

MIDSTREAM WORKSHOP WHITEPAPER



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How can the East-of-Suez Midstream Oil & Gas Industry Collaborate to Accelerate the Journey towards Net Zero and What's at Stake for those who Fail to Implement Effective Decarbonization Strategies?



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How can the East-of-Suez Midstream Oil & Gas Industry Collaborate to Accelerate the Journey towards Net Zero and What's at Stake for those who Fail to Implement Effective Decarbonization Strategies?

The midstream segment of the oil and gas industry, which encompasses the transportation, storage, and wholesale marketing of crude or refined petroleum products, plays a critical role in the energy supply chain. Many strategic storage terminals are designated as Critical National Infrastructure by national governments due to their importance in providing energy to industrial, transport and defence sectors. Storage capacity includes strategic reserves held for emergencies and supply disruptions. The midstream sector primarily uses fossil fuel-powered pumps and compressors for the transportation and storage of oil and gas, which are significant sources of carbon emissions. The long-distance nature of pipelines and the scale of distribution networks amplify the emission challenges. Pipelines require a substantial amount of energy to maintain the flow of oil and gas, which traditionally comes from combusting part of the product being transported. Methane leakage is a significant issue in midstream operations, particularly from aging infrastructure, which was not designed with carbon reduction in mind. Unlike upstream operations where new technologies can be rapidly deployed, midstream assets like pipelines and storage tanks are built to last for decades, often without the same awareness or foresight for decarbonization.

Increasingly stringent environmental regulations from organizations like the IMO and market demands for lower-carbon footprints are pushing the midstream sector to adopt greener practices. Compliance with these regulations and maintaining competitiveness in a shifting market landscape are major challenges. East-of-Suez midstream industry stakeholders need to act and take necessary measures to support the transformation that a net-zero transition entails.

Possible next steps could include integrating renewable energy sources into midstream operations, such as solar power to operate pipeline stations; investing in advanced leak detection technologies like infrared cameras and drones; implement CCS technologies at major emission points, such as compressor stations, and capture CO₂ before it is released into the atmosphere. Researching and testing the feasibility of blending hydrogen or ammonia with natural gas could also reduce overall carbon emissions, with the blends transported using existing pipeline infrastructure with minor modifications. And lastly, collaborating and working closely with regulators to help shape practical and effective environmental policies.

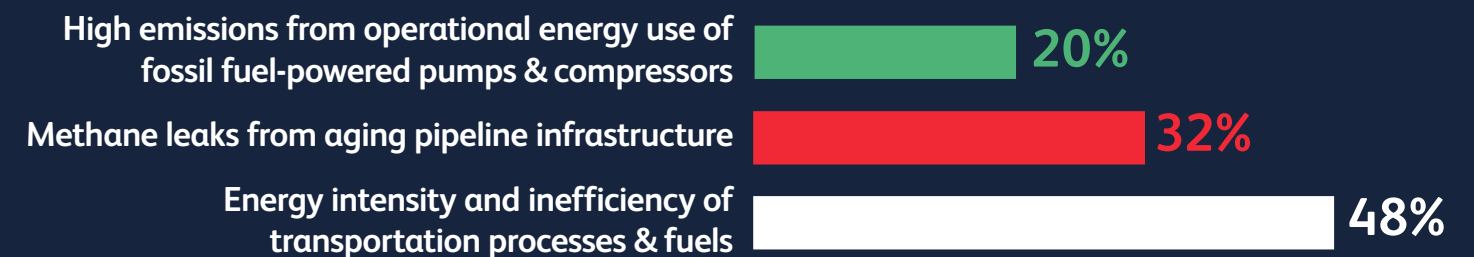
SURVEY RESULTS

GI conducted a survey with 100 East of Suez Midstream stakeholders on Oct. 1st, 2024 with the polling results outlined over the the following pages.

How critical is it for the East-of-Suez Midstream Oil & Gas Industry to unite in the effort to achieve net-zero emissions?



