

THE ENOC MIDSTREAM WHITEPAPER REPORT



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*Navigating Supply Chains from
'Just in Time' to 'Just in Case'
in a Disrupted Global Economy*



FOREWORD BY WORKSHOP CHAIRMAN

TURNING RESILIENCE INTO OPPORTUNITY FOR EAST OF SUEZ ENERGY



Sean Evers
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The global energy system is reassessing a principle that shaped decades of investment: efficiency means keeping inventories lean, assets fully utilized and supply chains moving through the cheapest available route. Successive disruptions have exposed the vulnerability of that model. When shipping routes become constrained, insurance costs escalate or ports face congestion, energy security depends on whether supplies can actually reach consumers.

For the East of Suez midstream sector, this shift creates a commercial opportunity. Storage, shipping, ports, pipelines and refining infrastructure can command greater strategic value by providing the alternatives that governments and businesses increasingly need. But translating that need into sustainable investment requires a clearer answer to two questions: which capabilities deliver meaningful resilience, and who will pay for them?

The discussions captured in this whitepaper identify optionality as the foundation. More inventory alone cannot secure delivery. Resilience requires diversified suppliers, accessible storage, flexible refining, dependable shipping and alternative transport corridors working together. The strongest proposition is an integrated network capable of adapting when one part of the supply chain fails.

Fujairah illustrates how geography can become a commercial advantage. Its location outside the Strait of Hormuz provides an alternative gateway, but location achieves its full value through connectivity. Rail, roads, pipelines and bonded customs corridors extend that advantage into consuming markets. Coordinated clearance

and efficient cargo evacuation are as essential as additional tanks or berths.

Investment must also address specific vulnerabilities. Markets exposed to LPG shortages require different solutions from economies losing refining capacity and becoming more dependent on imported fuels. Storage decisions should reflect the products consumers need, the infrastructure available and the speed at which reserves can be accessed.

Yet resilience will remain an aspiration unless its value becomes bankable. Long-term contracts, government commitments and public-private partnerships can support investment in capabilities whose greatest worth emerges during disruption. The commercial challenge is to recognize that security value before an emergency, rather than expect private operators to finance national protection without predictable returns.

The objective, however, is proportionate resilience. Maximizing existing infrastructure, removing bottlenecks and improving coordination can strengthen security while preserving efficiency. Additional capacity should follow a demonstrated need.

This whitepaper therefore frames resilience as a practical investment agenda. East of Suez operators have an opportunity to deepen partnerships between producing and consuming economies, turning dependable delivery into a service. Success will belong to those who combine strategic geography, operational flexibility and sustainable financing to make optionality commercially viable.

TOP 5 LEADERSHIP RECOMMENDATIONS

East of Suez midstream companies can earn value by making energy delivery more dependable, provided resilience is commercially funded and operationally efficient!

1. BUILD OPTIONALITY ACROSS THE ENTIRE SUPPLY CHAIN

Resilience requires multiple suppliers, shipping arrangements, storage locations, transport routes and flexible refining capacity. Midstream operators can turn this demand into business by providing integrated alternatives that keep energy moving when a supplier, vessel or chokepoint becomes unavailable; securing barrels alone does not guarantee delivery.

2. TURN FUJAIRAH'S GEOGRAPHY INTO CONNECTED COMMERCIAL ADVANTAGE

Infrastructure outside the Strait of Hormuz becomes more valuable when connected to consuming markets through pipelines, rail, roads and bonded customs corridors. The opportunity is to develop Fujairah as an alternative gateway, combining storage and port capacity with reliable onward delivery and coordinated clearance procedures.

3. MAKE RESILIENCE BANKABLE BEFORE DISRUPTION STRIKES

Spare capacity and strategic inventories require customers or governments willing to pay before an emergency occurs. Long-term take-or-pay contracts, government procurement and partnerships can provide predictable returns, enabling private investment in storage and logistics while recognizing the security value of capacity that may otherwise appear underutilized.

*(SOURCE: the content for the whitepaper was harvested from a workshop held in Fujairah on Oct. 6th, 2026 with 100 Midstream industry leaders)



4. TARGET STORAGE INVESTMENT AT PRODUCTS AND MARKETS MOST EXPOSED

The speakers repeatedly distinguished between crude availability and access to usable fuels. Investment should reflect each market's vulnerabilities: LPG storage where cooking-fuel supply is exposed, product storage where refining capacity is declining, and crude storage alongside flexible refineries—creating opportunities tailored to actual security needs.

5. PRESERVE EFFICIENCY WHILE ADDING THE RIGHT AMOUNT OF RESILIENCE

Just-in-case investment must complement efficient operations. Operators should maximize existing infrastructure, remove evacuation bottlenecks and coordinate transport before adding capacity indiscriminately; the strongest opportunities combine dependable emergency capability with productive everyday use, balancing the cost of redundancy against the economic consequences of disruption. ■

India and the East-of-Suez Energy System Must Build Optionality Beyond Strategic Inventories when “Just in Time” is No Longer Enough for Energy Security



Shrikant M. Vaidya
Former Chairman, Indian Oil Corporation

For India and the wider East-of-Suez energy system, resilience demands more than additional inventories. It requires diversified suppliers and shipping routes, strategic storage in the right geographies, greater shipping capabilities, flexible refining capacity, and deeper India-Gulf cooperation beyond the traditional buyer-seller relationship.

