Embracing Digital Modernization:

The imperative for an operational decisioning solution in the downstream energy industry.

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In today's downstream oil and gas industry, the era of stability and abundance has vanished. Structural economic change—driven by energy transitions, financial tightening, geopolitical volatility, and extreme weather—is rewriting the rules for industrial businesses. Margins are under siege. Growth is harder to find, and risk is multiplying. Traditional operating models simply can't keep up. In fact, 42% of CEOs believe their companies won't survive the next decade without reinvention.

This upheaval is creating a widening competitive divide: leaders must pivot from investing in more assets to investing in better decisioning. Winning now depends on a company's ability to make faster, smarter decisions across complex, multi-party operations. The old playbook—built for process automation and steady-state assumptions—is no longer enough. Success today demands operational dexterity, AI-powered foresight, and the ability to act in minutes, not weeks.

This white paper explores six critical trends shaping the downstream energy industry and whether they are emerging, accelerating or sustaining. It also demonstrates how a unified operational decisioning platform will help companies navigate these challenges successfully.

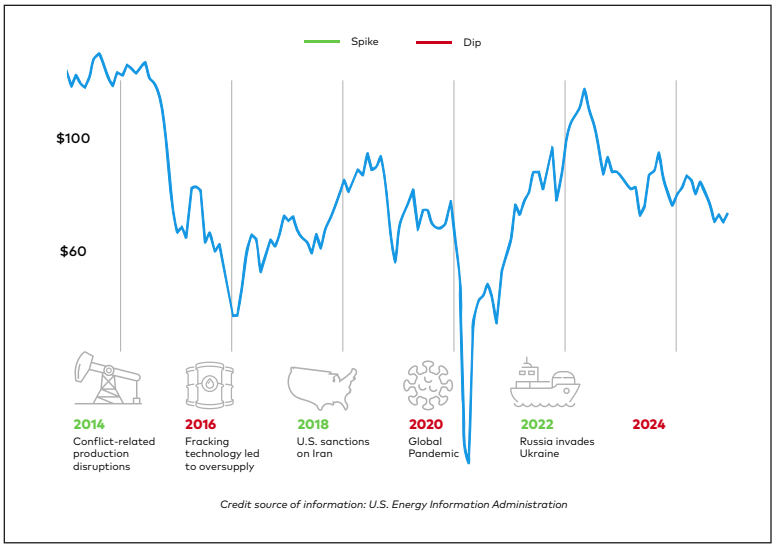
Volatility is further amplified by a state of constant “tight” supply, The supply chain can no longer absorb disruptions without the downstream market feeling the impact.

Trend 1

Emerging: Accelerating market volatility and geopolitical uncertainty

The downstream energy industry is inherently volatile, driven by supply and demand imbalances, geopolitical tensions, weather disruptions and fluctuating commodity prices. However, in recent years, these impacts have become more pronounced and unpredictable.

For instance, in 2019 no energy company could have predicted an 8% drop in oil production or a decreased global oil demand by 20 million barrels per day in one year due to a global pandemic. By the end of 2021, the market shifted again from demand to supply concerns with tight oil inventories due to an unexpected increase in demand post-pandemic.



This two-year snapshot is one of several events that punctuated the past decade with roller coaster oil prices ranging from $11 per barrel to over $124 per barrel.

Challenge: Volatility in one segment of the industry has ripple effects across the entire oil and gas supply chain.

Consider how fluctuations in crude oil prices can lead to unpredictable and unstable profit margins for downstream operations and in turn affect operational expenses for transportation and logistics companies. Or how geopolitical risks can delay long-term investments in refining infrastructure and technology upgrades, ultimately affecting the industry's growth and modernization.

Volatility is further amplified by a state of constant "tight" supply, The supply chain can no longer absorb disruptions without the downstream market feeling the impact.

Solution: Agile and responsive decisions to market fluctuations are necessary. Informed, confident decisions are a competitive advantage. This requires using integrated, real-time data to monitor and adapt strategies accordingly.

Traditional siloed systems and fragmented data sources within the industry – and often within the company – are detrimental to operations, and ultimately the bottom line.

One IDC study found companies lose up to 30% of potential annual revenue due to inefficiencies with siloed data as a primary cause.

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Trend 2

Emerging: Advanced analytics and artificial intelligence

The adoption of advanced analytics and artificial intelligence has become a critical differentiator in the oil and gas sector. These technologies offer unprecedented opportunities for downstream energy operations, including demand forecasting, pricing strategies, inventory management, and supply chain optimization.

