



Octaneum

Blockchain Solutions

for the Oil and Natural Gas Industry

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Oil and Natural Gas Market Trajectory

As the global population grows, so does the demand for energy sources that power every facet of our daily lives.¹ Despite the continual push for renewable energy sources – which comes from a variety of stakeholders, e.g., governments, scientists, and world citizens concerned about humanity’s negative impact on earth’s climate -- oil and natural gas dominate the energy market and will continue to be the primary sources of energy for the foreseeable future. Indeed, regardless of the efforts to construct and deploy geothermal, hydropower, solar, wind, and biomass technologies,² oil and natural gas consumption continues unabated.

Oil Consumption and Production Statistics

Oil is one of the most significant energy sources, comprising 32.9% of the world’s energy consumption.³ Although oil is utilized in every industry, the transportation sector currently consumes roughly 50% of total global consumption.⁴ Consumption by the petrochemical industry lags far behind that of transportation, at 14% of total oil consumed, while the combined residential, commercial, and agricultural demand for oil marginally supersedes that of the aviation industry, at 8% and 7%, respectively.⁵ While global investment in clean or green energy sources and technology has sextupled between 2004 (\$45B) and 2017 (\$280B),⁶ that sector continues to fall short

¹ Clemente, Jude. (2016). Global Oil Demand Can Only Increase. *Forbes*. Available at: <https://www.forbes.com/sites/judeclemente/2016/08/28/global-oil-demand-can-only-increase/#62c3e60f31a0>

² U.S. Department of Energy. (n.d.). Renewable Energy Technologies for Federal Projects. Available at: <https://www.energy.gov/eere/femp/renewable-energy-technologies-federal-projects>

³ Hussain, Jassim. (2015). Energy Alternatives and the Future of Oil and Gas in the Gulf. Available at: <http://studies.aljazeera.net/en/dossiers/2015/03/201533183514675179.html>

⁴ Statista. (2018). Distribution of oil demand worldwide 2016 by sector. Available at: <https://www.statista.com/statistics/307194/top-oil-consuming-sectors-worldwide/>

⁵ World Energy Council. (2016). World Energy Resources 2016. Available at: https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources_SummaryReport_2016.pdf

⁶ Statista. (2018). New investment in clean energy worldwide from 2004 to 2017 (in billion U.S. dollars). Available at: <https://www.statista.com/statistics/186807/worldwide-investment-in-sustainable-energy-since-2004/>

in delivering on its technological promise. In light of these facts, oil has a high likelihood of maintaining its status as the primary source for powering the world.

As is true for any commodity whose valuation is at the mercy of a labyrinthine network of internal and external forces, oil's prices are volatile. In 2014, for example, oil prices dropped from approximately \$100/barrel to under \$60/barrel.⁷ By 2016, prices had dipped to below \$30/barrel.⁸ As of May 8th of this year, Brent crude oil, the international price benchmark, is trading at around \$74/barrel.⁹ Price changes are neither unexpected nor unprecedented, as similar dips occurred in 1986, 1999, and 2001.¹⁰ Significant drivers of price change include increased production by non-OPEC nations, notably U.S. Light Tight Oil, and the buildup of OPEC spare capacity.¹¹

Emerging economies consumed 58.1% of global oil in 2016, with India (+5.2%) and China (+1.5%) generating increases, while oil use by Japan (-1.2%) and the U.S. (-0.9%) moved in the opposite direction.¹² Overall, global consumption rose for the second year in a row at 1.6 million barrels per day (b/d) after 15 years of decline.¹³

Despite concerns over exhausting the world's oil supply, there is a significant amount of oil still in the ground. Proven crude oil reserves total 1,650.7 billion barrels globally.¹⁴ Current consumption is 100.28 million b/d with 100.45 million b/d in current production.¹⁵ This works out to more than 45 years of oil based on known oil reserves. In 1980, global proven oil reserves were 642 billion barrels, while in 2010

⁷ Macrotrends. (2018). Brent Crude Oil Prices – 10 Year Daily Chart. Available at: <http://www.macrotrends.net/2480/brent-crude-oil-prices-10-year-daily-chart>

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² World Energy Council. (2016). World Energy Resources 2016. Available at: https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources_SummaryReport_2016.pdf

¹³ Ibid.

¹⁴ U.S. Energy Information Administration. (2018). International Energy Statistics – Crude Oil Proved Reserves. Available at: <https://www.eia.gov/beta/international/data/>

¹⁵ Ibid.

they were 1,432 billion barrels.¹⁶ Proven reserves change as new oil fields are discovered, and as advances in oil detection and extraction technologies create additional opportunities to increase the usable oil supply. Certainly, concerns about draining oil reserves are understandable; however, we are not as close to this reality as many people believe.

Case in point: OPEC countries control over 2 million b/d in unused production capacity, while the U.S. is expected to scale production quickly over the next two years and to drop imports from its 3.7 million b/d in 2017 to 1.5 million b/d in 2019.¹⁷ All things considered, there is ample production to meet demand.