Which challenge poses the greatest risk to the Midstream industry's ability to decarbonize successfully?



Energy Efficiency is a Low-lying Fruit Solution to Reducing Emissions



David Bird
CEO, OQ8

Achieving net-zero acceleration is one aim, but we should also be reducing costs and improving efficiency where we can. At \$80 oil, it's not hard to make energy efficiency projects compelling, investing in retrofitting with a good IRR, and taking emissions out of the atmosphere. The refining industry is already demonstrating progress in this regard. For instance, Oman and Kuwait have made significant investments in state-of-the-art refineries with zero fugitive emissions. OQ8's new \$9 billion terminal on the east coast of Oman has 30% lower energy intensity than the global refining fleet. It's a stark contrast to older refineries in places like Rotterdam, which are highly polluting. One sticking point is that Western banks that once supported these older projects are now hesitant to fund new ones, despite their efficiency. This disconnect in financing is troubling.

Working on a Joint Narrative

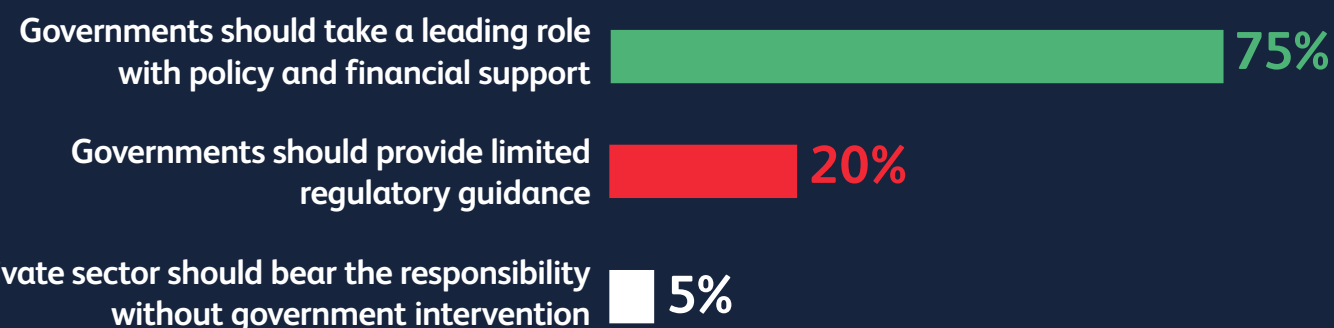
The oil and gas industry has historically struggled with collaboration. In design, for example, every operator has different standards, and so we end up with bespoke facilities, increasing costs in development or operations. Those savings can instead go towards collaboration on solutions like carbon capture and storage. It's crucial to have a narrative on decarbonization, especially when working within a regulatory framework. Transition is expensive, and we need a frank conversation with stakeholders about who will bear the costs. For example, we are willing to collaborate with others on renewables and hydrogen, but these projects need viable business models and better products than what we have today. Singapore is a great example of a strategy to deliberately get out of an energy intensive industry. However, there is no single solution – regional and local realities will dictate adaptation. The Middle East has renewables on its doorstep, so it can have a profound narrative for action in that regard, but in the meantime, we can invest in modern technologies and new infrastructure that allow for efficiencies and reduced emissions.

SURVEY RESULTS

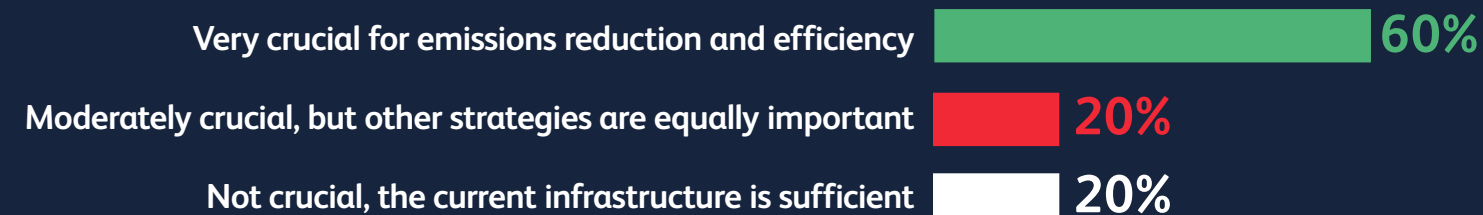
What is at stake for Midstream companies if they fail to meet decarbonization goals?



