Ensuring Natural Gas Availability

- What does Gas Availability Mean?
- Pipelines are Pipelines
- It is All About Institutions
- Even a Well-Designed Market Needs Logistics
- Adequate Infrastructure and Investment
The Political Economy of Pipelines:

A Century of Comparative Institutional Development

Published: April 2012
US and EU Perspectives on Gas Infrastructure

- Like Night and Day

- In the US, we’re dealing with two **deregulated** industries
  - Merchant power generation (**deregulated**)
  - Gas (**deregulated**) and pipeline transport markets (**deregulated capacity markets**)
  - The gas pipeline industry is based on **well-defined property rights** regarding spatial and temporal shipping capacity on the pipeline system.
  - Pipelines handle gas through the **competitive trade in property rights** to transport over a cost-based regulated interstate pipeline system
  - Expansion to the gas pipeline system has handled **competitively** with **investor capital**
In the EU, we’re dealing with a tightly-regulated pipeline sector with very high barriers to entry

- Socialized spatial and temporal pipeline capacity on the EU pipeline system
- “Entry/Exit” pricing (born in the UK) abstracts from physical transport contracts
- The EU, in its 2009 regulations, has decided not to use pipeline prices and physical contracts (and the capital markets) to ration capacity use.
- Central planning, not markets.
The US has had interstate pipelines for more than 100 years—and in the 21st century, pipeline planning and expansion is done competitively by investors.

The EU created some pipelines after WWII, but the great expansion came in the 1970s. The existing system was generally planned and constructed by state-run companies.

Pipeline planning is transparent, independent and competitive in the US, but is none of those three things in the EU.
Gas Prices tied to Oil

Gas and Oil Prices in Europe, 2005 – February 2013
Gas Prices Competitive

Gas and Oil Prices in the U.S., 2005 – February 2013

Henry Hub Natural Gas and WTI Crude
2005 - February 2013

$100 Billion/year less than what Europeans pay for equivalent volumes

Hurricanes Katrina and Rita
Ensuring Gas Availability

- What does it mean?

- In the US, it means avoiding the economic shortages like we had in the 1970s.
  - Those were the result of economic regulation of the wellhead price of gas.
  - There was plenty of gas, but oil companies preferred to keep it out of interstate markets until price controls went away.

- In 2013, it seems to mean how we handle needle peak days in the electric markets
Pipelines are Pipelines

- Pipelines are pipelines
  - Cost is linear in diameter-miles. Twice as long, twice as expensive. Twice as wide, $\pi$ times the capacity.

- Point-to-point pipeline capacity conforms to century-old formulas
  - Mr. R. Weymouth figured out the mathematical relationship that defined gas pipeline capacity 101 years ago. Nothing much has changed.

- Pipeline capacity is something Archimedes would admire
The Quintessential Picture of Declining Costs

Average Cost of Gas Pipeline Capacity

Pipe Diameter (inches)

Cost per Pipeline Cross Section per Mile

-1,000

$1,000

$3,000

$5,000

$7,000

$9,000

$11,000

$13,000

$15,000

1956

1959

1960

1980

1935

Power (1980)

Power (1959)

Power (1960)

Power (1935)

Power (1956)
What Interests Economists about Pipelines (at least some of us)

- **Asset Specificity**
  - “Marginal costs with a ball and chain”
  - Avoiding opportunism (and “hold up”) is key for those who sink money in stationary, high-fixed-costs and dedicated assets.
  - The remedy for asset specificity in pipelines is either vertical integration or contracts.
  - But pipeline contracts that could take the place of vertical integration are *hard*. That type of contract had to be *invented* in the US—and only arose in the 1940s.
What Interests Economists about Pipelines (at least some of us)

- **Transacting** on a network
  - Transacting between two points on an AC electricity grid is impossible—the electrons flow everywhere at the speed of light.
    - Hence we have US **Independent System Operators (ISOs)** for all the power pools connected by AC grids.
  - Transacting between two points on an interconnected gas system is **easy**—a matter of straightforward accounting with commingled gas.
    - Hence we have **no ISOs, or TSOs**, for the US interstate gas pipeline system.
Has the US Ever Planned a Government-Financed Pipeline?

