Natural Resource Governance Institute

Decarbonization of Oil and Gas in the Gulf Cooperation Council: The Way Forward



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Key messages

- It is unrealistic to expect a complete phase-out of oil and gas overnight. History has shown that a transition from one energy system to another takes time, but COP28 created political momentum, especially in the GCC countries, to invest not only in technologies such as carbon capture and storage (CCS), but also in the energy transition.
- GCC countries each focus on the same four key areas of decarbonization:
  1- maximizing energy efficiency while reducing emissions from operations
  2- developing renewable and clean energies
  3- investing in carbon capturetechnologies, and
  4- institutionalizing the role of national oil companies in decarbonization efforts.
- Ensuring improved emissions reporting by companies will allow for better emissions management and greater reductions in emissions. Companies in GCC countries must follow international reporting guidelines and standards.
- It is important to establish clear, holistic and realistic priorities and action plans for investing in renewable energy, to avoid unproductive projects and financial waste. Detailed, actionable plans to reach net-zero targets in the region are also needed. Ambitious targets are meaningless without concrete steps to achieve them.
- There is also need to acknowledge the limitations of CCS technologies. While these can play a role, they should not be treated as a primary approach to decarbonization.

01
Introduction

COP28 in the United Arab Emirates (UAE) will be remembered as the COP of transitioning away from fossil fuels. Weeks of negotiations led to what was named the "UAE Consensus," which gave political blessing to action towards orderly transitions based on countries' capacities. Oil and gas companies were also held accountable for their responsibilities in fighting climate change, with the launch at COP28 of the Oil and Gas Decarbonization Charter, in which companies pledged to accelerate decarbonization of their businesses. Signatories included national oil companies from the Middle East and North Africa (MENA) region, such as Abu Dhabi's ADNOC, Saudi Arabia's Aramco and Bahrain's Bapco Energies.

For activists, scientists and campaigners who believe the only acceptable action to fight climate change is to end the production of fossil fuels now, the launch of the voluntary pledges by national oil companies constitutes greenwashing. This sort of criticism must be amplified to pressurize governments and companies to take serious action to reduce emissions. However, such pledges are also important to enable civil society organizations (CSOs), communities and citizens to monitor and hold governments and companies accountable.

The MENA region has historically contributed very little to climate change, but it is currently home to oil and gas giants, with the highest per capita carbon dioxide (CO2) emissions globally. It is therefore important for the MENA governments, NOCs and societies to contribute to fighting climate change. The global community particularly welcomes efforts by the financially rich MENA countries to contribute to decarbonization efforts, and by the giant NOCs of the region to deliver on their commitments.

The Natural Resource Governance Institute (NRGI) has been following the energy transition paths in MENA since 2023. We understand the differences in capacities and needs among the various countries of the region, and acknowledge the fear of transitioning away from oil and gas for countries dependent on these resources for their state revenues. Some countries in the region see opportunities to invest in clean energy for their power sector, in order to provide secure electricity and cut import bills. Fossil fuel-rich countries, such as members of the Gulf Cooperation Council (GCC), are investing in new technologies for clean energy and seeking a place on the global stage to influence the energy agenda.

NRGI has sought to bring these nuances of the energy transition to MENA populations, by creating a space for experts from the region to reflect on these developments and to develop recommendations for action to present to decision-makers and CSOs. To this end, we have organized webcasts in Arabic bringing together regional experts to discuss key topics related to the energy transition in MENA. We are also compiling the experts' recommendations ' in a series of briefs, to be the base for actionable advocacy for a just energy transition. Part of NRGI's just energy transition program, this publication is based on a webcast on the role of GCC governments and their NOCs in decarbonization efforts.

02
Emissions, the oil and gas sector, and development

The Paris Agreement, adopted during COP21 in 2015, sets out global commitments to limit global warming to well below 2 degrees Celsius, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. This requires all stakeholders to reduce and eliminate greenhouse gas (GHG) emissions. Fossil fuel combustion is the primary source of these emissions, via the processes involved in burning coal, oil and natural gas, which release significant amounts of CO2 and other GHGs, such as methane, into the atmosphere. Global climate change frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) highlight that fossil fuels are the leading contributor to GHG emissions caused by humanity, leading to around 90 percent of all CO2 emissions and almost a third of methane emissions. Within this context, debates and commitments around decarbonization emphasize reducing the average carbon intensity of primary energy sources over time. Five of the top ten oil producers in the world are in the MENA region, in the GCC states. For example, Saudi Arabia, the world's second largest oil producer after the USA, is responsible for 11 percent of the global share of produced oil. Decarbonizing the oil and gas sector therefore becomes a crucial priority for countries relying on the sector for development and the well-being of their citizens.