The world is rediscovering the value of “Just in Case”.

For decades, the global energy industry pursued efficiency almost to perfection. Lean inventories, maximum utilisation, the cheapest shipping routes, minimum spare capacity and increasingly integrated supply chains delivered enormous economic value. But recent geopolitical disruptions have exposed the vulnerability of an energy system optimised almost exclusively for efficiency. When shipping routes are constrained, insurance becomes prohibitively expensive, vessels are diverted and ports face operational restrictions, the economic benefits of lean supply chains can quickly disappear.

The fundamental lesson is that energy security is no longer simply about the availability of molecules. It is increasingly about their assured delivery.

Crude oil may be available somewhere in the

world, but if vessels cannot sail, insurance is unavailable, maritime chokepoints are disrupted or refineries cannot process alternative grades, those barrels offer limited economic value to consumers.

The challenge is therefore not to abandon “Just in Time” efficiency in favour of “Just in Case” redundancy, but to establish the right balance between operational efficiency and strategic resilience.

India’s Energy Security Requires Optionality Across the Entire Value Chain

India’s exposure to global energy disruptions is particularly significant. The country imports approximately 88% of its crude oil requirements, while domestic consumption continues to expand.

Oil demand, currently around 5.6 million barrels per day, is expected to reach approximately 7.5 million barrels per day in the foreseeable future. This growth makes reliable access to international energy supplies an increasingly important national economic priority.

The recent crisis demonstrated that diversified sourcing can provide a powerful buffer against geopolitical disruption. India’s substantial imports of Russian crude helped offset interruptions affecting supplies transiting the Strait of Hormuz.

India’s ability to source crude from approximately 45–50 countries has also provided valuable flexibility, reducing dependence on individual suppliers and geographical corridors.

However, diversification alone is insufficient.

The crisis exposed a particularly acute vulnerability in liquefied petroleum gas. Approximately 60% of India’s imported LPG passes through the Strait of Hormuz, while around 95% of imported LPG is used for domestic cooking.

Unlike crude oil, where alternative sourcing arrangements helped cushion the disruption, LPG supply constraints created immediate concerns for household energy security.

India is consequently looking to expand LPG storage capacity at import terminals, refineries and other strategic locations, recognising that critical domestic fuels require additional protection against supply interruptions.

Strategic storage must nevertheless be considered alongside broader supply-chain flexibility. Building additional tanks without addressing shipping access, refining capability and product distribution would deliver only partial resilience.

The objective should be optionality across the entire energy value chain: from the source of supply to the final consumer.

Refining, Shipping and Strategic Geography Are the Foundations of Resilience

One of the most important lessons from India’s experience is that refining capacity itself must be recognised as a strategic national energy security asset.

India currently possesses approximately 275 million metric tonnes of refining capacity, with expansion towards 310 million metric tonnes anticipated by 2030. This substantial domestic refining capability has helped India maintain petroleum product availability despite major disruptions to international crude flows.

A flexible refinery provides multiple strategic advantages. It can process crude from different geographical sources, accommodate changes in available grades and produce the petroleum products required by domestic consumers.

It can also support regional product markets when other refining and distribution systems come under pressure. Refining capacity therefore represents more than industrial infrastructure. It provides an operational buffer against supply disruptions and reduces the need to depend exclusively on large inventories of finished products.

Shipping represents another essential component of this resilience architecture. India’s government has announced plans to add 100 vessels to its merchant fleet over the next five to ten years, recognising that a major energy-importing economy must exercise greater control over how its supplies reach domestic markets.

Access to vessels, maritime insurance arrangements and emergency logistics capabilities are increasingly becoming matters of national energy policy rather than purely commercial considerations. Strategic storage must also evolve beyond the traditional assumption that national reserves should necessarily be located within national borders.

India and the UAE have explored

opportunities for additional strategic storage cooperation, including potential Indian storage arrangements in Fujairah.

This reflects an important principle: energy security depends not simply on how many barrels are held in reserve, but where those barrels are positioned and how reliably they can be accessed.

Fujairah provides a compelling example of geographic optionality.

Located outside the Strait of Hormuz, its established storage, port, bunkering and trading infrastructure offers strategic advantages that extend well beyond its physical size.

Infrastructure positioned outside vulnerable maritime chokepoints, supported by diversified transport routes and storage capabilities, can transform redundancy from an apparent commercial burden into a valuable strategic asset.

India-Gulf Cooperation Must Move Beyond the Buyer-Seller Model

The evolving energy security landscape presents an opportunity to redefine the relationship between India and the Gulf. For decades, this relationship has largely operated through a straightforward commercial arrangement: the Gulf produces energy, and India consumes it. That model remains important, but it is no longer sufficient to address the complexities of modern energy security. India brings enormous and growing energy demand, extensive refining capacity, a major petroleum product market and increasingly sophisticated energy infrastructure.

The Gulf contributes substantial production capacity, strategic storage locations, shipping expertise, established trading capabilities and advantageous geography. Together, these complementary strengths could support a more integrated resilience partnership.

Such cooperation should extend to strategic petroleum storage, emergency product supply arrangements, shipping

partnerships, refining flexibility and more closely connected regional supply chains. These initiatives would strengthen India’s ability to withstand disruptions while creating new commercial opportunities for Gulf energy producers, terminal operators, shipping companies and infrastructure investors.