The Natural Gas Market

Natural gas is the world's second-largest energy source, with 24% of the market share and 22% in power generation.¹⁸ In the U.S., natural gas accounts for 29% of energy production.¹⁹ Notably, natural gas is currently the cheapest way to generate electricity.²⁰

The U.S. Henry Hub natural gas price average for March 2018 was \$2.69/million British thermal units (Btu),²¹ while the Japanese import price for liquefied natural gas (LNG) was \$9.40/million Btu,²² and the EU's LNG import price was \$7.03/million Btu.²³ Price

¹⁶ Index Mundi. (2015). World Crude Oil Reserves by Year. Available at: <https://www.indexmundi.com/energy/?product=oil&graph=reserves>

¹⁷ U.S. Energy Information Administration. (2018). Short-Term Energy Outlook. Available at: https://www.eia.gov/outlooks/steo/report/global_oil.php

¹⁸ World Energy Council. (2016). World Energy Resources 2016. Available at: <https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources-SummaryReport-2016.pdf>

¹⁹ U.S. Energy Information Administration. (2017). U.S. Energy Facts Explained. Available at <https://www.eia.gov/energyexplained/>

²⁰ Institute for Energy Research. (2018). Levelized Cost of New Electricity Generating Technologies. Available at: <https://www.instituteforenergyresearch.org/studies/levelized-cost-of-new-generating-technologies/>

²¹ U.S. Energy Information Administration. (2018). Natural Gas. Available at: <https://www.eia.gov/dnav/ng/hist/rngwhhdm.htm>

²² YCharts. (2018). Japan Liquefied Natural Gas Import Price. Available at: https://ycharts.com/indicators/japan_liquefied_natural_gas_import_price

imbalances have resulted from an oversupply in North America along with continuously evolving energy security plans around the globe.

Worldwide proven natural gas reserves are 6,966 trillion cubic feet (Tcf).²⁴ Based on 2015 worldwide production, that leaves about 55 years' worth of natural gas for future consumption.²⁵ It is estimated that proven reserves constitute only 15% of the natural gas in the U.S. The remainder is either undiscovered, inaccessible with current technology, or not financially feasible to harvest within the existing infrastructure.²⁶

Current Industry Challenges

The oil and gas industry function within a complex regulatory environment. Companies must receive permission from governments to extract oil and gas. In many jurisdictions, these companies must build infrastructure that aligns with local and national codes and adhere to a variety of regulations. Furthermore, throughout the oil supply chain there are different standards in both equipment and business practices. The highest number of international arbitration cases involves oil and gas companies, and this is a result of the vast number of agreements that exist between companies and governments.

For example, a company that wants to explore an area for possible oil extraction may create a consortium of companies to distribute and thus lower their risk. This requires agreements on how costs and future revenues will be split. Then the company, which is leading the consortium in this case, will need to obtain the appropriate permissions from the government, involve a government-owned company in a production-sharing

²³ YCharts. (2018). European Union Natural Gas Import Price. Available at: https://ycharts.com/indicators/europe_natural_gas_price

²⁴ U.S. Energy Information Administration. (2018). International Energy Statistics – Proved Reserves of Natural Gas. Available at: <https://www.eia.gov/beta/international/data/browser/>

²⁵ World Energy Council. (2016). World Energy Resources 2016. Available at: https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources_SummaryReport_2016.pdf

²⁶ Brock-Wirfs, Jordan. (2014). IE Questions: What are “Unproved” Reserves and Why Should You Care? Available at: <http://insideenergy.org/2014/12/22/ie-questions-what-are-unproved-reserves-and-why-should-you-care/>

agreement, and negotiate with the government regarding the percentage of royalties, bonuses, and taxes. Subsequently, a company that finds enough oil for extraction will need to establish transportation contracts. Additionally, for every international jurisdiction separate permits and contracts may be required. Hence, every step in the process requires negotiation, which, in turn, increases the complexity of the venture and the likelihood of arbitration.²⁷

Climate change advocacy groups have long pressured oil and gas companies to shift their focus. Recently, such advocacy groups have garnered broad support from politicians, and this support resulted in the Paris Climate Agreement of 2015, and we have seen increasing shareholder concerns over how oil and gas companies will remain profitable under new regulations. In just the first three months of 2018, there were 36 shareholder resolutions regarding the targeting of oil, gas, and power companies.²⁸ In contrast, the total for all shareholder resolutions targeting climate change initiatives aimed at U.S. companies for all of 2017 totaled only 46.

Investors want to know how these firms are going to address climate risk planning, methane emissions, political lobbying disclosure, and the transition to cleaner energy. ExxonMobil shareholders voted 62% in favor of annual disclosure of what parts of the company's portfolio will remain economically viable despite global efforts to limit climate change.²⁹ While Trump's administration has been oil- and gas-friendly, global trends are moving towards regulatory regimes that require business planning to take climate change into consideration. Companies in the industry will face increased pressure to be efficient and to be focused on maintaining a healthy portfolio as climate change regulations come into play.

²⁷ Bishop, Doak; Quintanilla, Roche; McBrearty, Sara. (n.d.). The Breadth and Complexity of the International Energy Industry. *Global Arbitration Review*. Available at: <https://globalarbitrationreview.com/chapter/1142563/the-breadth-and-complexity-of-the-international-energy-indU.S.try>

²⁸ Hasemyer, David. (2018). 3 Dozen Shareholder Climate Resolutions Target Oil, Gas and Power Companies. Available at: <https://insideclimatenews.org/news/07032018/shareholder-resolutions-climate-change-2-degrees-methane-lobbying-trump-administration>

²⁹ Ibid.

Further complicating this intricate navigation through the issues of governmental regulatory agreements and climate change is an elaborate and often overlapping supply chain system. There are three primary supply segments, each of which presents a diverse and pervasive set of challenges for the oil and natural gas industry: upstream, midstream, and downstream.

Upstream

Also called exploration and production (E&P), the upstream phase of the supply chain includes searching for crude oil and natural gas fields, drilling exploratory wells, and drilling and operating wells that bring the commodities to the surface. In recent years, the upstream phase has grown to include unconventional gas (natural gas extracted from coal beds) and liquefied natural gas processing and transport.

Upstream is cost-intensive and begins the complex legal processes of leasing the area, whether onshore or offshore, that is projected to contain oil or gas. Geological surveyors, rig contractors, other service contractors, and strict regulations present additional cost and contractual liabilities throughout this stage.