Voices in developed countries argue for delinking oil and gas from economic development, but this does not resonate with populations in the MENA region who still depend on their governments to provide jobs and meet their basic needs. The emphasis for resource-rich countries—especially in the Gulf—is on making their oil and gas products the cleanest possible while the world is still economically reliant on oil and gas.



The actions of the oil giants in the region are especially critical, given estimations by the Intergovernmental Panel on Climate Change that limiting global warming to 1.5 degrees Celsius will require global GHG emissions to peak before 2025 at the latest and be reduced by 43 percent by 2030. The substantial oil revenues of the GCC nations position them uniquely not only to lead their own decarbonization efforts, but also to support other MENA countries in their energy transitions, to ensure the whole region is politically and economically more stable than at present.

NRGI's webcast guest Dr Charbel Moussa of KPMG believes that the political momentum and government buy-in for work on decarbonization technologies and an orderly energy transition was launched at COP28. Dr Moussa stated that, "Today, politically, there is a domino effect, and governments cannot say that we are only going to invest in technology. There also has to be an investment in the gradual transition from oil and gas to other sources of energy."

GHG emissions can be categorized into three groups, as defined in the Greenhouse Gas Protocol, which is widely adopted across industries, including the oil and gas sector:

- ***Scope 1 Emissions:*** Direct GHG emissions from sources owned or controlled by a company. For oil and gas companies, these include emissions from combustion in their boilers, furnaces and vehicles, and emissions from chemical production in their processing equipment.
- ***Scope 2 Emissions:*** Indirect GHG emissions from the generation of purchased electricity, steam, heating and cooling consumed by a company. For the oil and gas sector, this primarily involves the emissions associated with the electricity used in extraction, refining and distribution processes.
- ***Scope 3 Emissions:*** All other indirect emissions that occur in a company's value chain, both upstream and downstream. In the oil and gas industry, this includes emissions from the use of sold products (e.g., combustion of oil and gas by consumers), transportation and distribution, and investments, among other activities.