How much responsibility should national governments have in supporting the Midstream sector's transition to net zero?



How crucial is the modernization of aging infrastructure for reducing environmental risks in the Midstream sector?





The Midstream Sector has Often Escaped Scrutiny on Emissions



Gary Kalmin
CEO, Aquarius Energy

We should take on that responsibility and find ways around challenges like carbon credits, price discovery, and liquidity. We also need to address transparency issues to distinguish between real progress and greenwashing. Technology will drive change, but it will take time. We've seen several ideas

that could improve efficiency in the sector, such as using previously flared gas for energy. The midstream sector doesn't always have a strong voice in policy discussions, which leads to misinformed decisions. We should be communicating a mature decarbonization narrative. On carbon pricing for example, we need incentives, penalties, and some form of measurement. If we see the opportunity to be in biofuels as part of our value chain, we will do so, but in the interim, we will always remain where our customers need us to be, be it in traditional fossil fuels or otherwise.

Significant Emissions Pressures Exist on Conventional Midstream Infrastructure



Guy Moeyens
CEO, VTTI

In some regions, we're seeing a push for biodiesel and bio-material infrastructure as part of meeting sustainability targets. For example, in the city of Amsterdam, 75 % of the square meters in our facilities must be low fossil by 2040, to extend our concession. This directive has led many to major investments in biofuels and bio-upgrading, which ties back to the broader question of sustainable financing. In Europe, more banks are stepping back from traditional midstream projects, reluctant to engage in large project financings if they don't meet stringent climate-related conditions. It's becoming clear that companies with access to capital in places like the UAE will have an easier time securing funding.

Tangible Progress

Singapore is building an ecosystem to become non-energy intensive. In the UAE, ADNOC is making aggressive moves toward green ammonia. In Fujairah, by next year, VTTI will be running our operations almost entirely on electricity and that is possible because we can connect to the grid. In some other geographies, there is so much demand on grid systems that users may have to wait for years to secure access. Our goal ultimately is to reach net-zero emissions. We're working with key stakeholders and making real progress. Our business is part of an interconnected value chain. We need to think long-term, align with energy policies, and seize business opportunities for the future. The first step is to get our own house in order, but we're also looking at how we can support our customers in decarbonizing.



As of 2023, 85 % of IFC Financing Must be Paris-aligned



Emin Ikiisik
Regional Industry Manager, Infrastructure, Middle East, Pakistan and Afghanistan, International Finance Corporation

From July 2025 onward, that target rises to 100 %. This commitment is coordinated with other multilateral development banks. Over the past five years, we've provided \$51 billion in climate finance, with around 69.5 million tons of CO₂ emissions avoided. This includes financing 10 gigawatts of solar, wind, and hydro capacity, and over \$1 billion in blue bonds and blue loans.

One of the key challenges in emerging economies is access to both finance and markets. We frequently face detailed questions on whether projects are truly Paris-aligned, particularly regarding climate mitigation and adaptation. Cheaper financing is critical, especially for renewable projects in places like Central Asia. The competition to access finance has become fierce, driven by the need for lower costs.

Efficiency improvements can make a strong business case for climate financing, like transitioning cranes at ports from fuel oil to renewable energy. We've even debated whether these types of efficiency gains could generate carbon credits. However, creating viable carbon markets and pricing still needs to progress and will push businesses to integrate climate considerations into their revenue models.

