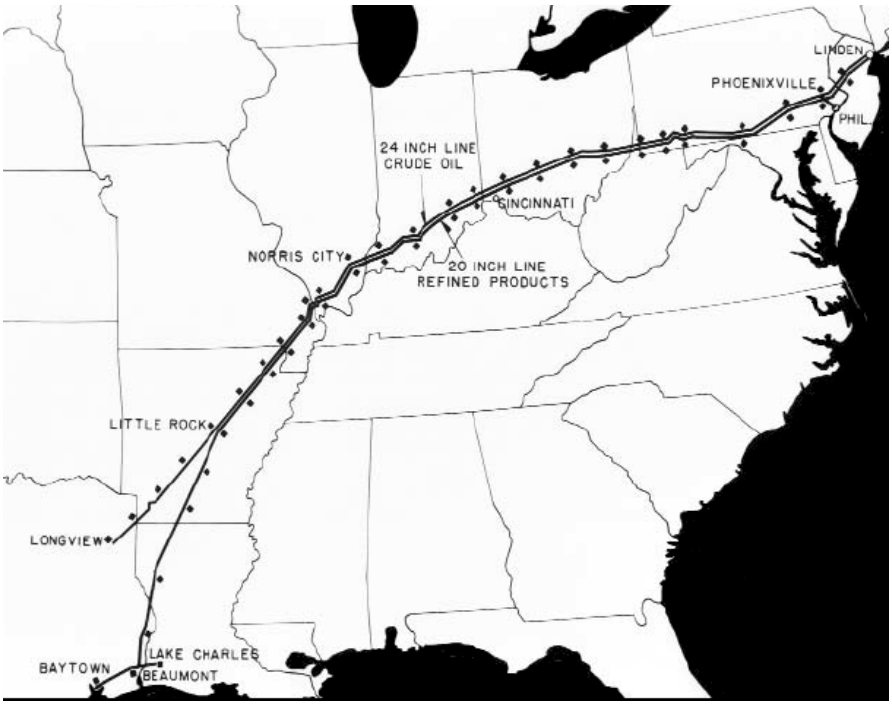
Midstream energy companies have typically fared better than bonds and other yield-oriented securities such as REITs and utilities during a rising interest rate environment. Pipeline companies' combination of attractive yield and growth potential distinguishes them from other income-oriented investments. Unlike bonds and REITs, midstream companies can more easily grow their distributions, which can help drive total return. Historically, midstream energy companies have experienced short-term volatility when interest rates increased, followed by a rebound and solid long-term performance. We believe that although these real assets are not immune to rising interest rates, they remain attractive long-term investments in both periods of economic growth and uncertainty. While higher rates are inevitable, we believe that over the long term, quality growth will prevail.

Pipelines are long-lived assets: Big Inch and Little Big Inch pipelines

The Inch pipelines (Big Inch and Little Big Inch) are petroleum pipelines that were built during World War II as emergency war measures. Prior to the war, petroleum products were transported by oil tankers, which were attacked by German submarines, threatening oil supply to the northeast and subsequent shipments to Great Britain. This pipeline project was championed as a more secure way to transport petroleum products.

History of energy infrastructure

Big Inch and Little Big Inch Pipelines of WWII



Source: Courtesy the Library of Congress, U.S. Farm Security Administration/Office of War Information Black & White Photographs.

The pipelines were owned and financed by the government, but built and operated by a non-profit corporation backed by some of the largest U.S. oil companies, praised as an excellent example of private and public sector cooperation. In 1947, the Texas East Transmission Corporation purchased the pipelines for $143,127,000. With demand for natural gas rising, the corporation converted them to transport natural gas. The conversion was a solution to the large amounts of natural gas flaring occurring in the Texas oilfields.

In 1957, the Little Big Inch portion, south of Ohio, was transferred from TETCO to the subsidiary Texas Eastern Petroleum Products Corporation (TEPPCO), and converted back to use for petroleum products. TEPPCO was later spun off into a separate company that was then later purchased by Enterprise Products in 2010. The pipeline is still in full operation today and is considered a prime asset within Enterprises' portfolio.

In 1989, TETCO, which still owned the Big Inch pipeline, was purchased by the Panhandle Eastern Corporation, and in 1997 this company merged with Duke Power, to form the Duke Energy Corporation. A decade later in 2007, the pipeline was spun off from Duke Energy, to form part of Spectra Energy Partners, an affiliate of Spectra Energy. Yet another decade later to 2017, Enbridge Inc. purchased Spectra Energy and Spectra Energy Partners, creating the largest energy infrastructure company in North America. Enbridge continues to own and operate the Big Inch pipeline system today. Now simply known as the Texas Eastern, the system comprises more than 9,200 miles of pipeline and connects the Gulf Coast supply centers to high demand markets in the northeast. The natural gas moving along the system supplies local power companies. The pipeline network can transport 6.7 Bcf/d of natural gas and offers approximately 75 Bcf of gas storage long various points along the route. It is also interesting to note that the pipeline has expanded many times throughout the years as both increased demand and new locations have required additional natural gas.

Expansion history:

- 1996 - The pipeline was connected to the Egan Natural Gas Hub
- 1996 - ITP Phase I & Philadelphia Lateral completed
- 1997 - Columbia, Virginia & Line 1-A Expansion completed
- 1998 - Lebanon Lateral Expansion completed
- 1999 - CNG Lease Expansion completed
- 2000 - Ironwood Lateral & Vermillion Lateral completed
- 2001 - Liberty Expansion completed
- 2002 - TIME Expansion, Hanging Rock Lateral & Freehold Lateral completed
- 2004 - M-1 & Dominion Expansion completed
- 2007 - TIME II Expansion Phase 1 completed
- 2008 - Cedar Bayou Lateral & TIME II Expansion Phase 2 completed
- 2008 - Open season launched for TIME III Project connecting Rocky Mountain natural gas supplies
- 2009 - Northern Bridge Project completed
- 2011 - TEMAX/TIME III, Hot Spring Lateral Project
- 2012 - Spectra announced FERC approval for a 20 km extension into New York city
- 2012 - TEAM 2012 Expansion & Philadelphia Lateral Expansion Project completed
- 2013 - Spectra Energy Secures Long-Term Contracts for Gulf Market Expansion Project
- 2013 - NJ-NY Project
- 2014 - TEAM 2014 Expansion completed

As you can see, the Big Inch and Little Big Inch pipelines have played an integral role in the buildout and economic expansion of the U.S. These two pipelines have not only persisted for almost 80 years, but continue to be critical assets to the areas they serve. The Inch pipelines are just one example of the many long-lives assets that in the U.S.

Conclusion

In our view, energy infrastructure is one of the most essential real assets and is critical to our everyday lives. Midstream energy investments can also play an essential role in a portfolio potentially providing solid long-term performance with steady cash flows, inflation protection and low correlation to broad equity markets. As the industry has gone through a structural transformation over the past few years, performance has retreated and price volatility has increased, despite growing cash flow. As governance and balance sheets have improved and the dependence on equity capital markets has dissipated, we believe volatility and returns will revert back to longer-term norms.

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