The average costs in the U.S. from 2005 to 2015, for an onshore well, were between \$4.9 and \$8.3 million.³⁰ Costs include those for land acquisition, facilities, lease expenses, drilling and sourcing, and disposal of water and other fluids resulting from hydraulic fracturing.³¹ The amount of paperwork involved in building a single well is overwhelming. One well can generate upwards of 6,000 invoices, involving more than 60 contractors.³² The organization and resources required by E&P companies to find and drill for oil and gas are considerable and time-consuming, and even small changes can create significant impacts on the financial bottom line.

³⁰ U.S. Energy Information Administration. (2016). Trends in U.S. Oil and Natural Gas Upstream Costs. Available at: <https://www.eia.gov/analysis/studies/drilling/pdf/upstream.pdf>

³¹ Ibid.

³² Jones, Valerie. (2018). OCT 2018: 'Waste' Seen as Major Inefficiency for E&P Companies. *Rigzone*. Available at: https://www.rigzone.com/news/otc_2018_waste_seen_as_a_major_inefficiency_for_ep_companies-30-apr-2018-154454-article/

Fixed costs -- such as those for the labor that is required for processing all of the invoices and for managing contractors -- can be greatly reduced if the oil and gas industry embraces technology. Furthermore, oil and gas companies have downsized the skilled workforce on the exploration and production side of operations, rather than using technology to automate back-office processes while maintaining their talent in the field. Embracing technology would allow reduced costs in finding talent, reduced costs in back-office operations, and increased efficiency in exploration and production operations.³³

Midstream

The midstream sector includes transportation and storage and is the link between E&P and the end consumer. Transportation is comprised of pipelines, rail transport, barges, oil tankers, and trucks with storage facilities, all interspersed throughout this phase of the supply chain. Although the midstream relies on the condition of the upstream and downstream markets, it is fairly stable, with a good yield reported on the Alerian Index, 8.14%,³⁴ from long-term contracts and low-risk activities.

In this sector, shrinkage is a major problem. Global theft of crude oil is estimated to total between \$5.2 billion and \$11.9 billion annually.³⁵ The African Development bank estimates illicit oil trading at \$100 billion, whereas loss that includes fraudulent representation and adulteration of fuels comes in at \$133 billion.³⁶ Around 30% of Nigeria's refined fuel products are lost to theft, while the Philippines loses an

³³ Andrews, David S.; Datta, Aleek; Newman, Charles; Rousset, Jean-Marie. (2017). Oil & Gas Operators – The Talent Well Has Run Dry. *Accenture*. Available at: https://www.accenture.com/t20170630T025458Z_w_/hk-en/acnmedia/PDF-55/Accenture-Strategy-Talent-Well-Oil-Gas.pdf#zoom=50

³⁴ Alerian. (2018). Alerian MLP Index. Available at: <https://www.alerian.com/indices/amz-index/>

³⁵ May, Channing. (2017). Transnational Crime and the Developing World. *Global Financial Integrity*. Available at: <http://www.gfintegrity.org/report/transnational-crime-and-the-developing-world/>

³⁶ Transnational Alliance to Combat Illicit Trade. (2017). Illicit Trade in Petroleum. Available at: <https://www.tracit.org/petroleum.html>

estimated \$750 million to adulteration and smuggling.³⁷ Mexico's pipelines have seen a 38% increase in illegal taps, as compared to last year.³⁸ Shrinkage is a pervasive problem throughout the oil and gas lifecycle, but is particularly concentrated in the mid- and downstream sectors.

Downstream

The final sector involves many changes of ownership. Downstream includes refining crude oil, processing and purifying natural gas, and the marketing and distribution of their derivatives. The primary participants in this phase of the supply chain include oil refining, supply and trading, product marketing, wholesale, and retail.³⁹ Ultimately, the downstream component produces the most recognizable petroleum products, such as fuel for our vehicles and fuel to heat our homes, along with plastics, fertilizers, rubber for tires, and pesticides. In brief, the objective of the downstream phase is end-user consumption.⁴⁰ This sector is full of variable costs and sees a large volume of money in transactions. The downstream sector affects the agricultural and medical industries, due to the dependence of these industries on oil and gas derivatives. Integrated oil and gas companies operate in both the upstream and downstream sectors.

Inefficiencies result from the large number of transactions that occur downstream. Moving products and money between a vast number of companies across borders requires time to verify involved parties and to establish trust between them, as well as the risk of shrinkage during each step.

³⁷ Hardy, Jeffrey. (2018). Illicit Trade in Oil & Fuel: an Emerging Global Policy Challenge. Available at: <http://www.ipsnews.net/2018/04/illicit-trade-oil-fuel-emerging-global-policy-challenge/>

³⁸ Mexico News Daily. (2018). Pipeline fuel theft: the bleeding continues. Available at: <https://mexiconewsdaily.com/news/pipeline-fuel-theft-the-bleeding-continues/>

³⁹ EKTInteractive. (2015). Fundamentals of Downstream Oil and Gas. [Video File]. Available at: https://www.youtube.com/watch?v=e0US_VV2AI&feature=youtu.be&app=desktop

⁴⁰ Ibid.

Octaneum Blockchain Solutions

While the challenges within the oil and gas industry are diverse and disparate, one standard solution is the application of customized technologies to address specific issues. Various use cases of technology can produce a significant impact throughout the full value chain of the oil and gas industry.

Process Improvement

There is technology that exists today that can enable oil and gas companies to automate back-office operations. Doing so will free up resources that can then be re-directed to other business areas, such as keeping top talent in exploration and product operations, an area where many companies today are experiencing talent shortages due to the companies' prior efforts to minimize costs through downsizing. Technology has been incorporated into oil and gas fields for years. This year, BP announced that their Wamsutter field had cut methane venting by 74%, increased production by 20%, and reduced costs by 22%, all by outfitting the field with sensors and an artificial intelligence (AI) program that solves optimization models.⁴¹ Octaneum helps oil and gas companies to understand where technology can be integrated into their existing operations to automate processes and allow freed-up company resources to flow to more profitable areas.