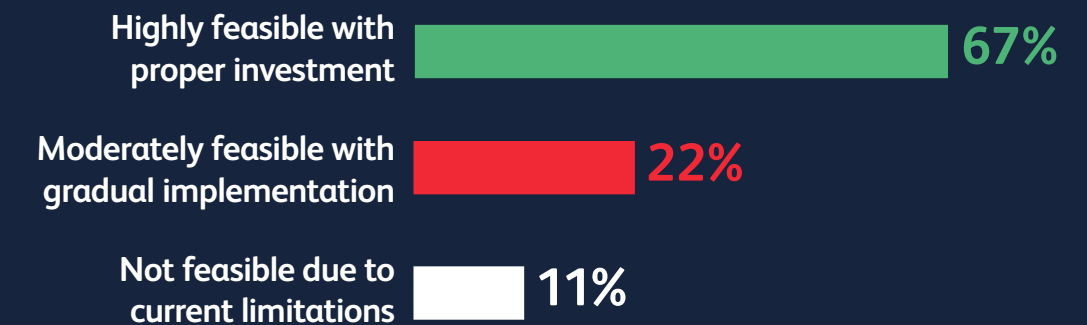
Equitable & Accessible Finance

In emerging markets, we see a strong tendency for other multilateral development banks to follow suit once a benchmark is set – whether by the IFC, the European Investment Bank or the Asian Development Bank. If a project doesn't meet Paris alignment standards, it becomes much harder to access financing, especially from commercial banks. While some banks may be open to financing non-climate-aligned projects, they may not be willing to take on the political risk in fragile or conflict-affected regions.

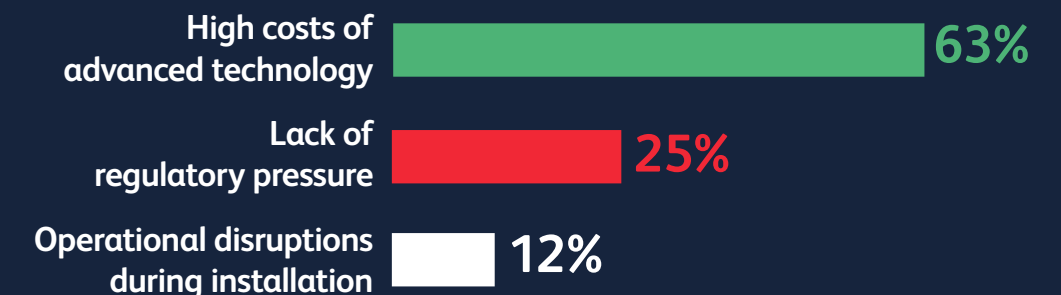
When assessing projects, we focus not only on climate mitigation but also on adaptation. Adaptation measures often represent a more immediate, lower-hanging fruit, and they acknowledge that the transition to renewables won't happen overnight. This was a key theme during last year's COP28 – a recognition that we are in a transition phase, not an abrupt phase-out of fossil fuels. It's also essential to consider fairness. Many emerging markets have not benefited from fossil fuels in the same way as developed nations, so enforcing strict fossil fuel phase-out conditions could be seen as unfair to countries still developing their economies.

SURVEY RESULTS

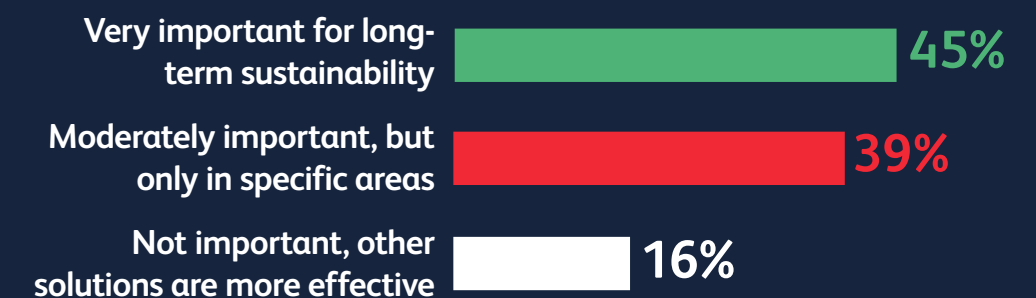
How feasible is the widespread adoption of renewable energy in Midstream operations, such as using solar power for pipeline stations?