Several major players have already seen gains using AI and advanced analytics. For instance, Shell Energy cites implementing AI across multiple functions to reduce emissions and cost and optimize processes, production and margins.

Challenge: While the generation of data is limitless, the time and talent to architect, process, and synthesize the data is not. Strong AI output relies on accurate data input. Companies struggle to access prevailing market data and even their own internal data. Globally, there are only a handful of oil and gas companies that have the capacity to employ a robust data engineering team—and for most companies, this is the major barrier to adoption.

According to research performed by Forrester Consulting on behalf of DTN, more than 70% respondents working in the downstream industry agreed that digital modernization is a top priority for their business. Yet, slightly more than half had begun the process citing cyber risk, lack of skills and inability to leverage data as the top reasons.

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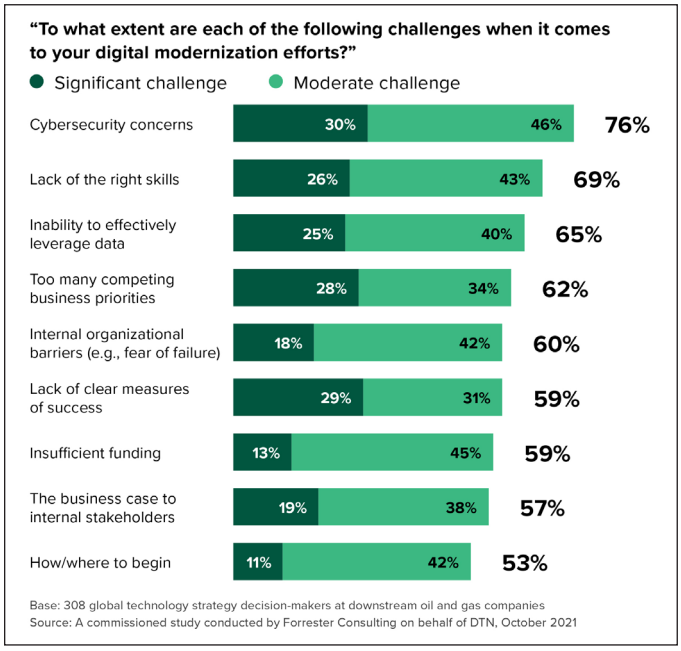

These sentiments were echoed in a Gartner survey on AI-driven operations, with risk and confusion preventing nearly half of pilot projects making it to actual production.

Solution: An integrated decisioning platform is essential to unlock the full potential of these transformative technologies. Integrated data streams reduce the bias for siloed data and connect relevancy and real-time insights. Contextual analytics provide role-specific, actionable insights, prescriptive next-best actions and integration with the system of execution that unlocks the value of a company's data. This nimble intelligence offers long-term benefits for companies, enables operational agility, and is strongly associated with overall company performance.

With more technology companies building scalable user-friendly, cloud-based platforms that work seamlessly with existing infrastructure, energy companies of all sizes can realize the benefits of advanced analytics. Combining the infrastructure with a trusted data provider, a company can make confident decisions and execute on them in a timely fashion before the opportunity disappears.

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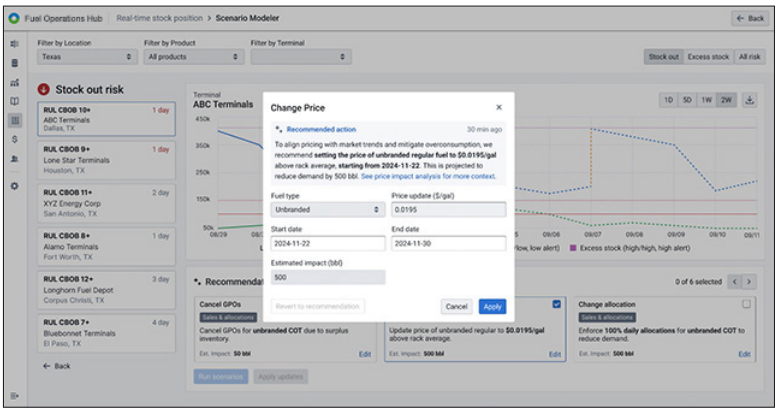
Trend 3

Accelerating: Weather Resilience Within Supply Chains

In the wake of global disruptions, the importance of supply chain resilience has become increasingly apparent in the downstream energy industry. Weather plays a significant part in many of those disruptions contributing to lost supplies, infrastructure damage, logistic disruptions, production loss, and sharp price spikes. While shorter than recessions, weather events can have super-sized effects on the entire oil and gas supply chain.