However, the transition towards greater resilience raises an unavoidable commercial question: who pays for it?

Spare capacity appears expensive when markets are functioning normally. Additional storage ties up capital, while alternative shipping routes and pipeline arrangements may seem inefficient compared with established transport corridors.

Yet during periods of disruption, these same assets can become extraordinarily valuable.

Governments and industry must therefore develop better ways to recognise, finance and reward the option value of resilience.

The objective should not be maximum redundancy at any cost. Excessive investment in underutilised infrastructure risks undermining the economic efficiency that has historically supported the global energy system.

Instead, investment decisions must identify which combinations of storage, shipping, refining flexibility, alternative routes and regional cooperation deliver the greatest security and commercial value.

Ultimately, the future of energy security is not a choice between “Just in Time” and “Just in Case”.

India and the wider East-of-Suez energy system need both.

Preserving efficiency while building strategic optionality will ensure that one disrupted shipping route, one unavailable vessel, one constrained supplier or one vulnerable geographical chokepoint does not escalate into a national economic crisis.

Resilience carries a cost. But the more important question is how much vulnerability our economies can afford. ■

Energy Resilience will Only Succeed If Someone is Willing to Pay for It



Guy Moeyens
CEO, VTTI

The global energy industry's shift from "Just in Time" efficiency towards "Just in Case" resilience presents significant opportunities for strategic storage and infrastructure investment. However, resilience only becomes commercially viable when governments and customers are willing to pay for additional capacity before the next disruption occurs.

For decades, energy infrastructure investment prioritized efficiency, utilization and predictable returns. Spare storage capacity was often considered an unnecessary expense. Recent geopolitical disruptions have challenged that assumption, demonstrating the strategic value of infrastructure capable of maintaining energy supplies during crises.

Governments are increasingly reassessing strategic petroleum inventories, with discussions moving beyond traditional 90-day stockholding requirements towards approximately 110 days of cover. This is creating demand for additional storage, particularly among energy-importing countries seeking greater control over emergency supplies.

In Europe, refinery closures are also shifting priorities towards finished petroleum products rather than crude inventories. Diesel, gasoline and jet fuel storage are becoming increasingly important, alongside infrastructure that ensures immediate accessibility during disruptions.

For commercial terminal operators, the challenge is translating national energy security priorities into financially sustainable

investments. Strategic storage requires substantial capital, while unused capacity generates limited commercial value during normal market conditions. Long-term contractual commitments offer a solution. VTTI's strategic storage development in Croatia demonstrates how take-or-pay agreements can provide predictable revenues and recover infrastructure investment over the contract period.

Countries with limited domestic inventories are considering new storage facilities while simultaneously increasing stockholdings within existing infrastructure. These approaches must advance together, balancing immediate security requirements with longer-term investment opportunities. Fujairah illustrates the potential for established energy hubs to respond to rising demand, with additional tank capacity potentially becoming operational within two years of an investment decision.

However, building capacity without committed customers risks replacing one form of inefficiency with another. Governments, national oil companies and private operators must establish financing arrangements that recognize the strategic value of resilience while delivering sustainable returns.

Ultimately, resilience cannot depend on infrastructure alone. It requires long-term commercial commitments, reliable financing and experienced operational teams. The value of energy security must be recognized and paid for before the next crisis arrives. ■

Fujairah's Strategic Connectivity Is Redefining Energy and Trade Resilience



Captain Mohamed Al Yahyai
CEO, Fujairah Terminals

Recent regional developments have demonstrated that resilience depends not only on additional infrastructure, but also on the ability to activate alternative trade corridors, maximise existing capacity and maintain the efficient movement of cargo. Fujairah's strategic location outside the Strait of Hormuz continues to play an important role in supporting the UAE's supply chains.

Importantly, the UAE's response has been supported by established business continuity arrangements and alternative logistics corridors, enabling coordinated action as regional conditions evolved.

A central component of this approach has been strengthening connectivity between Fujairah and ports across the UAE, particularly Khalifa Port and Jebel Ali. Bonded transport corridors, supported by customs cooperation, road networks and Etihad Rail, facilitate cargo movement between emirates while helping to minimise regulatory delays and logistical bottlenecks.

These arrangements extend beyond conventional containers to include ISO tank containers, general cargo and breakbulk shipments. Cooperation among port operators, customs authorities and government stakeholders is essential to the efficient movement of goods. Rail connectivity is

also becoming increasingly valuable, demonstrating how existing infrastructure can provide additional flexibility when trade flows are disrupted.

At Fujairah Terminals, our priority has been to maximise operational capacity while maintaining the efficient movement of cargo through the terminal. AD Ports Group's continued investment in cargo-handling equipment and supporting logistics infrastructure has strengthened operational flexibility and helped reduce congestion.

We have also strengthened operational planning and coordination with relevant stakeholders to support the efficient handling of essential supplies and materials for strategic national projects. These measures are not intended merely as short-term responses to regional developments. Strengthening connectivity between Fujairah and the UAE's wider port network creates lasting operational flexibility, regardless of how regional trade patterns evolve.

Ultimately, resilience requires infrastructure, coordinated planning and the flexibility to redirect trade when established routes become constrained. Fujairah demonstrates how strategic geography, multimodal connectivity and advance preparation can strengthen long-term supply chain resilience. ■

How can Redundancy be Converted From an Operational Cost Into an Investable Strategic Asset?