What is the most significant barrier to implementing enhanced leak detection technologies in the Midstream industry?



How important is the implementation of Carbon Capture and Storage (CCS) technology for reducing emissions in the Midstream sector?



IMEC – An Economic Corridor Designed for the New Middle East



Narendra Taneja
Chairman, Independent Energy
Policy Institute

Trade and economic ties between India and the Arab world have a long history. Ships have been sailing between the Indian west coast and the Arabian Peninsula for over 1500 years. Unsurprisingly, therefore, the two geographies enjoy unparalleled bonds and understanding. The India-Middle East-Europe Economic Corridor (IMEC) is a new discourse in this connectivity.

IMEC was formally announced in late 2023 on the sidelines of G20 Summit in New Delhi following a meeting between top leaders of Saudi Arabia, the UAE, India, the US, Italy, Germany, France and the European Commission. The ongoing military tensions in the Middle East may have temporarily dampened the initiative, but the countries involved intend to make the project a success, manifested when the commitment was reiterated at the G7 Summit in Italy in June.

The rationale for IMEC is backed by energy, economic and geopolitical considerations. The growing strategic ties between India and

Saudi Arabia and the UAE, the 2020 Abraham Accords and the I2U2 group, have helped create the required environment to initiate an ambitious transcontinental project like IMEC.

IMEC will have both an Eastern and Western leg. The former will connect the west coast of India to the UAE by land and sea, passing through Saudi Arabia and Jordan, and onto the port of Haifa on the Mediterranean coast. The western leg will see containers loaded on ships from Haifa to European ports, and from there, onto trains to EU countries.

IMEC advocates dismiss any comparison with China's Belt and Road Initiative (BRI). There are fundamental differences. BRI is a Chinese unilateral geopolitical project, while IMEC is multilateral and genuinely aimed at promoting global connectivity. IMEC will also include services and technology, like a high-speed data pipeline, and will not be limited to physical goods only.

The GCC countries, the EU and the US, are India's key trading partners and export-import destinations. IMEC as an alternate corridor, is not only a great economic move but also a strategic one, binding India and the Middle East in a mutually beneficial and brighter economic and geopolitically secure future.

Is Europe's Energy Security at Risk?



Ravi Bhatiani
Executive Director, FETSA

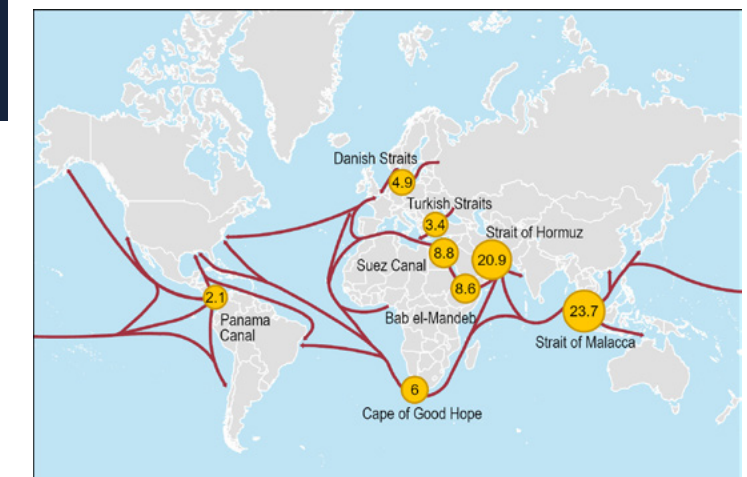
Strategic stocks create energy security, and potentially offer a mechanism to stabilize prices, by allowing a releasing in stocks during periods of market tightness. Stockpiles also reduce other countries' leverage, by reducing dependency on third countries and sudden cuts in supply.