For instance, in 2020 the industry experienced Hurricane Zeta, a Category 3 hurricane that drove an 8-million-barrel drop in regional oil stocks that affected the broader U.S. supply.



The Scenario Modeler in the Fuel Operations Hub uses AI to test scenarios using various inputs such as price changes, GPO approvals/denials, and allocation strategies to simulate the outcome.

Four months later, a Polar Vortex caused wellhead freeze-offs and power outages that debilitated gas producers, leading to a shortage of gas when demand was spiking. Gas shortages combined with iced-down processing units led to individual unit outages and entire closures at 25 refineries in Texas, New Mexico, Oklahoma, Louisiana, and Tennessee.

Challenge: The inherent nature of global disruptions is that they are often unforeseen or not forecast at the magnitude of disruption. But the dynamic movement of the oil and gas industry forces companies to be more resilient. Numerous studies point to extreme weather events increasing in frequency and intensity.

Even when there is no direct damage, extreme weather can impact operations. As in 2024 when multiple extreme heat days and electricity scarcity in the Midwest limited the refined fuels production with the utilization rate dropping to 86% between July 12 and August 9, causing supply to dip and prices to increase.

While weather forecasts elevate awareness, the prevalence of siloed data streams and lack of integrated insights specific to a company's assets, operations or location, leave a company vulnerable to unplanned weather risks.

Solution: By leveraging an operational decisioning platform that integrates real-time data from terminals, inventory systems and logistics and weather providers, companies can strengthen supply chain resilience. This visibility enables proactive risk identification, mitigation strategies, and rapid response to disruptions, minimizing the impact on operations and customer satisfaction.

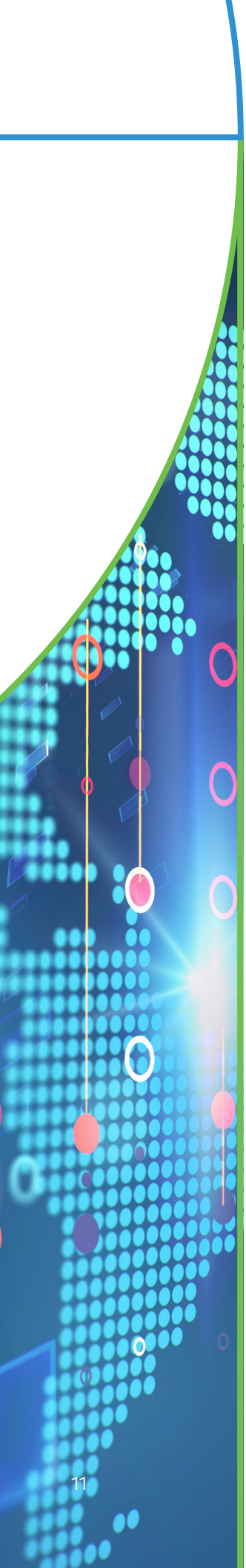
Trend 4

Accelerating: Global market demand for reliable and affordable energy

Global demand for reliable and affordable energy is rising rapidly, driven by two powerful and converging forces: the ongoing reliance on fossil fuels and the explosive growth of data centers. Despite efforts to transition toward renewable energy, fossil fuels—especially oil, natural gas, and coal—still supply over 80% of the world's energy needs.

Simultaneously, the surge in data centers, driven by AI, cloud computing, video streaming, and cryptocurrency, has become a major new source of indirect demand for fossil fuels. While these centers consume electricity, much of that power still comes from fossil-fuel-fired generation, especially in regions where renewables capacity is limited.

This rise in not at the expense of renewables, but rather in concert with increasing energy demand. Even with global renewable energy capacity having the fastest growth rate in the past two decades in 2023, global fossil fuel consumption and energy emissions were also at an all-time high.



Challenge: The rising demand for reliable and affordable energy sources is amplifying pressure on downstream oil and gas companies to deliver fuel efficiently, competitively, and sustainably.

The rising demand for reliable and affordable energy sources is placing downstream oil and gas companies at a critical crossroads. They must meet near-term demand while also adapting to long-term shifts toward cleaner energy. This dual pressure is accelerating the need for operational agility and smarter pricing strategies that support both conventional and low-carbon fuels.