03

GCC countries and NOC decarbonization policies and commitments

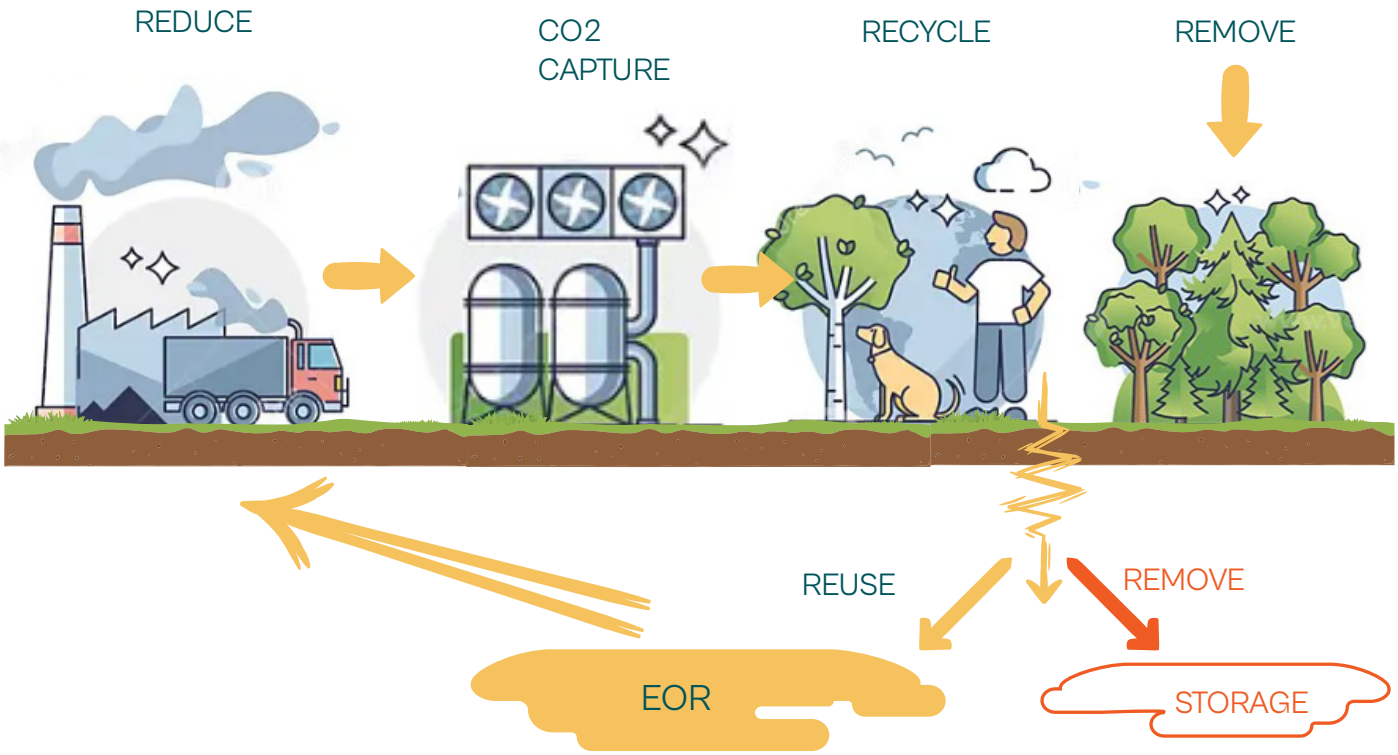
As previous NRGI research highlights, despite their vast financial capacities and low-cost reserves, GCC NOCs face significant financial risks as the global energy transition accelerates. The structural decline in oil demand, driven by decarbonization efforts, may lead to stranded assets and diminished revenues, as global capital continues to shift away from fossil fuels. NOCs such as Saudi Aramco are attempting to diversify into downstream industries such as refining and petrochemicals. However, over-investment in these sectors risks becoming a liability if the global demand for oil and its byproducts declines faster than expected. Thus, while these NOCs are better positioned than many smaller regional players, the need to mitigate financial risks through strategies that do not rely on oil and gas remains urgent.

Against this backdrop, GCC countries signalled their commitment to a greener and more sustainable future by developing and marketing holistic short- and medium-term strategies: Saudi Arabia's Vision 2030, Oman's Vision 2040, Qatar's National Vision 2030, the UAE's Vision 2021 and its related Energy Strategy 2050, Bahrain's Economic Vision 2030 and Kuwait's Vision 2035.

As of 2022, all GCC countries bar Qatar had set a net-zero target for 2050 or 2060. UAE and Oman committed to net zero by 2050, while Bahrain, Kuwait and Saudi Arabia set their net-zero objectives for 2060. For instance, the UAE has committed to reducing its GHG emissions by 40 percent by 2030, compared to "business as usual" levels, by focusing on five key emitting sectors. While these visions are cross-sectoral, the energy sector is the most critical priority for decarbonization across GCC countries. According to NRGI's webcast guest Dr Mohammed al Breiki from the Gulf Organization for Industrial Consulting, despite the plurality of energy sector decarbonization paths and targets among these countries, they each focus on four key areas:

1. Maximizing energy efficiency while reducing emissions from operations

Due to their high financial capacities, GCC countries are able to lead on and champion technologies and innovative concepts to maximize efficiency in oil and gas operations, while preventing and reducing potential CO2 emissions. For instance, Saudi Arabia has implemented the concept of the circular carbon economy. As Dr Breiki explained, this is "a concept that enables the recycling of carbon coming from different sources by using or capturing it." Saudi Arabia's NOC, Aramco, has adopted this concept, operationalizing its principles of "reducing, reusing, recycling and removing" CO2 emissions.