Supply Chain Management

The product life cycle is complex. The sheer number of parties involved in building infrastructure, testing product, moving product, and refining and distributing product is massive. The current system works, but can be made far more efficient with the latest technologies. Given the lower oil and gas prices of today, there is increasing pressure for companies to lower costs by becoming increasingly efficient. Possible carbon tax regulations and climate change regulations, in general, add another layer

⁴¹ Helman, Christopher. (2018). BP's New Oilfield Roughneck Is An Algorithm. *Forbes*. Available at: <https://www.forbes.com/sites/christopherhelman/2018/05/08/how-silicon-valley-is-helping-bp-bring-a-i-to-the-oil-patch/#48a200c430a8>

to the need for firms to run an efficient business model. Know Your Customer (KYC) requirements can be used to reduce time requirements in verifying parties in the supply chain and allow companies to know who is responsible for the product at all times. Octaneum refines oil and gas company supply chains to optimize efficiency and improve the bottom line.

Production Management

Quantity and quality are the two essential product metrics for the oil and gas industry. Every time there is a change in possession, each is measured, e.g., when a truck moves oil from a well to a pipeline. Both quantity and quality are measured at each end, even if a single company owns both the well and the truck. In transactions, data on quantity and quality are time-sensitive and often need to be no more than 72 hours old.

Verifying quantity and quality is called proof of product. The data are available, but not leveraged. Processes in use today for proof of product can be made more efficient with blockchain, so that the company will have a clear record of any changes in product and of where these changes occurred. Combining proof of product and KYC on the blockchain will enable companies to know where changes have occurred, and who in product management has altered the product quantity or quality, if at all. This will give companies the tools they need to find out where shrinkage is occurring and to minimize it.

Octaneum is positioned to transition the industry to integrate new technologies and take advantage of the new efficiencies offered by these technologies. Octaneum provides a comprehensive blockchain integration service to determine the needs of market players in different areas of the industry.

Octaneum Strategic Blockchain Integration Solutions

Octaneum offers three primary services: feasibility assessment, front-end engineering and design (FEED), and blockchain integration under the company's blockchain solutions practice.

Feasibility Assessment

Octaneum will conduct a preliminary feasibility assessment to evaluate a company's existing infrastructure. Through a survey and questionnaire, Octaneum will determine whether the appropriate infrastructure is in place for leveraging the implementation of blockchain technology.

Front-End Engineering and Design (FEED)

At its core, the FEED study provides a comprehensive analysis of the scope of an engagement to transform business and operational processes with blockchain technology. Discoveries within the FEED study lead to the development of the framework for a design specification and provide a basis for the request for proposals to solicit bids from qualified service providers. Lastly, the FEED study will uncover the organizational structure and decision-making process that is optimal for the success of any follow-on technology engagement process.

FEED Requirements Analysis

The Octaneum FEED team assigned to the client engagement examines the current hardware and software at the core of the client's business. The team will review documentation such as control system architecture, communication network, data storage systems, equipment lists (which includes sensors), process flow diagrams, piping and instrumentation diagrams (P&IDs), I/O connections, and motor and electrical specifications, among other things.

To understand the current state of the existing gathering and pipeline system, the Octaneum FEED team will analyze: their locations; attributes such as type, size, and nomenclature; mechanical equipment including pumps, valves, tanks, and separators; electronic equipment such as sensors, measuring devices, and remote transmission units (RTU); programmable logic systems (PLC); and SCADA systems, including programs, configurations, human machine interfaces (HMI), and data tag protocols. The Octaneum FEED team will also analyze the client's ERP systems.

FEED Process

At the initiation of a FEED study, the Octaneum FEED team, in partnership with lead engineers from Globalogix, will determine the availability and accuracy of the client's documentation. Octaneum will verify documentation via selective on-site inspections. If specific field facilities do not provide documentation, Octaneum will survey these facilities to examine, identify, and generate documentation of the equipment.

FEED Deliverables

Octaneum's Strategic Blockchain Solutions service is expertly positioned to help clients in the oil and gas industry realize the transformation that blockchain will bring to their business. Octaneum offers blockchain-based technical solutions specifically designed for the oil and gas supply chain network.

Blockchain is based on a 2009 breakthrough in computer science. At that time, two long-standing, but not-yet-merged, technologies were combined: a distributed ledger was combined with cryptographic hash functions. "Distributed ledger" simply means that multiple copies are maintained in different locations, such as everyone in a company saving a file on his own computer. In a distributed ledger system, if one copy is updated, then all other copies on each computer will also update to reflect the same changes.

Consensus is the process by which all parties agree on how to ensure that all copies are identical. Cryptographic hash functions take data of any size and transform it into a fixed-size string of code. The process is write-only and an infeasible amount of

computational resources would be required in order to compromise the data. Hence, blockchain is a distributed method for securing data on the internet, and blockchain thus allows parties to interact directly (peer-to-peer) via smart contracts that are automatically enforced and executed.

There are several deliverables that Octaneum will provide, depending upon the data collected during the FEED study:

- Financial analysis – the targeted ROI threshold to move forward with blockchain implementation is between 8% and 10%.
- Distributed ledger technology (DLT) implementation and/or blockchain integration.
- Smart contract development.
- Cryptocurrency guidance.
- Machine learning and analytics.
- Hardware solutions.
- Personnel for operations and development.
- Partnership integration.