Solution: Balancing growing renewable energy demand while meeting the current strong demand for fossil fuels requires AI and advanced analytics to forecast, monitor, and respond confidently to market demand.

A single operational decisioning platform delivers the insights needed to foster agile decision-making without having to log-in to multiple platforms or manually coalesce insights from multiple sources. This delivers the most relevant information for the user is visible in one source at the time it is needed.

Trend 5

Emerging: The evolving customer experience landscape

Driven by the increasing digitalization of services and the desire for transparency, convenience, and personalized experiences, customer expectations are rapidly evolving. This has prompted oil and gas companies to move from a product-centric business model to a customer-centric one.

For instance, downstream operators are implementing frictionless touchpoints, including digital self-serve options and real-time tracking systems, to distributors and wholesalers to improve visibility on product availability, contract details, and order tracking.

Likely the most visible response to meeting new customer behavior is the c-store transformation with a focus on the customer retail experience over the traditional gas station. Majors realize they are selling a fungible commodity and customer experience is a key path to competitively differentiating in the market.

By building multi-service hubs offering electric vehicle charging, retail, and food services, energy companies expect to build brand loyalty and revenue by building personalized experiences and making it easier for customers to choose to do business with them.

Agile and responsive decisions to market fluctuations are necessary. Informed, confident decisions are a competitive advantage.

Challenge: Evolving customer experiences place new technology demands on an industry that is still on a digital modernization journey. Yet, companies that fail to adapt to these changing customer demands risk losing market share to more agile competitors.

Intricate supply chains and legacy systems will make it difficult to seamlessly execute frictionless transactions and provide real-time visibility into inventory levels, pricing, and delivery schedules. Personalized offerings, the next iteration of brand loyalty, will require integrating new and siloed data streams and layering insights to deliver a tailored experience.

Solution: To meet these expectations, downstream energy companies must embrace digital transformation and leverage a unified operational decision platform with trusted data.

By consolidating customer data from various sources, such as CRM systems and transactional records, companies can gain a holistic view of their customers' preferences, buying patterns, and pain points. These invaluable insights can inform targeted marketing campaigns, personalized pricing strategies, and tailored service offerings, ultimately enhancing customer loyalty and driving long-term growth.

Trend 6

Sustaining: The imperative of regulatory compliance and risk management

The downstream energy industry is subject to a complex web of regulations and compliance requirements, spanning environmental protection, safety standards, pricing transparency, and data privacy.

Recent regulations that focus on environmental protection, emissions reduction, and operational transparency have impacts across the energy value chain. For instance, while primarily targeting upstream, the EPA's expanded U.S. Methane Emission Standards have downstream implications for terminals and pipelines under fugitive emission reporting, leading to greater monitoring costs at storage and loading facilities.

Since 2020, several global regulations and policies have been implemented to address environmental concerns and promote sustainability in the oil and gas industry. These include European Union Emissions Trading System, Paris Agreement commitments, The International Association of Oil and Gas Producers sustainability reporting guidelines and the New Source Performance Standards.

Challenge: Overarching regulations on safety standards, data privacy and pricing transparency are applicable across countries and the oil and gas value chain. But there are significant variations in environmental regulations from region to region and from asset class to asset class that require comprehensive insights across the portfolio.

Political headwinds are divided between the U.S. and Europe around sustainability. Downstream fuel providers must navigate a patchwork of state-level mandates—like California's LCFS—while federal energy policy oscillates between climate action and energy independence.

In contrast, Europe has adopted a more unified and aggressive stance on sustainability.