Implementing this concept involves the roll-out of an array of measures and approaches, including investing in technologies to improve the efficiency of internal combustion engines in transport, and planning afforestation efforts. Three NOCs in the GCC have announced or started implementing plans to plant millions of efficient carbon-capturing trees. The Abu Dhabi National Oil Company (ADNOC) has announced the planting of 10 million Avicennia trees, Aramco has announced plans for several million mangroves trees, while Petroleum Development Oman (PDO) has announced it is planting sugarcane to help with the desalination of water that will be used to be injected in the oil wells. The sugarcane bagasse, a byproduct of the plant, will be used as a renewable energy source to power the desalination process, replacing traditional electricity typically generated from oil and gas. This approach not only supports water injection but also contributes to reducing CO2 emissions by using a cleaner energy alternative.

The GCC countries are also advancing innovative and pioneering technologies aimed at reducing CO2 emissions in their oil and gas extraction. For instance, PDO's "Miraah" project is one of the world's largest solar thermal facilities, harnessing the sun's energy to produce steam for use in oil production. According to Dr al Breiki, this technology has enabled the company to save or reduce about 300,000 tons of CO2 a year. ADNOC's Centralized Predictive Analytics Diagnostics (CPAD) initiative uses artificial intelligence and machine learning to analyze data related to operations across the company, to improve operational efficiency and reduce emissions. Qatar is seeking to reduce emissions in the transport of oil and gas through purchasing ships which use liquified natural gas (LNG) or clean fuels such as ammonia and methanol, rather than heavy fuel.

2. The development of renewable and clean energies

GCC countries have established ambitious overall targets for renewable and clean energy production and integration into their domestic energy mixes. For instance, Saudi Arabia aims to have 50 percent of its energy mix from renewable energy by 2030, while Oman and the UAE aim to derive 30 percent of their electricity from renewables or clean energy by the same year. Bahrain aims for 20 per cent of its energy to be renewable by 2035, while Kuwait and Qatar aim for 15 percent and 20 percent respectively by 2030.

Achieving these targets will require GCC countries to increase their renewable energy capacity tenfold by 2030 compared to the 2022 installed capacity of about 5.7 gigawatts. Fortunately, abundant and high-quality solar resources, coupled with the very large scale of solar photovoltaic (PV) projects, mean that the GCC countries are able to produce renewable energy at a very low coast. Currently, solar PV costs less than two US cents per kilowatt hour in the GCC countries, outperforming natural gas, liquefied natural gas, oil, coal and nuclear power in this respect. These countries are already leveraging this advantage. According to the World Bank, the UAE is home to three of the world's largest and lowest-cost solar plants. The expansion of solar energy production and use will reduce the share of fossil fuels in the domestic energy mix, while also improving efficiency in operations. For instance, as Dr al Breiki stated, the Kuwait Petroleum Corporation has adopted electrical extraction technologies using solar energy to reduce emissions from oil and gas extraction processes.

In addition to solar potential, some areas in the Gulf, such as Saudi Arabia's northwestern desert and southern Oman, boast significant wind potential. Despite solar PV being more competitive, GCC countries such as Saudi Arabia and in Bahrain are investing in wind farms, through a partnership between Bahrain's Bapco Energies and the Abu Dhabi Future Energy Company, Masdar. GCC countries are also investing in grey hydrogen (from natural gas) or blue hydrogen (grey hydrogen with carbon capture). For instance, ADNOC currently produces 300,000 tonnes of grey hydrogen annually, and is investigating the potential for green and blue hydrogen production, using carbon capture and storage technology. The company also aims to start producing blue ammonia in 2025 at its large-scale facility, which has a capacity of one million tonnes per year.



3. Investing in carbon capture technologies

GCC countries including Saudi Arabia, the UAE, Qatar and Oman are investing in carbon capture and storage (CCS) technology. This refers to the process of reducing emissions from industries such as fossil fuel extraction, by collecting CO_2 that would otherwise have been emitted into the atmosphere, and storing it underground in depleted oil and gas reservoirs and saline aquifers. This technology would arguably enable these fossil fuel producers to "have their cake and eat it" by contributing to meeting domestic net-zero targets while protecting export revenues derived from oil and gas.