DLT and Blockchain

Since the emergence of Bitcoin as the initial test case for blockchain, several other blockchain variations have surfaced: Ethereum, Hyperledger, and Ripple are the most prominent brethren of Bitcoin's blockchain, each with its own pros and cons that the Octaneum team carefully considered. For the oil and gas industry, smart contracts are an essential ingredient for every step within the upstream, midstream, and downstream sectors. Furthermore, an enterprise-grade blockchain protocol that allows customization and interoperability between supply chain partners is required. As such, Hyperledger is one of the blockchain variations that best fits the necessary conditions for serving the oil and gas industry, as it can be customized for each Octaneum client.

However, blockchain is a specific type of distributed ledger technology (DLT); it is not the only DLT available. In order to provide our clients with the best possible options

for streamlining supply chain processes, we will also incorporate Hashgraph as part of our software offerings. In short, Hashgraph is a DLT with high throughput, which increases transaction speed beyond the current capabilities of the blockchain DLTs. Unlike its blockchain competitors, Hashgraph has deployed a virtual voting system; thus, consensus is reached more quickly and this levels the playing field in terms of an equitable protocol for ensuring that no single group or individual can override the DLT system.

Smart Contract Development

Smart contract protocols are continually advancing with respect to the level of complexity they can facilitate. Translating legalese into code presents a monumental but not insurmountable challenge. Adding to this highly involved process are the specific requirements for the oil and gas sectors, which also must be captured within the if-then logic constructs of smart contract programming. As such, Octaneum will develop, test, implement, audit, and conduct bounty programs, as well as operate a select group of nodes and oracles to help further develop a reliable and standardized smart contract protocol for our oil and gas clients.

Cryptocurrency Guidance

Although most are familiar with Bitcoin, launching or utilizing a cryptocurrency isn't always as simple as setting up a wallet and attempting to be listed on one or more exchanges. There are a variety of different wallet considerations, e.g., hot wallets, cold storage, software wallets, hardware wallets, etc., and not all cryptocurrency exchanges are created equally. As it stands now, cryptocurrency remains in a "Wild West" environment where new entrants must be particularly cautious and knowledgeable about which exchanges are legitimate and must be aware of the most secure methods for storing the public and private keys that will allow access to these accounts. Octaneum will help guide clients through the entire cryptocurrency implementation process.

Machine Learning and Analytics

The use of machine learning and advanced analytics has rapidly progressed due to the considerable increase in the volume and velocity of data collection. Billions of

internet-connected devices are eternally streaming terabytes and petabytes of data: sensors, smartphones, video and audio monitoring devices, point-of-sale systems, smart refrigerators, and very soon self-driving vehicles will be added to the list. By utilizing machine learning techniques and predictive analytics, Octaneum will be able to parse through the pools of data, detect previously hidden patterns, and generate precise forecasts, so our clients will enjoy the advantages of optimized information to support the most accurate decision making possible.

Hardware

Without hardware, there is no software. Therefore, Octaneum will either build or lease servers for data warehousing and computation. Sensors are also an essential part of the oil and gas industry, e.g., monitoring shifts in pressure and vibration, etc. We plan to use analog sensors that will be connected to a digital adapter. Digital data will be transmitted via RTU to the communications network or by cable, where the SCADA database will receive and distribute all data to be available for use.

Personnel

Integrating new technology is costly and time-consuming; not only does integration require that existing personnel be trained on how to use (or how not to use) the system, but, in addition, the requirements of building, testing, and deployment often necessitate the hiring of new personnel. Octaneum will offer training services for current employees -- or, should clients prefer, may alternatively provide experts to assist with a smooth transition to the new system.

Partnership Integration

Each supply chain partner depends on a combination of unique and standardized processes, and this singularity translates into the need for customized solutions. However, oil and gas partnerships also must provide interoperability between their systems. Octaneum's objective is to construct DLT or blockchain integrations that align with the individualized needs of a single enterprise, and also account for the required industry-wide protocols to produce a market-wide standardized system.

The Octaneum Platform

During Q2 and Q3 of 2019, Octaneum plans to release a platform that will enable market players in the oil and gas industry to easily interact via blockchain and to automate part of the process that will allow a company to transition to a technology-backed business model.

The proposed Octaneum platform will deploy the permissioned blockchain technology HyperLedger Fabric which includes several features: multiple logical channels for inter-organization blockchains, pluggable consensus algorithms, digital certificates for identity verification, policy-driven smart contract access and execution. With regard to interchangeable consensus algorithms, the Octaneum team is currently researching several different algorithmic varieties to determine which will be the most viable best fit for the platform.

In addition to the core HyperLedger Fabric components, the Octaneum platform will incorporate infrastructure for IoT event management, automated business reporting, and predictive analytics using modern machine learning algorithms. The Octaneum team has established a partnership with Venture Aviator, which will recommend specific blockchain solutions and help Octaneum to build and maintain the platform. Our existing client base will be the first set of companies to use the platform.

Summary of Platform Tools and Technologies

The following tools and technologies will be used for the software development process, client application development, hosting HyperLedger Fabric components, and custom development of machine learning and business intelligence sub systems:

- HyperLedger Fabric;
- JavaScript, Go, C#, Python, Angular, Node.js, Asp.Net Core, Bootstrap, PrimeNG;
- MongoDB, CouchDB, SQL Server;
- Xamarin, PhoneGap, NativeScript;
- TensorFlow, CNTK, PowerBI;
- Git, Gerrit, Jira;
- Microsoft Azure or AWS IaaS.

Marketing Strategy

Octaneum's potential customer is any player of the LNG or oil supply chain that has demonstrated inefficiencies within their current operations. Octaneum is already engaged with companies covering all stages of the supply chain. After building solutions for our first wave of customers, Octaneum is planning to launch a global marketing campaign via a partnership with USCS – who will be positioned as the sales and distribution channel for Octaneum services. Octaneum has already been featured in many blogs and articles via several influencers within the blockchain space.