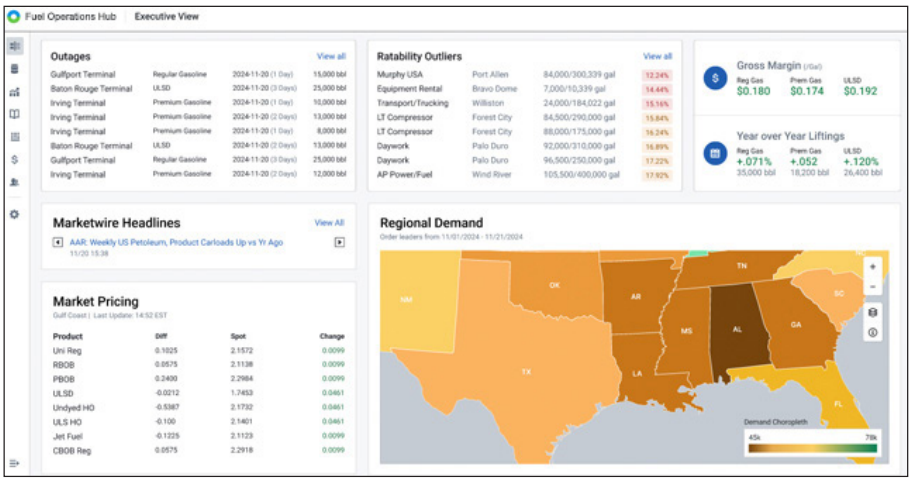
Solution: As the regulatory landscape continues to evolve, downstream energy companies must prioritize robust compliance and risk management strategies. An operational decisioning platform that integrates regulatory data, automates compliance reporting, and provides real-time monitoring and alerting capabilities can significantly mitigate compliance risks and ensure adherence to industry standards.

Furthermore, a unified platform can streamline risk management processes by consolidating risk data from various sources, enabling comprehensive risk assessments, and facilitating the implementation of mitigation strategies. By integrating risk management capabilities directly into operational workflows, companies can proactively identify and address potential risks, minimizing their impact on operations and ensuring business continuity.

The Path Forward: Embracing a comprehensive, one-platform solution

As the downstream energy industry navigates the emerging trends outlined in this white paper, the need for a single operational decisioning platform becomes increasingly apparent. By consolidating disparate systems, integrating data silos, and leveraging decision-grade data and automation, companies can unlock unprecedented operational agility, margin optimization, and customer-centric innovation.

An operational decisioning platform offers numerous benefits that can propel downstream energy companies towards long-term growth and operational excellence including:



The executive view on the DTN Fuel Operations Hub displays strategic metrics in one dashboard to drive agile, confident decisions across operations and systems.

1. **End-to-end visibility and collaboration:** By breaking down data silos and integrating various systems, such as terminal operations, inventory management, pricing, demand forecasting, and market intelligence, a one-platform solution provides a single source of truth for all stakeholders. This end-to-end visibility fosters collaboration, enables proactive decision-making, and eliminates operational blind spots.

2. **Streamlined processes and automation:** With a comprehensive platform, companies can automate and optimize various processes, including order processing, inventory management, invoicing, and reconciliation.

   This automation not only enhances operational efficiency but also reduces the risk of errors, freeing up valuable resources to focus on strategic initiatives.

3. **Advanced analytics and predictive capabilities:** By consolidating and normalizing data from various sources, a one-platform solution enables companies to leverage AI, advanced analytics, and machine learning capabilities to their fullest potential.

   Demand forecasting, market trend analysis, supply chain optimization, and pricing strategies become more accurate and data-driven, empowering companies to make informed decisions and stay ahead of market dynamics.

4. **Margin optimization and network efficiency:** Real-time visibility into stock positions, demand patterns, and market conditions within a comprehensive platform provides the foundation for margin optimization and network efficiency.

   Companies can leverage AI to optimize pricing strategies, balance contract and spot sales, streamline inventory allocation, and optimize logistics, maximizing profitability while minimizing waste.

5. **Enhanced customer experience and loyalty:** By integrating customer data, pricing information, and inventory management capabilities within a unified platform, companies can deliver personalized experiences, real-time visibility, and seamless self-service capabilities.

   This elevated customer experience fosters transparency, trust, and loyalty, driving long-term growth and customer retention.

6. **Regulatory compliance and risk mitigation:** A comprehensive, one-platform solution can integrate regulatory data, automate compliance reporting, and provide real-time monitoring and alerting capabilities, mitigating compliance risks and ensuring adherence to industry standards.

   Additionally, by consolidating risk data and integrating risk management capabilities into operational workflows, companies can proactively identify and address potential risks, minimizing their impact on operations and ensuring business continuity.

A single operational decisioning platform is not merely a technological shift but also a transformative strategic move that will shape the future of downstream energy companies. By fostering a culture of innovation, data-driven decision-making, and customer-centricity, companies can future-proof their operations and position themselves as leaders in the evolving energy landscape.

The time to act is now, and those who seize this opportunity will reap the rewards of long-term growth, operational efficiency, and a sustainable competitive advantage.

Learn more about AI and how integrated analytics support operational efficiency and give downstream oil and gas companies a competitive edge.

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