

NRG Energy:

Tracing Natural Gas Purchases Through Blockchain



PROJECT OBJECTIVE

NRG Energy, Inc. is the largest independent power producer in the US, with roughly 50 GW of fossil fuel, nuclear, and renewable energy. Approximately 90% of its natural gas is purchased over an exchange, meaning that the exact origin is unclear beyond the general region of procurement. **Through the S-Lab project, NRG wishes to develop a plan for a pilot program using blockchain technology to trace the source of natural gas.**

BUSINESS CASE

NRG follows five key pillars of sustainability. This project relates to the third pillar – **Sustainable Suppliers**. The company’s goal is to be able to trace 20% of its natural gas purchases to specific wellheads by 2019, achieving carbon and water reduction goals.

- 1 SUSTAINABLE BUSINESS
- 2 SUSTAINABLE CUSTOMERS
- 3 SUSTAINABLE SUPPLIERS
- 4 SUSTAINABLE OPERATIONS
- 5 SUSTAINABLE WORKPLACE



METHODOLOGY AND FINDINGS

We conducted eight interviews across the natural gas supply chain and with blockchain experts. Supplemented by secondary resources, we explored three avenues:

Is blockchain the best solution?

We looked into the problem of supply chain traceability to understand whether blockchain is the best solution and to explore other methods of tracing a commodity.

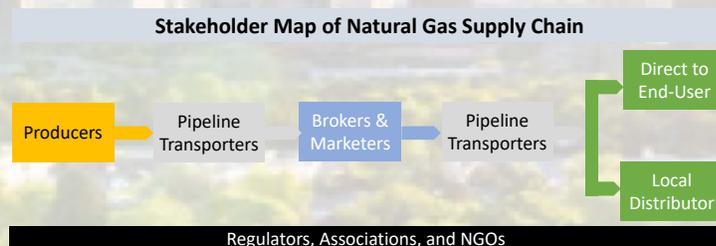
Is implementation feasible?

We mapped out the stakeholders of the natural gas supply chain to understand how each player will respond to blockchain technology implementation.

How can we implement?

We researched into the different types of blockchain ecosystem, mapping out a pilot plan that can be followed to implement the technology across the supply chain.

We find that the characteristics of transparency and decentralization of blockchain technologies could be useful to generate a new natural gas marketplace.



However, after analyzing the incentives of the major stakeholders in the natural gas supply chain, we believe that **implementing blockchain is difficult** due to the vast number of producers that require buy-in. Unless a **price premium** can be commanded on natural gas from “sustainable” wellheads, it will be difficult for all producers to get on board with the technology.

Moreover, brokers and exchanges will most likely resist the implementation of blockchain. Marketers and brokers are against transparency in the supply chain because **competitive advantages as part of the trading strategy can be eroded** if they reveal their sources. Based on our interview, the only method to “force” marketers to reveal their source is through **regulatory requirement**. Otherwise, they are **unlikely to support** any form of technology for traceability.

RECOMMENDATIONS

Pilot Project Plan

Objective: Build a private blockchain platform and test engagement between participants.

Stakeholders Involved: NRG and 2-3 known responsible natural gas producers with existing relationship.

Required resources:

- Technology development phase (4-6 months)
 - Option A: Hire a small blockchain firm \$0.5 M to \$1 M in development costs + 10 employees
 - Option B: Hire IBM -> \$4 to \$5 M in development costs + 10 employees
- Operation phase: 5 full time employees

Alternatives to Consider

Responsible broker program: Design and promote a program for brokers who only deal natural gas from known responsible producers. These brokers could be incentivized by an assurance from NRG (and perhaps other industrial natural gas consumer) that they will purchase supplied before turning to other brokers.

Through this program, NRG would not need to know the exact supplier of the natural gas, it would be enough to have the certainty that a specific broker only deals with responsible producers.