Octaneum anticipates three stages of marketing. The first stage focuses on fundraising, which includes Octaneum's attending blockchain- and crypto-related events; this will help to expand Octaneum's presence within the blockchain community and will also help in attracting crypto investors. As such, the first stage will facilitate the beginning of stage two.

Stage two targets small- and medium-sized firms worldwide, and governments in developing countries. During this stage, Octaneum will leverage our connections in oil and gas industry and the partnership with USCS.

Stage three will consist of product marketing for the platform along with Octaneum brand recognition building, which will involve a plethora of marketing tools such as PR, SEO, SMM, and interactive marketing.

Revenue Model

Real solutions require innovative changes. Octaneum's blockchain software solution services integrate the best of both proprietary and open-source solutions to leverage sensor reporting data, oracle monitoring, and smart contract execution into a world-class platform. Such solutions are supported by relatively simple hardware networks that maintain the backbone of a cryptographically verifiable ledger. Our business model therefore contains multiple value generation channels, each of which provides

a return on investment that is mutually beneficial to our clients and to the Octaneum enterprise.

Solution Services

A substantial portion of surveys and front-end engineering will be conducted by our strategic partner, GlobaLogix. Therefore, Octaneum does not view this segment as a profit center, but intends instead to mark up the services sufficiently to cover the company's operating expenses. Services will include the following:

- FEED Study
- Market, Business, Jurisdiction Analysis
- Education

Customized Blockchain Solutions

Blockchain solution packages will be largely customized for each client. Nearly all of the solutions will provide a financial return to the client; however, Octaneum wants to ensure that a minimum of 8% to 10% ROI will be generated. The initial cost of development, integration, and the first year's maintenance and support will be 10% of the projected savings.

In terms of ROI, Octaneum will share in those returns at a reduced rate in the early months, until the client recovers their initial investment. Thereafter, a flat agreed upon share of the returns (10%-20% of the annual total) will be collected. The typical term for a contract shall be 10 years. Additionally, Octaneum will be paid monthly for maintenance and support services. Areas of blockchain implementation providing financial returns may include:

- Distributed Database Implementation
 - Software – Hyperledger, Hashgraph, etc.
 - Hardware – Servers, sensor integration
 - Personnel – Operators, Development
 - Expansion – Integrating additional partners

- Smart Contracts
 - Development, testing, implementation, auditing, bounty hunting
 - Nodes/Oracles
 - Operating nodes/oracles on behalf of clients as a revenue channel
 - Enhancement, growth, market expansion
- Cryptocurrency: These services, if applicable, are optional and provided upon the client's request.
 - Entry into Markets – Setup
 - Value storage and transfer
 - Integration of cryptocurrency swaps into smart contracts
- Platform development and maintenance: When launched, Octaneum will provide a standardized price structure based upon a menu of proven modules, which are likely to include:
 - Integration setup fees
 - Run nodes
 - Run oracles
 - Percentage of execution of smart contracts -- decreasing over time

RoadMap

2017

- NOVEMBER: Octaneum, Inc. is organized, and team assembled.

2018

- JANUARY: Company incorporated, and white paper drafted in anticipation of an STO.
- FEBRUARY: Roadshow begins. INTERMEX reorganizes as OCTANE GROUP, Inc. Bridge capital being raised.
- MAY: Reg D SEC 506 C Offering begins. Engagement with US market participants starts.

- JUNE: Companies covering entire supply chain all the way from the wellhead to pump onboarded.
- MAY-SEPTEMBER: Custom-tailored solutions being developed for the first customers.
- OCTOBER: Test of the product.
- NOVEMBER: Custom-tailored solutions provided to first clients. Global marketing campaign begins.

2019

- Q2 Equity lock-up period ends. Shareholder meeting.
- Q3-Q4 Global platform released. World expansion and companies onboarding.

Team and Partnerships

Jonathan King - CEO

Jonathan King attended the University of San Francisco School of Finance. Mr. King's experience in financial technology began on the trading room floor, and he eventually managed currency exchange traders and developed the architecture for and directed several automated market strategies. Mr. King also founded Greenbox Traders, which is a user-friendly trading system for beginners that includes proprietary education, training, strategies, and platforms. He was CEO of INTERMEX, the predecessor of Octaneum Group.

Ashley Basham - President

Ashley Basham is an active participant in the oil and gas industry, with nearly two decades of operational experience in supply chain, production, and storage of NGLs and petroleum commodities. His unique hands-on exposure to the downstream segment of the petroleum industry makes his contribution to the executive committee practical while visionary. Ashley was the first of the management team to forecast that the evolution and integration of blockchain technologies would be applied to the energy sector. Mr. Basham is an angel investor in the project.

Anthony Fair - COO

After graduating with an electrical engineering degree in 2006, Anthony Fair applied his skill set to high-tech production and operational environments. With four years as a flight test officer and five years in semiconductor manufacturing, he specializes in process innovation, engineering management, and technical analysis. An early adopter of blockchain assets, Mr. Fair pursues agorist-inspired solutions to the challenges facing society.

Ryan Rupnarain - CFO

Ryan Rupnarain earned his degree in Corporate Finance from the University of the Incarnate Word, posting several academic achievements, including Dean's List. Mr. Rupnarain has an extensive corporate finance background with three Fortune 500 companies, most recently as Senior Investment Analyst in the wealth management division of JP Morgan.

Oleg Kitaev - CTO

Oleg earned his B.SC.in automation of technological processes from the Technological Academy, Voronezh, Russian, and a PH.D. in management in social and economic systems from the Institute for System Analysis, Russian Academy of Sciences.

Oleg's software design and development experience spans nearly twenty years. Recently he was responsible for development of land property management platforms for domestic and international companies in oil & gas, pipeline, utilities, pipeline, alternative energy, and coal industries. As a software engineer, he is responsible for several novel systems, including business intelligence for high-speed flow cytometry, mobile GPS navigation, project management, web data analytics, and others. Oleg's interests include machine learning, decentralized computing, agile software production, and enterprise business automation.