GCC countries already have large-scale CCS projects in different stages of development. For example, Qatar's Ras Laffan LNG carbon-capture facility has a capacity of 2.2 million tonnes per year. QatarEnergy's Sustainability Strategy also includes a commitment to increase CCS capacity at its facilities to between 7 million and 9 million tonnes per annum by 2030. Similarly, as Dr al Breiki highlighted during the webcast, CCS technology has enabled Saudi Arabia's Uthmaniyah oilfield *"to capture about 40 million cubic meters of carbon dioxide and store it underground to improve oil extraction."* The table below outlines all CCS projects implemented or planned in GCC countries until 2030 to capture CO_2 at source or through direct air capture.

Operational

Saudi Aramco Uthmaniyah	Saudi Arabia	2015	Natural gas processing	0.8
Qatargas Qatar LNG	Qatar	2019	Natural gas processing	2.2

In construction

44.01 Project Hajar	Oman	2024	Direct air capture	Under evaluation
Qatar Petroleum North Field East	Qatar	2025	Natural gas processing	2.1
QAFCO Ammonia-7 Blue Ammonia Facility	Qatar	2026	Hydrogen, ammonia, fertilizer	1.5

Advanced development

ADNOC Ghasha Concession Fields	UAE	2025	Natural gas processing	Under evaluation
ADNOC Natural gas processing plant	UAE	2025	Natural gas processing	2.3
Saudi Aramco Jubail Hub	Saudi Arabia	2027	Natural gas processing	9

Early Development

Gulf Cryo MEG Plant	Saudi Arabia	2024	Chemical	Under evaluation
ADNOC TA'ZIZ Blue Ammonia	UAE	2025	Hydrogen, ammonia, fertilizer	0.8

4. Institutionalizing the role of NOCs in decarbonization

At COP28 in Dubai, 50 international and national oil companies, representing more than 40 percent of global oil production, signed the Oil and Gas Decarbonization Charter (OGDC). The charter, launched by the COP28 Presidency and the Kingdom of Saudi Arabia, commits signatory companies to key climate actions, namely net-zero operations by 2050 at the latest (Scopes 1 and 2), ending routine flaring by 2030, and near-zero upstream methane emissions by 2030. The charter was launched as one of a series of initiatives under the Global Decarbonization Accelerator (GDA), unveiled during COP28 with the stated purpose of speeding up the energy transition and drastically reducing global emissions. Four GCC NOCs signed the charter: Saudi Aramco, Abu Dhabi's ADNOC, Oman's PDO and Bahrain's Bapco Energies, thereby reasserting and contributing to their countries' net-zero targets.

The launch of the OGDC targeting NOCs could be interpreted as a diplomatic compromise between the advocates of phasing down and transitioning away from fossil fuels, and those who fear that an accelerated transition would have significant impact on their economies and societies.

04
Takeaways and looking forward

In the GCC context, this political recognition of transitioning away from fossil fuels has the potential to pave the way for more investment, research and innovation opportunities targeted towards the new GCC generation. This could mean job opportunities for young people who want to be part of the solutions to the climate problems caused by previous generations.

During the webcast, Dr Moussa highlighted the tension that exists in global debates on climate action and decarbonization. Climate action advocates argue for the urgent need to phase out fossil fuels to mitigate climate change, while many government officials and development advocates argue for the continued use of fossil fuels to drive national development and reduce energy poverty. For many resource-rich developing countries, fossil fuels remain a critical source of energy and economic development. MENA governments have therefore been supporting the decarbonization efforts of their national oil companies, despite criticism from environmentalists and climate activists that the emphasis on decarbonization technologies will slow the phase-out of fossil fuels. GCC countries argue that the world needs a wide range of technologies and scientific innovations to tackle one of the most important existential challenge of modern times, and that their NOCs can be part of this scientific and technological advancement alongside the main global players. They also claim it is unrealistic to expect a complete phase-out of oil and gas overnight. As Dr Moussa highlighted, history has shown that a transition from one energy system to another takes time. It is important to acknowledge that even "with alternative energy or clean energy, these energy sources can increase, but oil and gas will still play a role."

The GCC fossil fuel producers are at the heart of a global debate around the future of energy systems and new economies. They acknowledge the importance of transitioning through their local and international commitments, and the pledges and targets they have set. Some, like the Saudi government and Aramco, are faster than their neighbouring countries in assessing the consequences of the transition and taking action, such as the decision to stop investing in additional oil production beyond their current capacity and to focus on more productive portfolios, such as petrochemicals, refineries and new energies. However, not all GCC countries and their companies have the same financial capacities to act fast without social and economic turbulence.