REDUNDANCY BECOMES INVESTABLE WHEN COST OF DISRUPTION IS MADE VISIBLE

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Spare capacity has long struggled to compete for capital in an energy industry that rewards high utilization and immediate returns. An empty tank, an alternative pipeline or a standby pump can appear unproductive under normal conditions. Yet when a primary route closes or a critical asset fails, that same infrastructure can protect revenues, preserve deliveries and prevent an operational interruption from becoming an economic crisis.

Converting redundancy into an investable strategic asset therefore requires a broader assessment of its contribution. Investment decisions must recognize the value of avoided downtime, protected production and dependable customer supply. These benefits become commercially meaningful when companies can identify the risks being addressed, quantify the losses being avoided and establish who will pay for protection.

The starting point should be credible operational scenarios. Attempting to duplicate an entire supply chain against every conceivable threat risks excessive expenditure without guaranteeing security. Infrastructure can remain exposed even after substantial investment. A stronger proposition identifies likely interruptions, estimates their duration and consequences, and selects alternatives that restore flows efficiently. This makes resilience easier to justify to management, governments and customers.

Financial models must reflect those scenarios. Valuations based predominantly on normal operating conditions systematically overlook the contribution of assets designed for abnormal circumstances. Probability-weighted assessments should incorporate deferred production, interrupted sales, emergency logistics costs and recovery expenditure. As with insurance, the premium paid for optionality should be judged against the potential loss it helps prevent.

Interconnection offers a practical way to reduce that premium. Companies do not each need to own a complete duplicate system. Connections between producers, terminals, storage facilities and transport networks can unlock capacity already available elsewhere. Reverse-flow arrangements and shared access can create alternatives at lower cost than standalone construction. Accurate metering, clear ownership rules and agreed operating responsibilities make such cooperation commercially workable.

Existing infrastructure deserves particular attention. A network may appear flexible while depending on a single transfer point whose failure disables several facilities. Additional pumps, alternative connections, recovery capability and available tank buffers can address these weaknesses. Auditing current assets and available land should precede decisions to build new capacity.

The financing question is equally important. Infrastructure operators need predictable revenues; occasional crisis demand cannot support a durable investment case. Take-or-pay contracts and premiums for priority access can monetize availability before disruption strikes. Government participation becomes justified where continuity protects national supply and the wider economy, extending benefits beyond individual commercial customers.

Reliable delivery also depends on enforceable relationships. Owning ships or storage can strengthen control, while dependable partners offer another route to optionality.

Either approach requires clarity over access, delivery obligations and conduct during emergencies. Insurance exclusions and force majeure provisions must be understood before they undermine the protection customers believe they have purchased.

Redundancy becomes investable when its purpose, performance and payment are explicit. The strongest projects combine measurable reductions in downtime with shared infrastructure and contracted revenues. By making the cost of interruption visible, the energy sector can turn resilience from a discretionary expense into a disciplined investment in continuity and lasting commercial value. ■

TOP 5 RECOMMENDATIONS

1. BUILD THE INVESTMENT CASE AROUND AVOIDED OPERATIONAL DOWNTIME

Identify credible interruption scenarios and quantify deferred production, lost revenues and recovery costs. Use these estimates to demonstrate which buffers justify their cost and to secure contributions from governments and end users benefiting from continuity.

2. INCORPORATE DISRUPTION RISK INTO FINANCIAL VALUATIONS

Evaluate redundancy using probability-weighted disruption scenarios alongside normal operating assumptions. Explicitly value avoided losses and alternative delivery capability, making the commercial benefit of optionality visible within investment decisions.

3. STRENGTHEN EXISTING INFRASTRUCTURE BEFORE BUILDING ADDITIONAL CAPACITY

Audit shared connections, pumps, tank availability and recovery arrangements to identify critical dependencies. Prioritize targeted upgrades and usable operating buffers that deliver the greatest reduction in downtime per dollar invested.

4. SHARE CAPACITY THROUGH INTERCONNECTED NETWORKS

Develop connections, reverse-flow capabilities and shared access arrangements across operators and jurisdictions. Establish accurate metering and clear ownership rules so companies can access collective redundancy without each financing a complete duplicate system.

5. CONTRACT AND PAY FOR RELIABLE AVAILABILITY IN ADVANCE

Use take-or-pay commitments and premiums for priority access to fund dependable capacity. Align customer and government contributions with their benefits, while clarifying delivery obligations, force majeure provisions and insurance coverage before disruption occurs.

***How can Regional Integration
Strengthen Energy Resilience
Without Weakening Commercial
or National Sovereignty?***

Regional Energy Integration: Strengthening Resilience While Preserving National Sovereignty and Commercial Independence

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The growing vulnerability of strategic maritime corridors, particularly the Strait of Hormuz and Bab el-Mandeb, has reinforced the need for greater regional energy integration across the East of Suez. Energy resilience cannot depend solely on constructing alternative infrastructure. Sustainable cooperation requires commercially viable investments, diversified logistics networks, political commitment and contractual arrangements that preserve national sovereignty and individual competitive advantages.