- Once!
- Oil Deliveries to the East Coast of the United States January 1941 to August 1945.
Inland Fuel Market Performance and Adequacy is All About Institutions

- When the institutions of regulation successfully take pipelines out of the fuel trade, the inland fuel markets can be competitive.
  - In the EU gas industry, the pipeline companies control everything and there are no major independent buyers like America’s distribution utilities.
    - No competitive bypass, no real fuel rivalry, no Polish shale, high prices
  - In the US oil industry, the pipeline companies are vertically integrated and subject to strange and antiquated regulations.
    - Hard to site new pipelines, backlog of North Dakota/Alberta tar sands crude oil.
>213,000 Miles of Interstate Pipelines

Physical Contracts for Pipe, Receipt and Delivery Point and Interconnections between Pipeline Companies

Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite.
Compare to Notional Entry/Exit “Islands” in Europe

Physical Contracts Prohibited in the Third Package in favor of “entry/exit” arrangements

Source: Pamela Taylor, OFGEM, EPRG Winter Seminar (Cambridge), 9 December 2011
When Pipeline Companies Do Not Control the Gas Trade

Gas and Oil Prices in the U.S., 2005 – February 2013

Henry Hub Natural Gas and WTI Crude
2005 - February 2013

Hurricanes
Katrina and Rita
Gas and Oil Prices in Europe, 2005 – February 2013

When Pipeline Companies Do (among other things)…

European Consumers are Paying €80 Billion/year more than what Americans pay for equivalent volumes.
“Poland Stumbles as Shale Gas Industry Fails to Take Off”  Herald-Standard (Uniontown, Pennsylvania)  Tuesday, January 29, 2013

“Despite the enormous infusion of capital and promises that production could start as early as 2015, however, Poland's gas industry has yet to take off. Hampered by difficult geology, a paltry service sector, a lack of adequate infrastructure, as well as an uncertain regulatory and tax environment, there have been few exploratory wells drilled.”
Regulation of Pipelines Always Begins as a Total Mess

- The US botched the regulation of US oil pipelines in 1906—it strengthened monopoly in the oil business, contrary to the public interest.

- The US tried to regulate gas pipeline better, beginning in 1938:
  - It took the next 62 years of litigation and regulation to make reasonable public interest regulations in the year 2000 that made gas competition possible.

- Europe has tried regulation its pipelines 3 times since 1998:
  - It is currently a public interest mess…at best a work in progress.
US Oil Pipeline Regulation Grew out of a Battle Between These Two Men

What Came of it in 1906 was Pretty Crummy Regulation (PCR)—that still exists today.
Problems in Oil Pipeline Adequacy

A Glut has Developed at Cushing OK

Cushing, OK
Supply glut discounted price (WTI)

Spread of as much as $20 per barrel

Gulf Coast, TX
Premium price tracking Brent and other indices
Problems in Oil Pipeline Adequacy

Spread on Brent versus WTI Crude Oil Prices

Notes and Sources:
Data from Bloomberg, L.P.
Brent crude oil spot prices were only available beginning May 19, 2003.
Problems in Oil Pipeline Adequacy

“2012: The Year of the Tank Car”

![Graph showing originated rail carloads of crude petroleum on U.S. Class I railroads from 2003 to 2012.](image)

- **2003**: 12,291
- **2004**: 9,961
- **2005**: 6,032
- **2006**: 4,729
- **2007**: 5,912
- **2008**: 9,500
- **2009**: 10,840
- **2010**: 29,605
- **2011**: 65,751
- **2012**: 203,585

*Jan.-Sept. annualized, Source: AAR Quarterly Commodity Statistics database
Even Well-Functioning Gas Markets have Temporary Problems

- Chicago City Gate - Henry Hub Natural Gas Price Basis Differential
- SoCal Border - Henry Hub Natural Gas Price Basis
- GDO Midpoint Basis to Henry Hub

Source: Task Force analysis based on Platts data
Consequences of the Southwest Cold-Weather Event of 2011

- **Top-Down Planning?**
  - No practical possibility of the FERC reversing effective deregulation of the incremental market for pipeline capacity

- **Market Signals for Capacity?**
  - Pipelines are highly profitable. Just ask Warren Buffet (who is also into Burlington Northern)

- **Innovative new Pipeline Prices and Services?**
  - Probably not. Value of intangible property rights in capacity markets is too well defined to be upset.
Consequences of the Southwest Cold-Weather Event of 2011

- More and better logistical coordination
  - Align gas and electric cay

- Better incentives for electric plant availability
  - Penalties
  - Storage
  - Dual fuel requirements

- Regional consumers of capacity/storage
  - The ISOs: A National Grid proposal
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