The seemingly contradictory policies and decisions being taking in some Gulf countries show the difficulties in managing the transition. Countries such as the UAE pledge billions in clean energy innovations, while the government and its oil company also announce investments worth billions to boost oil and gas production. For the Gulf countries, investment in all types of energies has been the mantra from the beginning of the energy transition negotiations as a way to show agency in decision-making and deciding the fate of their countries, without denying their shared responsibility in the global quest for solutions to climate change. For the UAE, leadership in oil and gas development is not only part of its economic development plan, but also part of its global political leverage, while for other countries, such as in Kuwait, the sector is more a question of generational issues. From this perspective, the region's political leadership is seen as needing to shift to younger generations, able to think differently and view current economic and societal problems from a different angle than oil and gas resources. There is a shift in how the oil and gas sector is viewed by Gulf citizens, with less political power residing in the oil and gas sector, and an increasing focus on other sectors. This will enable the region's leaders to reach a position where they could reduce spending on oil and gas, and even consider being the first in the region to transition away from fossil fuels.

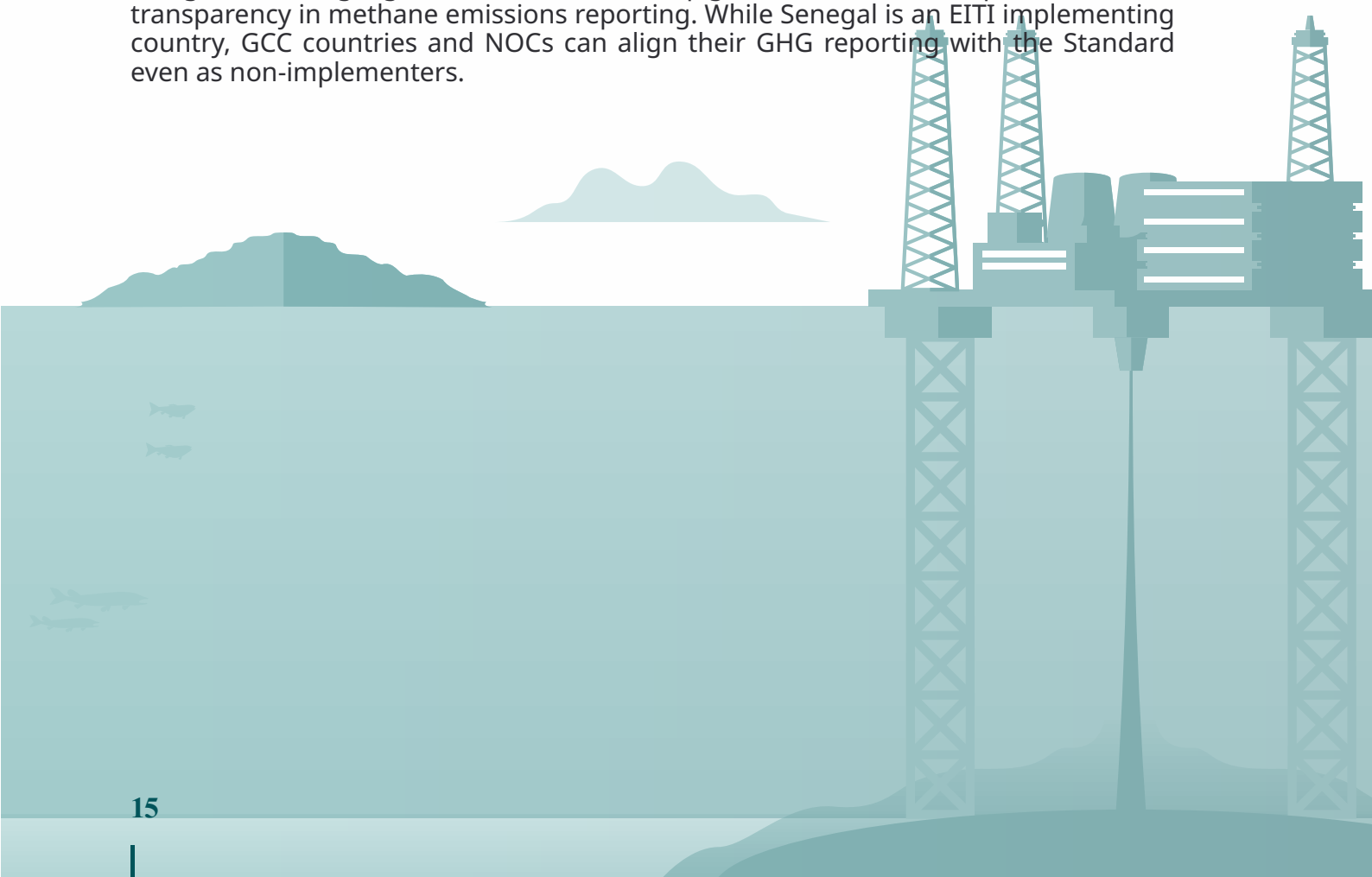


05
Increasing NOCs' role in decarbonization

Ensuring improved emissions reporting

Effective and transparent reporting on emissions by NOCs and smaller companies remains a critical challenge. Without accurate data, it is impossible to ensure responsibility for emissions or to meaningfully reduce them. As Dr al Breiki highlighted during the webcast, improving reporting is a necessary first step in holding companies accountable. NOCs in the GCC countries follow a variety of international reporting guidelines and standards, to varying degrees. For instance, Aramco's GHG reporting aligns with International Petroleum Institute Environmental Conservation Association (IPIECA) Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, as well as the Greenhouse Gas (GHG) Protocol of the World Resources Institute and the World Business Council for Sustainable Development. This is a positive step, and one that must be taken by all Gulf