Katie Ananina - CMO

Katie Ananina graduated from the Saint Petersburg State University in Russia with a degree in Economics. Ms. Ananina is the captain of the Russian National Sailing team.

As analyst for the Russian Investment Fund, she became fascinated with and a student of Blockchain and its implications for world economies. She evolved as an expert on the petrol industry as she was developing and marketing new petrol sites for the Russian Real Estate Development Group. Katie provides international marketing perspective as a member of the executive committee.

Salvador Suarez Santamaria – VP LATAM

Salvador Suarez Santamaria is an Industrial Engineer and holds a Master’s of Science in public policy and an executive MBA from IPADE University in Mexico City. He has more than 20 years’ experience as senior management in industries such as power generation, oil and gas, transportation, and logistics. Mr. Santamaria also worked as a public servant in a national development bank, and in government energy companies, local transportations, and the Mexican Congress. Salvador is the Operations Officer for the company’s Latin American unit in Mexico City.

Alejandro Arteaga – Head of Compliance

Alejandro Arteaga holds a B.S. in engineering technology from Texas A&M University and an MBA from the University of the Incarnate Word. Mr. Arteaga’s experience has focused on multinational business consulting and cross-border solutions. For the past several years, he has served as Chief Compliance Officer for a capital markets brokerage firm. He serves in that capacity for the company and develops KYC protocols for the company’s clients.

Orlando Maldonado – Head of Cybersecurity

Orlando Maldonado earned his BBA in Computer Information Systems from Texas A&M University. Drawing on a ten-year career in telecommunications and 12-year career in healthcare, he has developed an expertise in analyzing company needs for computer systems/software management and data processing to aid in the improvement of information technology functions and operations.

Advisors and Consultants

Gabriel Abed

Gabriel Abed, Founder of Bitt Inc. and Digital Asset Fund, is recognized as a leading Caribbean authority on digital currencies, math-based protocols, and blockchain technology. The Barbados-based entrepreneur is acknowledged internationally as a pioneer in the digital currency evolution, having led the movement toward central-bank-issued cryptocurrencies and initiated discussions on the subject of “Blockchain Technology” at the Caribbean Development Bank, the International Monetary Fund and World Bank, the United Nations, the Commonwealth Secretariat, and multiple Central Bank forums, and on other world stages.

His intellectual interest in Bitcoin took root in 2010 when he was an undergraduate at the University of Ontario pursuing a degree in Information Technology, where he majored in Information Network Security, graduating with Honors. Enthralled by the potential of cryptocurrencies, and conscious of the revolution unfolding around him, he became an early adopter and lifetime evangelist. A passion for positive change, backed by 6 years of experience in the software and technology field, led to his groundbreaking journeys founding Bitt and Digital Asset Fund.

Eli Ansari

Eli joins us with 22 years of global capital formation and investment management experience, as founder and CEO of Corporate Metrix Multi-Family Office, Miven Family Office (Victor Tsao/Linksys), and Miven Venture Partners, and as co-founder of Skyline / Irvine Ventures (Safi Qureshey/AST).

Eli Invested in 50+ private companies, including ProofPoint (NASDAQ: PFPT), A10 Networks (NASDAQ: ATEN), Vivotech, and over 100 VC / PE funds, including Kleiner Perkins, Greylock, Sequoia, Accel, Foundation, Silver Lake Partners, Elevation Capital, Affinity Capital, and IDG.

As the Chief Investment Officer at Miven Family Office, he led the investment team, making diversified global investments in all major asset classes, including venture investments in media and technology companies in the US, China, and India, sourcing

proprietary deal flow, conducting due diligence, negotiating deals, and monitoring investments.

Early Boykins III - VC, Andra Capital

Early is an ICO investor and advisor, with a focus on business development. He brings six years of cryptocurrency experience. Early was a participant in the first ICO: Omni (formerly Mastercoin) in 2013. He is a Director at Andra Capital -- a "tokenized" technology growth fund focused on late-stage investments, specifically in the Silicon Valley private technology sector.

E. David Ellington

David is the Founder/CEO of an Internet social networking site with 150+ employees/consultants (six years) that he built/sold during Internet 1.0 Public Service. He is a former Commissioner and Trustee of the US\$18B San Francisco Retirement Board (SFERS - 5.5 years); is a former Chairman of the San Francisco Telecommunications Commission (5 years); and serves on several corporate, civic, and non-profit boards. David is a lawyer (California licensed, 25+ years). He is well-traveled, having circled the globe ten times. Consistent with this travel, he offers extensive international experience, having lived, worked, and/or studied in India, Tokyo, Singapore, Bangkok, Dubai, London, Paris, and South Africa.

Oliver Gale

The founder of Bitt.com, Oliver is a global advocate of digital fiat currency, a serial entrepreneur, and an award-winning recording artist. Championing discussions at the United Nations, International Telecommunications Union, MIT, numerous central banks and speaking events around the world, Oliver is a pioneer in the field of central-bank-issued digital fiat currency. He is also a member of the Financial Inclusion Global Initiative, a Bill and Melinda Gates Foundation project launched in collaboration with the World Bank. Oliver is a seasoned executive and business leader, having served as President, CFO, and Executive Director at Bitt.

In 2017, Oliver entered the digital asset management space, founding BaseTwo.com and Cryptai Analytics. BaseTwo is a venture capital firm focused on protocol and

platform investments, and early-stage initial coin offerings, while Cryptai is a sister company focused on AI behavioral trading. Oliver previously founded CaribHash and Cryptocurrency Capital Management, respectively the Caribbean's first industrial cryptocurrency mining and a private digital asset investment group. A University of Bristol alumnus from the School of Economics, Finance and Management, Oliver is a seasoned crypto investor.