Regional pipeline networks, storage facilities and alternative export routes offer opportunities to reduce dependence on vulnerable maritime corridors. However, infrastructure investments justified exclusively by current disruptions carry significant risks, particularly when projects require several years to complete. Investments must demonstrate long-term commercial value under normalized market conditions. Shorter pipeline connections, expanded storage capacity and links between existing production facilities and export terminals offer more practical opportunities than ambitious cross-border megaprojects. Government support and sovereign wealth fund participation may be necessary where strategic infrastructure cannot be justified by commercial returns alone.

Combining maritime transportation, pipelines, trucking, rail and storage facilities strengthens operational flexibility and reduces dependence on individual supply routes. Fertiglobe's experience demonstrates how geographically diversified production, inland warehouses, floating storage

and existing logistics partnerships can sustain operations during prolonged disruptions. Flexible transportation arrangements enable companies to adjust logistics according to market conditions while maintaining customer commitments. However, alternative infrastructure remains vulnerable to modern security threats, including drone attacks, reinforcing the importance of diversification rather than dependence on any single solution.

Effective regional integration also requires operational agreements that can be activated immediately during disruptions. Contractual relationships among producers, warehouse operators, shipping companies, distributors and customers must be established before emergencies arise. Clearly defined activation criteria, commercial terms and access to existing logistics infrastructure can reduce response times and strengthen supply continuity without requiring companies to surrender ownership or operational independence. Such arrangements provide a practical pathway toward cooperation through existing commercial ecosystems.

Azerbaijan's diversified pipeline network, particularly the Baku-Tbilisi-Ceyhan pipeline, illustrates how political support, international investment and shared transit interests can enable major cross-border infrastructure. Comparable East of Suez projects would require sustained political commitment, financing and alignment of national interests. Differing strategic priorities, geopolitical uncertainty and questions surrounding future infrastructure utilization

remain significant obstacles. Regional cooperation must therefore deliver identifiable economic and strategic benefits to participating countries rather than depend exclusively on collective ambitions.

Regional integration does not necessarily require centralized ownership or diminished national control. Cooperation can develop through commercially negotiated infrastructure access, diversified supply arrangements and mutually beneficial partnerships. Historical cross-border gas projects also demonstrate the risks associated with

pricing disagreements, contractual disputes and insufficient alignment between stakeholders. Practical, economically sustainable cooperation must therefore be supported by transparent commercial agreements, appropriate financing and long-term political commitment. The priority is to create additional supply options, improve operational flexibility and strengthen regional energy security while allowing governments and companies to retain control over strategic assets, commercial decisions and national energy priorities.

TOP 5 RECOMMENDATIONS

1. PRIORITIZE COMMERCIALLY VIABLE REGIONAL INFRASTRUCTURE CONNECTIONS

Develop targeted pipeline connections, expanded storage facilities and alternative export routes that strengthen regional energy resilience while preserving national ownership and control. Prioritize shorter, economically sustainable infrastructure projects that retain commercial value beyond the current crisis, rather than relying exclusively on expensive cross-border megaprojects.

2. ESTABLISH PRE-AGREED COMMERCIAL AGREEMENTS FOR EMERGENCY SUPPLY CONTINUITY

Strengthen cooperation among energy producers, warehouse operators, shipping companies, distributors and customers through contractual arrangements established before disruptions occur. Define commercial terms and clear activation criteria to enable immediate access to alternative logistics and storage facilities while protecting each company's operational independence and commercial interests.

3. INTEGRATE EXISTING MARITIME, PIPELINE, RAIL AND ROAD TRANSPORT NETWORKS

Build resilience through diversified transportation systems that combine shipping, pipelines, rail, trucking, inland warehouses and floating storage. Leverage existing regional infrastructure and commercial partnerships to maintain supply continuity, allowing individual companies to select the most economically viable transportation options without surrendering control over their operations.

4. MOBILIZE SOVEREIGN INVESTMENT AND POLITICAL SUPPORT FOR STRATEGIC CROSS-BORDER PROJECTS

Establish government-backed investment frameworks for strategically important infrastructure that cannot be financed through commercial returns alone. Apply lessons from Azerbaijan's diversified pipeline network, where political commitment, international investment and shared economic interests enabled cross-border connectivity while maintaining national control over strategic assets.

5. DEVELOP MUTUALLY BENEFICIAL COMMERCIAL FRAMEWORKS THAT PRESERVE NATIONAL SOVEREIGNTY

Structure regional energy cooperation around transparent pricing, clearly defined contractual obligations and shared economic benefits rather than centralized ownership. Ensure cross-border infrastructure arrangements protect national strategic interests, maintain commercial independence and minimize disputes over pricing, access and operational responsibilities. ■



How can Companies Quantify and Monetize Geography as a Balance-sheet Asset?

Monetizing Geographic Optionality: Valuing Strategic Location as a Balance-Sheet Asset

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Geographic location has emerged as a critical determinant of commercial value across global energy markets, particularly as disruptions to strategic maritime corridors expose vulnerabilities in traditional supply chains. Infrastructure positioned outside vulnerable chokepoints, connected to alternative transportation routes or located close to major demand centers, can deliver significant operational and financial advantages. However, translating geographic resilience into measurable asset valuations requires distinguishing temporary crisis-driven premiums from sustainable commercial returns.

