Risk Management as U.S. Natural Gas Transportation Explodes

MIT Supply Chain Management

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MIT GLOBAL SCALE NETWORK

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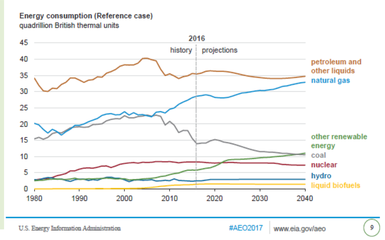
Motivation / Background

The EIA projects that, by 2040 40% of all energy production in the U.S. will be from natural gas, up from 29% today.

Since 1997, pipeline incidents have caused: 11,457 accidents, 322 fatalities, 1,336 injuries, and over $7 billion in costs.
(US DOT Pipeline and Hazardous Materials Safety Administration.)



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Jukka Isokoski. Gasum Oy. https://commons.wikimedia.org/wiki/File:Liquid_natural_gas,_land_transportation,_Finland.jpg. Available for public use with adaptation.

Key Question / Hypothesis

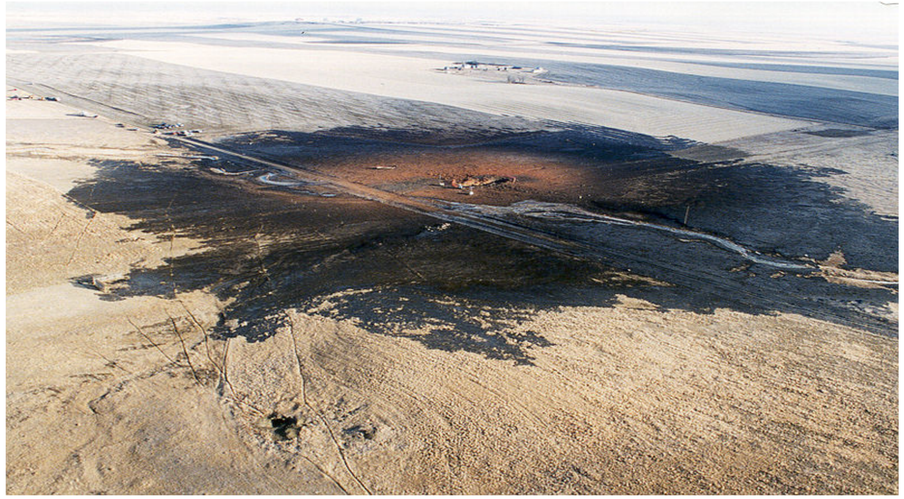
Goals/ Questions:
Quantify the risks associated with the transportation of natural gas.
How might these risks scale with the growing demand?

Expectations:
Pipelines will be the safest option.
The current infrastructure will be unable to support the growing demand.

Relevant Literature

Diana Furchtgott-Roth. (2013). Pipelines are Safest for Transportation of Oil and Gas (Issue Brief No. 23) (p. 10). Manhattan Institute for Policy Research. Retrieved from https://www.manhattan-institute.org/pdf/ib_23.pdf

U.S. Energy Information Administration. (2017). Annual Energy Report 2017. Retrieved from https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf



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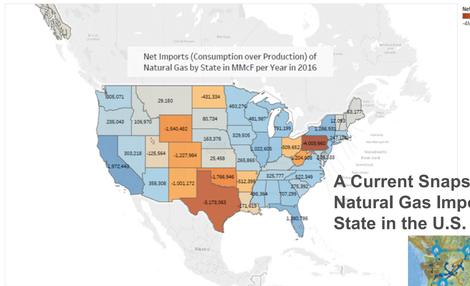
Methodology

The project analysis will consist of two parts:

1. **A forecast of the supply & demand for natural gas across the U.S. up to 2040.**
   - **Utilizing historical supply and demand data by the E.I.A.**
   - **Identify net producers and consumers.**
   - **Calculate the predicted volume to be transported.**
   - **Estimate the volume in excess of current pipeline capacity.**
2. **An analysis of the risks associated with natural gas transportation.**
   - **Utilizing accident data provided by the USDOT**
   - **Categorize accidents associated with transportation by pipeline, truck, and rail.**
   - **Identify factors most correlated with accidents (mode, location, product type, etc.).**
   - **Quantify the environmental impact for each mode of transportation.**

Initial Results



A Current Snapshot of Natural Gas Imports by State in the U.S.

U.S. Energy Mapping System U.S. Energy Information Administration. https://www.eia.gov/state/maps.php?v=Natural%20Gas.

Expected Contribution

Expected Deliverables:

- **A detailed supply and demand forecast for natural gas and derivative products across the U.S. up to 2040.**
- **Safety considerations and recommendations for the transportation of natural gas products.**
- **A potential justification for increase pipeline network capacity (the construction of new pipelines).**
- **Comparative risk statistics for the transportation industry.**

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