NOCs. In addition to helping achieve decarbonization targets, accurate reporting offers economic benefits for exporting countries. For instance, without the data from the exporter, European Union (EU) importers must use the EU's "default" emissions level for each product, which is assumed to be greater than actual emissions, thereby incurring a financial penalty to the exporter. Reporting actual emissions and then working to reduce them therefore limits costs from the EU Carbon Border Adjustment Mechanism (CBAM) and EU methane rules.

The Extractive Industries Transparency Initiative (EITI), with its multi-stakeholder structure and the introduction of its 2023 Standard, also offers a pathway for improved company transparency and reporting of GHG from exploration and production. For example, NRGI's recent report on methane emissions in Senegal's oil and gas sector highlights how the EITI can help governments and companies enhance transparency in methane emissions reporting. While Senegal is an EITI implementing country, GCC countries and NOCs can align their GHG reporting with the Standard even as non-implementers.



Expanding accountability to Scope 3 emissions

According to Dr al Breiki, ***"Most companies setting targets focus only on reducing emissions in Scopes 1 and 2, neglecting Scope 3 emissions."*** This is inadequate, as Scope 3 emissions—those resulting from the consumption of oil and gas products—are significantly higher than Scope 1 and 2 emissions combined, accounting for the overwhelming majority of total emissions from major oil companies.

Despite Scope 3 emissions being four times higher than Scope 1 and 2 emissions, they are frequently overlooked by NOCs and other oil and gas companies. This critical oversight, where the bulk of fossil fuel emissions occur at the end of the value chain during combustion by consumers, must be urgently addressed in any comprehensive decarbonization strategy. In July 2023, Bapco Energies launched its Sustainability Linked Finance Framework, allowing the company to link its financing with decarbonization goals, in line with the Kingdom of Bahrain's commitment to sustainability and climate action. According to the company's 2023 Annual Report, Bapco claims to be the first NOC to include Scope 3 emissions reduction commitments. Other NOCs in the region are still not doing this, but such decisions by governments and companies must be encouraged within the context of fighting climate change.