Antonio Resa Freg

Antonio is Founder and Director of *Estudios Corporativos, S.C. (ECOR Consulting®)*, a management education and consulting firm dedicated to generating value for its clients in Mexico and Latin America.

Antonio holds a bachelor's degree in Industrial Chemical Engineering, a Master's degree with Honors in Business Administration, and a Doctorate in Business Administration. In 1993, he attended the six-sigma course with Motorola University, and in 1998 earned a graduate degree in Business Administration from the Kenshu Center in Osaka Japan.

Antonio has published over 50 articles about quality, productivity, World Class, ERP, Class A Certification, ECR, Supply Chain Management, Innovation, JIT, Total Quality, Best Practices, S&OP, and Productivity in different magazines and newspapers in Mexico and South America.

Enrique Martinez

Enrique started his career as an Aerospace Engineer for Drone Research and Development for the United States Pentagon. In the year 2009, while a Strategic Adviser for the Obama Administration, he was given the Bitcoin paper written by Satoshi Nakamoto. A couple of months later, he finished working with the government and moved to Miami to continue exploring the new field of cryptocurrencies. Later in 2017, he founded Blocksis, a blockchain development company.

Enrique is well known and is currently supporting multiple Initial Coin Offerings as an Advisor. His company is currently on its way to becoming the first Utilities Blockchain company with exclusivity agreements to produce the first solar energy with

blockchain technology as well as the Advisor for the first water ecosystem blockchain company WaterChain. Enrique is also an Advisor for the first blockchain company to create a marketplace for trading refined petroleum products. He is currently instrumental in assisting cryptocurrency investors as they move to Puerto Rico to help rebuild the island. Enrique is a very well-known speaker on the subjects of cryptocurrency and blockchain technology, and he has authored two books on cryptocurrency trading.

Rafael Mosconi

Rafael serves as the Commercial Legal and Business Advisor at the Commercial Subdirection at Pemex Logistica. He is a lawyer who specializes in commercial and business development, and is capable of providing effective and deep business legal support to different areas of business. He is able to analyze the industry and markets and to understand the requirements of customers.

Dr. Izzy Nelkin

Dr. Izzy Nelkin is the President and Founder of Super Computer Consulting, Inc. (SuperCC). His firm specializes in the research, application, implementation, and exposition of complex derivatives, structured products, risk management, and hedge funds. Since its founding in 1997, Izzy's firm has assisted many consulting clients globally, including several regulatory bodies, major broker-dealers, and large- and medium-sized banks, as well as hedge funds. Izzy offers extensive experience with complex financial instruments and is adept at explaining their intricacies to wide-ranging audiences.

Over the years, he has taught thousands of interested parties in all areas of financial products. He has authored/edited eight books within the realm of finance and, for 18 years, was an instructor at the University of Chicago M.Sc. program in Financial Mathematics. Izzy is a member of the Product Development Committee at Cboe, the first options exchanges to bring Bitcoin futures to market.

Dr. Satyam Priyadarshy

Dr. Priyadarshy is one of the top 50 candidates in the country nominated to serve on the Corporate Boards by *AgendaWeek*, a Financial Times Group publication.

A veteran of Big Data, having created and led Data Science teams throughout his career, Dr. Privaydarshy knows a winning formula for building and mentoring teams that can add value to a business. He has developed a global reputation in Big Data, implementing powerful solutions through expertise in all aspects of the data pyramid that work well with business strategy and organizational strategy.

Dr. Priyadarshy brings with him extensive management consulting and corporate leadership experience in various companies, including Fortune 100 start-ups. As a thought leader, he was appointed Senior Fellow at the International Cyber Center at George Mason University. He is the President-Elect and a current Board Member of the DC Chapter of TiE. (TiE is the world's largest entrepreneurial network.)

Strategic Alliances

Venture Aviator

Venture Aviator is Octaneum's technology partner. Venture Aviator (www.ventureaviator.com) is a custom software development firm with a range of experience and expertise across consumer and business (including SaaS) applications for mobile, web, and e-commerce, and capabilities in cutting-edge technologies such as blockchain and AI/Machine Learning. Venture Aviator's blockchain development projects have raised over \$150 million via venture capital and Initial Coin Offerings (ICOs). Venture Aviator's blockchain clients include Rentberry (<https://rentberry.com/>) and Ponder App (<https://ponderapp.co/>). Venture Aviator will be providing recommended blockchain solutions to Octaneum clients along with constructing and maintaining Octaneum's platform.

GlobaLogix

Octaneum, Inc. has teamed up with GlobaLogix, globlx.com/ a Houston-based control and automation engineering firm recognized for information-based management solutions for the oil and gas industry. Their expertise at the field infrastructure level and their "complete data path" approach to remote monitoring and SCADA brings unique value to the Octaneum project. The principal role of GlobaLogix in the

partnership is to assist with or conduct the front-end engineering and design services for our partners and clients.

GlobaLogix provides control and automation engineering, design, and implementation services to oil and gas exploration and production companies. Its expertise extends from the wellsite to the control room and into the company back offices. In addition to field services, GlobaLogix offers data management support services that bring the digital oil field to its clients.

USCS

Octaneum has reached an agreement with USCS, a Texas-based company with a diverse outreach in many segments of the petroleum industry. The goal of the partnership is to deploy the existing global sales force of USCS to promote Octaneum solutions. The principals of USCS are directly involved in companies conducting business in the upstream, midstream, and downstream portions of the industry globally. It is believed that the collective customer base of USCS includes many potential blockchain clients for Octaneum. The early results of USCS' marketing and referral efforts have been positive and tangible, leading Octaneum to believe that this partnership could be responsible for a substantial portion of the coming year's business.