In the European Union, there are compulsory mandated strategic stocks for crude and refined products implemented through the Oil Stocks Directive, to ensure sufficient and continuous stocks for 90 days as a buffer for demand spikes and supply side disruptions. These stocks tend to be government owned but stored at independent storage sites throughout the continent, either above or below ground.

However, there are no EU mandated stocks for gas and LNG, nor for hydrogen or liquids that can be used to store hydrogen more easily, such as ammonia and methanol. There are also no mandates for low carbon and renewable liquid fuels, which could offer a substitute for refined products, and these would include synthetic fuels like HVO. Treatment of biofuels is covered by the Oil Stocks Directive, to an extent.

Investment in refining is today discouraged in Europe because it is not consistent with the EU Green Deal objectives and EU Climate

MARITIME OIL CHOKEPOINTS DAILY TRANSIT VOLUMES (MILLION B/D)



Data source: U.S. Energy Information Administration (EIA) analysis, based on Vortexa tanker tracking and Panama Canal Authority, using EIA conversion factors and calculations

Law obligations. Refining capacity is shifting to the African continent, the Middle East, South America, the US and Asia. At the same time, oil and gas demand is forecast to remain relatively stable towards 2050. In times of tight supply, such as today, this will give geopolitical and economic leverage to producer states, that may be either non-aligned, or hostile to, EU policy objectives and foreign policy goals. This puts Europe in a position of great vulnerability for energy security.

Historically, states with large strategic reserves of 200 + days - such as China, Japan, and the US - have the greatest defence against such leverage. Increasing Europe's strategic reserves of current and future energy is therefore a matter of absolute priority to ensure Europe has strategic autonomy. Without security of energy supply, industrial policy and the competitiveness of the EU economy would suffer.

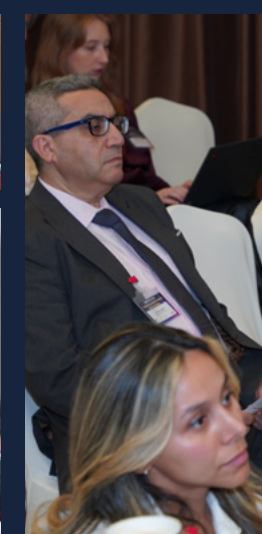
DECARBONIZATION TOP TAKEAWAYS

- Methane emissions make up 57 % of total oil and gas emissions, 47 % of which come from upstream operations and only 10 % from midstream and downstream, mostly related to gas and LNG, not oil.
- As a first step to reducing emissions, storage companies in Fujairah could look to handle biofuels logistics.
- Green hydrogen requires massive amounts of power to produce, with minimal returns. Instead of waiting for large-scale green energy solutions, many shipowners can improve efficiency through advanced technology and modernizing older infrastructure.
- The UAE is doing a lot with decarbonization but needs to exercise caution with over-regulation as it could stifle companies before they even begin. In Europe, some of the more stringent policies are beginning to receive some backlash.
- 90 % of global GHG emissions are under a net zero directive, but only 20 % of that is legal and actionable.
- Collaboration across the value chain is essential to ensure that different stakeholder initiatives on lowering emissions, can feed into each other. For example, collaboration between the midstream and upstream operators will be crucial for CCS.
- Net zero is achievable through a combination of regulatory pressure and financial incentives. Technology is catching up and advances in solar, wind, and energy storage are making renewable energy more scalable and reliable.
- Carbon credits are becoming a significant part of the trading equation, helping customers offset their emissions.
- Storage companies in Europe are planning and aligning with 2030 and 2050 emissions targets. European regulatory standards such as the zero-pollution, are becoming stricter. Companies need to report emissions across the supply chain; failure to comply will result in tariffs, making products less competitive. Adapting to European standards is crucial for companies in the Mideast who want to remain competitive in that market.

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