The widening price differential between crude oil delivered inside and outside the Strait of Hormuz illustrates the financial significance of geographic optionality. Upper Zakum crude stranded inside the Gulf has traded at a discount approaching \$40 per barrel compared with comparable access outside the chokepoint. Freight rates, war-risk insurance premiums and regional price assessments provide additional indicators of geographic value. Nevertheless, these signals are influenced by exceptional market conditions and may not represent durable premiums suitable for long-term investment decisions.

Proximity to demand centers and the ability to shorten supply chains offer structural advantages beyond periods of disruption. Dangote Refinery's location near major Nigerian and West African markets reduces transportation requirements and supports flexible crude procurement and product distribution. Investments in additional marine berths and export facilities further strengthen access to alternative markets. Geographic value therefore extends beyond physical

location to include the ability to redirect cargoes, diversify feedstocks and minimize logistical inefficiencies throughout the value chain.

Fujairah demonstrates both the advantages and limitations of strategic geography. Its position outside the Strait of Hormuz, established storage infrastructure and access to international shipping routes provide valuable logistical alternatives. However, reduced bunker demand, declining storage inventories and weaker terminal throughput demonstrate that geographic advantages do not automatically translate into higher utilization or profitability. Restoring customer confidence, strengthening emergency response capabilities and maintaining competitive commercial services remain essential to converting strategic positioning into sustainable earnings.

Investment decisions must also distinguish between government and commercial priorities. National oil companies and governments may justify infrastructure investments through domestic supply security and strategic resilience, while private enterprises require commercially sustainable returns under normalized market conditions. Large capital commitments based exclusively on temporary disruptions risk creating underutilized assets once markets stabilize. Geographic optionality should therefore be evaluated through normal operating economics, supplemented by stress testing against increasingly volatile market conditions and potential supply interruptions.

Customer willingness to pay for supply security remains uncertain. Reliable delivery, diversified procurement options and reduced inventory requirements can justify higher costs within an integrated supply strategy, but passing these premiums directly to consumers remains difficult. Transparent commodity benchmarks often fail to capture the full costs of freight, insurance and disrupted logistics, complicating efforts to monetize resilience.

A consistent valuation framework should combine location-

specific price differentials, transportation costs, market proximity, alternative route availability, operational flexibility and sustained throughput. Assessments must also consider exposure across the entire supply chain, including essential operational inputs. Geographic optionality creates value through commercial flexibility and reduced vulnerability, but its balance-sheet recognition depends on demonstrating sustainable economic benefits beyond exceptional market conditions.

TOP 5 RECOMMENDATIONS

1. DIFFERENTIATE GEOGRAPHIC VALUE BETWEEN GOVERNMENT AND COMMERCIAL INVESTORS

Establish separate valuation criteria for national oil companies, government entities and private enterprises. Sovereign investors should prioritize energy security, domestic supply continuity and strategic infrastructure resilience, while commercial investors assess profitability, utilization and sustainable returns. Geographic optionality must be measured against each investor's objectives rather than through a single valuation approach.

2. QUANTIFY THE COMMERCIAL VALUE OF SUPPLY AND EXPORT FLEXIBILITY

Measure geographic optionality through access to alternative feedstock sources, domestic and international markets, and multiple export routes. Assess the ability to redirect cargoes, diversify crude procurement and maintain operations during disruptions. Infrastructure offering greater flexibility can generate additional commercial value by reducing dependence on individual suppliers, markets or transportation corridors.

3. MEASURE GEOGRAPHIC PREMIUMS THROUGH OBSERVABLE MARKET PRICE DIFFERENTIALS

Use crude and product price differentials, freight costs and insurance premiums to quantify the financial advantages of infrastructure located outside vulnerable chokepoints. Compare loading locations inside and outside the Strait of Hormuz to establish measurable geographic premiums, while distinguishing temporary crisis-driven price distortions from sustainable commercial advantages.

4. EVALUATE GEOGRAPHIC RESILIENCE ACROSS THE ENTIRE SUPPLY CHAIN

Assess geographic exposure throughout the complete operational value chain rather than focusing exclusively on feedstock procurement and product exports. Include access to essential industrial inputs, equipment, catalysts, pipeline infrastructure, transportation networks and alternative logistics arrangements. Measure the ability to sustain throughput, minimize supply interruptions and maintain operational continuity when individual supply routes become unavailable.

5. INCORPORATE GEOGRAPHIC OPTIONALITY INTO LONG-TERM ASSET VALUATIONS WITHOUT OVERESTIMATING CRISIS PREMIUMS

Evaluate infrastructure investments under normalized market conditions while stress-testing their performance against future disruptions. Assess whether geographic advantages translate into sustainable utilization, reliable customer access, reduced logistics costs and stronger commercial returns. Recognize that markets may assign substantial premiums to strategic locations during crises but may not sustain those premiums once normal trading conditions return. ■



How Can Integrated Midstream Platforms Create a Natural Hedge Without Concentrating New Risks?



Integrated Midstream Platforms: Building Natural Hedges While Managing Concentration Risk

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Integrated midstream platforms offer opportunities to strengthen energy resilience by combining shipping, storage, terminals and refining capabilities. Greater control over transportation and infrastructure can reduce exposure to volatile freight markets, improve supply-chain flexibility and support more diversified earnings. However, integration does not automatically create a natural hedge. Investments concentrated in the same geography, maritime corridor or operational infrastructure can become simultaneously vulnerable during disruptions, potentially amplifying rather than reducing financial and operational risks.