Incentivizing NOC decarbonization: carrot and stick

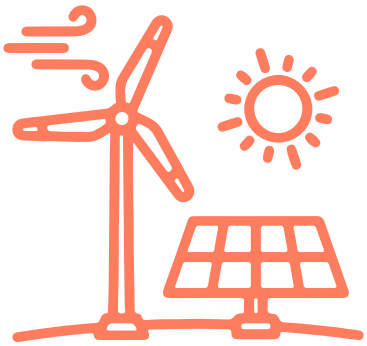
NOCs across the GCC countries are currently not incentivized to divert resources away from their vast oil and gas reserves towards new technologies which may offer less immediate financial return. Gulf governments can draw lessons from existing international policies, such as the U.S. Inflation Reduction Act (IRA) and the EU's CBAM and carbon tax. As Dr Moussa stated, a combination of incentives (the "carrot") and regulatory pressures (the "stick") can push NOCs towards decarbonization efforts. The IRA, for instance, offers financial incentives for companies investing in clean energy technologies, while the EU's CBAM imposes penalties for continued high-emission practices. If governments in the Gulf region adopt a similar dual approach towards their companies, this could drive meaningful progress in reducing emissions while maintaining economic stability.



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Establishing clear, holistic and realistic priorities and action plans

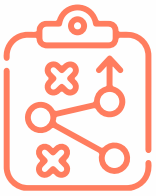
When evaluating energy transition policies, it is essential to assess their impact across multiple dimensions: economic, financial, human and practical, both in terms of effectiveness and efficiency. As Dr Moussa noted, successful energy transition policies must balance these diverse factors to ensure both long-term sustainability and immediate practicality.



Investing in renewable energy

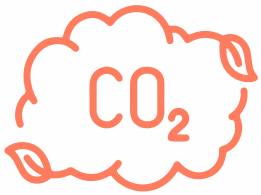
Investment in renewable energy production is undoubtedly a positive priority, but it must be approached with economic sensitivity. According to Dr Moussa, "If the company wants to invest in renewable energy, it is better to sell electricity than to use it for their own needs to replace oil." Renewable energy investments by NOCs should focus on creating broader economic value through the sale of electricity to consumers, fostering a transition that benefits both the environment and the economy.

In other words, although GCC countries have set ambitious renewable energy targets, there is need for a strategic focus on renewable energy investments that generate fresh revenue streams, rather than merely replacing oil for domestic use. NOCs could prioritize selling renewable energy to external markets, leveraging the economic value of clean electricity. This approach not only contributes to the global energy transition, but also helps reduce financial risks from declining fossil fuel demand, safeguarding these countries' economies during the transition.



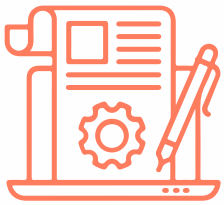
Putting in place context-sensitive strategies and policies

For energy transition strategies to succeed, they must be realistic and sensitive to local contexts. For instance, despite the MENA region's great solar potential, simply installing solar panels on a large scale is insufficient if the supporting infrastructure, such as the electricity grid, is unable to handle the output, or if industries are designed primarily for oil and gas consumption. In such cases, the benefits of solar energy remain unrealized, and progress stalls. Therefore, policies must be tailored to existing capabilities, and include investments in infrastructure upgrades that can support new energy sources.



Acknowledging the limitations of CCS technologies

CCS technologies are often promoted as a solution that will reduce emissions, but they are not without significant limitations. CCS has questionable economic and financial returns, often requiring substantial investments with minimal profitability. For GCC NOCs, focusing too heavily on CCS technologies might expose them to further financial risks, especially as the global market increasingly prioritizes renewable energy sources and low-carbon technologies. While CCS can play a role, it should not be treated as a primary solution for decarbonization, and investments in energy efficiency and renewables should take precedence.



Establishing actionable and detailed plans for net-zero targets

One of the key challenges facing the global decarbonization effort is the lack of clear, detailed action plans. As Dr al Breiki argued, "most countries set targets for net zero, but fail to provide clear annual action plans to reach those targets." Ambitious targets are meaningless without concrete steps to achieve them. Governments and NOCs must develop transparent, year-by-year roadmaps that outline how they plan to meet their net-zero commitments, ensuring that targets are not merely aspirational, but are also actionable.



Natural Resource
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The Natural Resource Governance Institute is an independent, non-profit organization that supports informed, inclusive decision-making about natural resources and the energy transition.

We partner with reformers in government and civil society to ddesign and implement just policies based on evidence and the priorities of citizens in resource-rich developing countries.

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