VIEW POINT

TRANSFORMING THE ENERGY ECOSYSTEM WITH BLOCKCHAIN

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The Oil and Gas industry are currently facing a crisis that threatens even most of the stable organizations. After an extended period of high oil prices till 2014, the industry is facing what appears to be an extended period of low oil prices. Over the last few years, Oil companies have been witnessing **declining** operational efficiency and asset reliability while experiencing increase in **exploration and production costs**. Crude oil is trading below the production costs for most of the countries. Add to this increased costs of input, maintenance of aging assets, increased regulatory insight like cap on carbon emissions, and complex supply chains.

Now, more than ever before, the Oil & Gas industry needs to evaluate the opportunities to reduce operational expenses through business process automation and disintermediation, improve transparency in the supply chain, and maximize their asset potential. These opportunities lie in new and emerging technologies such as blockchain. This point of view makes a business case for this technology, explores the potential for blockchain across the O&G value chain. Blockchain can facilitate the collaboration between industry stakeholders through seamless transfer of data/value, track the sourcing of raw materials and products from suppliers till distribution channels. Thereby automating many currently manual tasks in supply chain processes. The result will be dramatically increased efficiency, improved asset maintenance, lower costs, faster processing, improved data quality and reduced fraud.

Challenges faced by the energy industry

The past five years of low and volatile oil prices have impacted the entire Oil & Gas industry. From corporate strategies, operational performance, financial results, to even innovate, companies are exploring new ways to adjust to the new normal.

Operational expense: Administrative processes such as post trade reconciliations, procurement of spare parts, equipment, materials and services (like Proppant, water hauling) and invoice reconciliations are complex and error prone. Operational efficiency opportunities are present across the value chain right from Oil exploration to consumption.

Supply chain: Growing supply chain complexity with ever increasing network consolidation combined with greater dependency on third parties across the value chain is resulting in counterfeit. Currently,10%[2] loss of fuel due to pilferage and contamination.

Asset maintenance: Existing infrastructure and assets within Oil & Gas industry are continuing to age resulting in increased equipment failures. As per the U.S. Department of Energy estimates, 75%[4] of breakdown or outages are unplanned leading to shortfall in oil production.

Blockchain adoption is picking up steam in the Energy industry

BEnergy firms are increasingly reporting higher production costs and lower revenues due to declining oil prices. In pursuit of sustainable cost reductions and near- and long-term profitability, oil companies are exploring strategies in operational efficiency, reduced expense ratios and new revenue models.

According to a global market research report, Blockchain in Energy is expected to grow at a CAGR of 50%, blockchain investments to reach $3 Billion and yield potential savings of $300 B to the industry by 2025 YoY.

Opportunities for blockchain across the energy value chain

The opportunities for blockchain are present across the value chain, from oil explorations and production to refinery, distribution and marketing.

Supply chain: The oil & gas industry spend up to 10% of its annual revenue on Freight Bill Audit and Pay process, average of 40,000 USD per hour in Demurrage Claim Settlement and incurs loss up to 10% of the global fuel sales in fuel pilferage & contamination. Blockchain based network connecting the stakeholders in a supply chain automates the end to end business processes like order to cash, freight bill audit and pay and provides complete traceability of the refined products.

Trading & Financial Transactions in O & G Value chains: Commodity trading involves complex processes and multiple intermediaries like Brokers and Pricing Index reporters at various points of the life cycle which makes it inefficient, error prone involves high transaction costs due to costly exchanges, broker fees etc. and high operational costs due to time consuming reconciliation issues and costly back office processes.

Blockchain based trading platform provides single source of truth for the complete trade lifecycle to the counterparties through shared ledger and automates manual verification and post trade reconciliations by eliminating the data exchanges through emails or fax. With streamlined processes and improved efficiency, there is potential savings of up to 30-60%[7] in the transaction costs.

Contract Management: The contract management process is mostly manual, and paper driven in today's world making it inefficient and intermediary dependent. Oil & Gas companies usually have different types of contracts as part of their operations across the value chain like joint operating agreements, LSTK contracts, pipeline contracts, Lease exchange agreements and minerals supply contracts. Blockchain based platform automates the existing paper contracts and reduces the operational costs by 9%[6].

Digital Prescriptive Maintenance: Energy industry is having a challenge of timely asset maintenance. Downtime is most costly to the oil industry when it's unexpected, and 75% of shutdowns are unplanned and cost oil and gas companies an average of $200[5] billion a year. DLT based prescriptive (milestone-based services) & condition-based asset maintenance (ambient & performance-based service) provides the distributed transaction ledger for maintenance milestones and helps in reducing the unplanned downtimes and outages.

Regulatory oversight: Policy makers and regulatory bodies face a challenge in ensuring compliance by the Energy companies. Regulation demands complete adherence to key areas like price reporting, operational safety, auditability and trade surveillance. Immutable ledger technology and transparency can significantly improve auditing and regulatory compliance in security, record management, risk management and auditable document exchange.

Document Exchanges across the Value chain: In oil & gas industry, large project documents like drawings, seismic surveys and contracts and shipping related documents must be continually exchanged between the counterparties. Most of these documents are still exist in paper and are varied in size and format across the value chain. This makes the document exchange a complex process which involves intermediaries and results in delayed payments & disputes, longer verification and enforcement of compliance with regulatory bodies. Blockchain can provide unprecedented accessibility and transparency of different documents like regulatory, engineering, maintenance, supply, contractual etc. between the counterparties across the value chains.

Marketplace for EV charging: A key challenge to widespread adoption of electric vehicles (EVs) is range anxiety. Lack of easy availability of EV charging infrastructure is often a key deciding factor for electric vehicle buyers. Oil & Gas companies can capitalize by offering existing infrastructure for EV charging over a marketplace.

Blockchain based platform offered by the energy companies connects private & commercial charging station owners, EV owners and energy companies. EV owners can raise a request for charging and receive bids from the charging station owners. Smart contract can select a best bid matching his requirement of EV owner. The amount of time and energy used to charge the vehicle is recorded on blockchain. The energy company decides the rate and the blockchain verifies what the driver owes and digitally transacts payment.

Conclusion

Blockchain technology has strong potential to greatly impact the oil and gas industry by improving the operational efficiency, reducing expense ratios and by creating new revenue streams. It brings transparency in tracking the source of raw materials & products from suppliers till distribution channels, thereby automating many currently manual tasks in supply chain processes like water hauling, automated freight bill audit and pay, document exchange, demurrage, inventory management to name a few. It also helps in reducing the volume of manual work involved in activities such as bookkeeping, capital project tracking (authorization for expenditure) and contractual obligations.

About the Authors

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Divik handles global engagements in Healthcare, Life Sciences, Energy and Utilities in Blockchain. He also offers executive level advise and thought leadership focusing on how blockchain can be applied to specific business units and how to it can leveraged by public or private sector organizations. He also has expertise to undertake assessment of corporate strategy to evaluate blockchain potential applicability and business impact.

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