Access to tanker capacity has become increasingly important as freight rates rise and vessel availability tightens. National oil companies, trading houses and shipping companies are expanding fleet control through vessel ownership and time-charter arrangements to secure cargo movements. Elevated freight earnings can accelerate investment payback, but purchasing vessels at exceptionally high prices creates significant exposure if market conditions normalize. Fleet strategies must therefore balance immediate transportation requirements with long-term vessel availability, age profiles, operating costs and future commercial viability.

Diversification must extend beyond ownership of different assets to include geographical exposure, supply sources and transportation routes. Combining shipping, storage and refining within one platform provides limited protection when all operations depend on the same chokepoint. Effective integration requires access to alternative markets

and logistics networks capable of operating independently during disruptions. Global trading platforms can provide additional flexibility by redirecting cargoes and utilizing assets across multiple regions, reducing dependence on individual trade flows.

Fixed infrastructure represents another significant vulnerability. Pipelines, loading terminals and refineries remain exposed to physical attacks and prolonged operational interruptions. Unlike shipping capacity, which can be expanded or repositioned quickly, damaged infrastructure may require substantial time and capital to restore. Investments in bypass pipelines, particularly those supporting exports through Fujairah and the Gulf of Oman, can reduce dependence on vulnerable maritime routes. However, infrastructure diversification must avoid creating new single points of failure.

Insurance availability and access to financing are equally critical to successful integration. Elevated war-risk premiums and limited insurance coverage can prevent commercially viable projects from securing bank financing. Government-backed insurance guarantees, export credit agencies and strategic partnerships offer potential mechanisms to unlock private investment without requiring governments to finance infrastructure directly. Regional financial institutions can support these arrangements, provided risks are appropriately allocated and commercial incentives remain aligned.

Operational efficiency must remain central to resilience planning. Expanding fleet capacity, improving vessel utilization and strengthening pipeline connectivity can address immediate supply constraints, while longer-term infrastructure investments require careful assessment of capital intensity and exposure to changing market conditions. Financial hedging also introduces liquidity requirements, particularly when elevated freight rates generate substantial margin calls.

The optimal integration model depends on the ability to combine commercial flexibility with effective risk diversification. Ownership can secure critical transportation capacity, while partnerships and hybrid structures can distribute financial exposure and provide access to specialized capabilities. Shared operating standards, aligned strategic objectives and clearly defined governance arrangements are essential to ensuring that integrated platforms strengthen resilience without concentrating new risks.

TOP 5 RECOMMENDATIONS

1. SECURE STRATEGIC SHIPPING CAPACITY THROUGH A BALANCED OWNERSHIP AND CHARTERING MODEL

Strengthening control over transportation capacity through selective vessel acquisitions, time-charter agreements and fleet partnerships. Prioritize immediate cargo movement requirements while assessing vessel age, acquisition costs, future freight earnings and long-term fleet suitability. Avoid excessive reliance on high-priced shipping assets whose commercial viability depends exclusively on elevated crisis-driven freight rates.

2. DIVERSIFY INTEGRATED ASSETS ACROSS GEOGRAPHIES AND TRANSPORTATION ROUTES

Ensure shipping, storage, terminal and refining investments are not concentrated around the same vulnerable maritime corridor or infrastructure network. Develop access to alternative supply sources, export markets and transportation routes, including bypass pipelines that reduce dependence on the Strait of Hormuz. Structure integrated platforms to maintain operational flexibility even when individual assets or routes become unavailable.

3. ESTABLISH GOVERNMENT-BACKED INSURANCE AND FINANCING PARTNERSHIPS

Develop strategic partnerships among governments, export credit agencies, insurers and commercial banks to address war-risk coverage gaps that restrict infrastructure investment. Explore government-backed insurance guarantees and credit enhancement mechanisms that enable private companies to secure financing without requiring direct sovereign ownership of every asset. Prioritize arrangements that distribute financial exposure while supporting regional energy security.

4. PRIORITIZE INFRASTRUCTURE INVESTMENTS THAT REDUCE SINGLE POINTS OF FAILURE

Direct capital toward bypass pipelines, alternative loading facilities and transportation capabilities that strengthen supply continuity. Evaluate the vulnerability of fixed infrastructure, including pipelines, terminals and refineries, alongside the flexibility of mobile shipping assets. Balance immediate investments in vessel availability with longer-term infrastructure development, ensuring that integration does not replace existing bottlenecks with new operational dependencies.

5. ADOPT HYBRID INTEGRATION MODELS WITH SHARED GOVERNANCE AND ALIGNED STRATEGIC OBJECTIVES

Select ownership, joint ventures or commercial alliances according to the level of operational control, investment exposure and specialist capabilities required. Establish shared operating standards, clearly defined responsibilities, coordinated risk management and agreed governance arrangements across participating organizations. Ensure that all partners pursue aligned commercial and strategic objectives, allowing integrated platforms to capture operational benefits without creating excessive financial or organizational concentration. ■



***How can Fujairah Energy Hub
Evolve Into a Global Marketplace
for Resilience?***

Transforming Fujairah Into a Global Marketplace for Energy Resilience

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Fujairah's strategic position outside the Strait of Hormuz provides an opportunity to evolve from a regional energy logistics hub into a broader marketplace for supply-chain resilience. Achieving this transformation requires more than additional storage capacity or physical infrastructure. Flexible product handling, integrated transportation networks, regional cooperation and commercially sustainable investments are essential to maintaining energy flows during disruptions while supporting long-term competitiveness across East of Suez markets.

Operational flexibility is a defining capability for future energy hubs. The ability to switch storage facilities between different petroleum products according to changing market demand can strengthen supply continuity without requiring substantial new infrastructure. Flexible storage utilization enables terminals to respond to shifting product shortages, particularly when disruptions create imbalances between gasoline, diesel, LPG and other refined products. Maximizing existing infrastructure before committing to expensive capacity expansions can improve asset utilization and reduce exposure to investments that may become underused once markets normalize.

Crude blending represents another opportunity to enhance the commercial value of energy storage hubs. Refineries cannot process every crude grade without operational constraints, making feedstock compatibility an important consideration during supply disruptions. Integrating blending capabilities with crude storage facilities would allow operators to combine available grades into suitable refinery feedstocks.

This approach could expand procurement options, strengthen refining flexibility and improve the ability to redirect crude supplies toward facilities experiencing shortages.

Regional logistics integration is equally important to developing a resilient energy marketplace. Increased cargo movements between the UAE and Oman have exposed bottlenecks at border crossings, ports and storage facilities. Oman's green corridor arrangements and efforts to extend free-zone regulatory benefits to industrial parks demonstrate how administrative flexibility can expand available storage and distribution capacity. Reducing customs barriers, simplifying cross-border trucking arrangements and improving access to alternative logistics facilities can strengthen regional supply continuity without requiring entirely new infrastructure.

Floating storage offers another practical response to temporary capacity shortages. Repurposing suitable vessels as offshore storage facilities can provide additional flexibility when land-based terminals reach capacity. Such arrangements may reduce the need for permanent storage investments driven by exceptional market conditions. However, floating storage must be coordinated with port access, vessel availability, cargo handling requirements and downstream distribution networks to ensure efficient operations.

Geographic diversification across East of Suez hubs can further strengthen energy security. Fujairah, Jebel Ali and other UAE facilities can complement Oman's ports, including Duqm and Salalah, by providing alternative routes to international markets. Stronger connectivity between ports, pipelines, road networks

and potential rail infrastructure would enable cargoes to reach customers through multiple channels, reducing dependence on individual chokepoints and congested logistics corridors.

Long-term competitiveness also depends on regulatory cooperation, skilled personnel and coordinated investment. Infrastructure expansion must be supported by efficient operating frameworks, commercial partnerships and experienced leadership capable of responding to changing market conditions. Digital optimization may improve

coordination, but physical flexibility remains essential to moving and processing energy commodities.

Fujairah's evolution into a resilience marketplace should therefore prioritize adaptable storage and blending capabilities, integrated regional logistics and commercially sustainable infrastructure. These capabilities can strengthen supply reliability, attract diversified cargo flows and position the hub as an increasingly important component of global energy security.

TOP 5 RECOMMENDATIONS

1. PRIORITIZE FLEXIBLE STORAGE AND INTEGRATED CRUDE BLENDING CAPABILITIES

Develop storage infrastructure capable of switching between petroleum products as market demand changes, while integrating crude blending facilities to accommodate diverse refinery feedstock requirements. Maximize existing terminal capacity and product-handling flexibility before committing to major expansions, enabling Fujairah to respond to supply disruptions without creating unnecessary long-term capital exposure.

2. STRENGTHEN CROSS-BORDER LOGISTICS THROUGH REGIONAL REGULATORY COOPERATION

Establish more efficient logistics corridors connecting Fujairah and other UAE energy facilities with Oman's ports, industrial parks and storage infrastructure. Simplify customs procedures, harmonize trucking arrangements and expand access to bonded storage facilities. Build on existing green corridor initiatives to reduce border delays, improve cargo movements and strengthen regional energy supply continuity.

3. EXPAND STRATEGIC STORAGE OPTIONALITY THROUGH EXISTING INFRASTRUCTURE AND FLOATING CAPACITY

Address temporary storage shortages by utilizing available industrial facilities, flexible warehousing arrangements and suitable vessels for floating storage. Coordinate offshore storage with port operations, cargo handling and distribution networks to maintain efficient throughput. Prioritize scalable solutions that can respond to disruptions without requiring permanent infrastructure investments justified solely by temporary market conditions.

4. DEVELOP AN INTEGRATED NETWORK OF COMPLEMENTARY EAST OF SUEZ ENERGY HUBS

Strengthen connectivity between Fujairah, Jebel Ali and other UAE energy facilities and Oman's alternative ports, including Duqm and Salalah. Improve coordination across pipelines, road transportation, shipping services and potential rail connections to diversify cargo routes and expand access to international markets. Encourage regional infrastructure partnerships that reduce dependence on individual maritime corridors while supporting efficient commercial operations.

5. INVEST IN SKILLED TALENT, COORDINATED GOVERNANCE AND COMMERCIALLY SUSTAINABLE INFRASTRUCTURE

Strengthen the institutional capabilities required to manage increasingly complex energy logistics networks through experienced personnel, effective leadership and closer cooperation among governments, port authorities, terminal operators and commercial stakeholders. Prioritize investments that improve operational flexibility and supply continuity while remaining economically viable under normalized market conditions. Use digital tools to support coordination without treating technology as a substitute for physical infrastructure. ■



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