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Economic Perspective of Improving Energy Management and Supporting The Achievement of SDG 7: Affordable and Clean Energy

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ABSTRACT

The oil and gas industry has long been a significant contributor to global greenhouse gas emissions, with flaring and methane emissions from production processes being major concerns. However, in recent years, there has been increasing pressure from governments, environmental organizations, and stakeholders to reduce or eliminate flaring, while capturing and storing carbon dioxide (CO_2) emissions. This article reviews recent technological advancements, strategies, and efforts undertaken by global oil and gas companies to achieve zero flaring and implement effective carbon capture and storage (CCS) solutions. Despite progress, challenges related to scale, cost, and infrastructure development remain significant barriers to the large-scale implementation of these technologies. This review highlights key case studies, technological innovations, and policy frameworks driving these efforts, while offering a future perspective on achieving a carbon-neutral oil and gas sector from an economic viewpoint.

INTRODUCTION

The oil and gas industry is a vital sector in the global economy but is also one of the largest contributors to greenhouse gas (GHG) emissions, which contribute to global climate change. Therefore, the challenge faced by this sector is finding a balance between meeting the world's energy needs and reducing the environmental impact it generates. This article discusses two major initiatives to reduce the carbon footprint of the oil and gas industry: gas flaring reduction and the adoption of carbon capture and storage (CCS) technology. From an economic perspective, these steps are not only crucial in climate change mitigation efforts but also reflect significant changes in energy market dynamics and global policies.

Grubler and Wilson (2014), in their article emphasize how long-term economic policies and innovations in the energy sector can facilitate a smoother transition to renewable energy. They argue that to tackle these challenges, the role of energy policies that support investment and innovation is critical. Therefore, the energy sector requires policies that can reduce transition costs and create incentives for renewable energy investments.

Two major contributors to emissions are gas flaring and carbon dioxide (CO_2) emissions from combustion and processing activities. In response to growing environmental concerns, the industry is increasingly adopting measures to reduce its environmental footprint, especially through gas flaring reduction and the implementation of carbon capture and storage (CCS) technology. Flaring is often used as a method of disposing of excess gas during production, but it results in CO_2 and methane emissions into the atmosphere. CCS involves capturing CO_2 emissions from industrial processes, compressing them, and transporting them for storage in geological formations or for use in other processes, such as enhanced oil recovery (EOR) (Rubin *et al.*, 2012). Recent advancements in both areas reflect a significant shift towards more sustainable practices in this sector.

Gas flaring, although often used as a cheap and quick way to deal with excess gas that cannot be utilized, has significant economic and environmental impacts. As a source of CO_2 and methane emissions, flaring not only contributes to climate change but also leads to the waste of natural resources that could be more optimally used. Economically, the gas that is burned loses its economic value because it cannot be sold or used to generate energy. Gas flaring is a significant environmental issue, both in terms of direct emissions and the lost economic value of gas that could have been sold. According to the World Bank, global gas flaring accounted for about 1,3% of total global CO_2 emissions in 2019, with countries like Russia, Iraq, and regions with high flaring intensity in Africa and the Middle East being the largest contributors (World Bank, 2020). However, in recent years, substantial progress has been made towards the goal of zero flaring.

Technological advancements in flare gas recovery systems (FGRS), gas-to-liquid (GTL) technology, and micro-turbine power generation have provided new hope. From an economic standpoint, flaring reduction can open up new opportunities for utilizing the gas, either in the form of high-value products or as a renewable energy source. For example, by converting gas that would have been flared into electricity on-site, oil and gas companies can reduce operational costs and generate additional revenue. Moreover, flaring reduction can help companies meet increasingly stringent regulatory demands, reduce penalty costs, and improve the company's image in terms of sustainability (The International Council on Clean Transportation *et al.*, 2014).

Advancements in flare gas recovery systems (FGRS), micro-turbine power generation, and small-scale gas-to-liquid (GTL) technology have enabled oil and gas companies to capture and utilize gas that would have otherwise been flared. These technologies allow the conversion of waste gas into valuable products or to be used for on-site power generation. Carbon Capture and Storage (CCS) has become increasingly recognized as an important technology for achieving net-zero emissions, especially in sectors like oil and gas that are difficult to decarbonize. CCS involves capturing CO_2 emissions from industrial processes, compressing them, and transporting them for storage in geological formations or for use in other processes such as enhanced oil recovery (EOR) (Taha, Abdelalim and AboulFotouh, 2024).

Recent developments in CCS have been significant. Carbon Clean Solutions, a leading carbon capture technology provider, has developed new modular systems that reduce the cost of CO_2 capture from industrial facilities. This technology has been applied in several oil and gas facilities, including those operated by Chevron and Petrobras. ExxonMobil and Chevron have both made substantial investments in CCS infrastructure. ExxonMobil LaBarge facility in Wyoming, USA, is one of the world's largest CCS operations, capturing over 7 million tons of CO_2 annually (Chevron Corporation, 2023; ExxonMobil, 2025). CarbonCure Technologies has developed a method for injecting CO_2 into concrete production, effectively storing it in building materials. This process is increasingly being applied in oil and gas operations as part of a broader CCS strategy (CarbonCure Technologies Inc., 2025).

While technological advancements have been made, widespread CCS implementation faces several challenges, including high costs, infrastructure requirements, public perception, and regulatory hurdles. The capital and operational costs of CCS technology remain very high, limiting its adoption, especially in areas with lower carbon prices or where alternative mitigation measures (such as renewable energy) are more cost-competitive. The development of the infrastructure required to transport and store captured CO_2 is a major barrier. This requires large pipelines and underground storage sites, which can be difficult to develop and regulate. There is also public skepticism regarding the safety and long-term viability of CO_2 storage, especially in areas where CCS sites are near residential areas or environmentally sensitive locations (Tcvetkov, Cherepovitsyn and Fedoseev, 2019).

Achieving Sustainable Development Goal (SDG) 7, which focuses on affordable and clean energy access, is a major challenge that involves profound changes in the global energy sector. From an economic perspective, the transition to sustainability in energy involves not only technological policies but also innovations in energy management economics and policy design. This review article aims to provide insights and an economic perspective on enhancing energy management to support the achievement of SDG 7, referencing several recent scientific studies.

LITERATURE REVIEW-THEORETICAL FOUNDATIONS

Energy Economic

Energy economics refers to the field of research that focuses on the relationship between supply and demand of energy, and how the introduction of new energy efficiency technologies can affect energy consumption and savings (Metic and Pigosso, 2022). The energy economics provides a socioeconomic perspective on the production and consumption of energy. The focus is on the macroeconomic dimension, which will include: a global analysis of energy markets with particular relevance to demand and supply, as well as the investment and finance drivers, impacting the global energy markets (Altawell, 2021).

Energy economics are a critical component of energy supply and use, and attempting to discuss energy resources without economics ignores a huge factor driving the type of energy being used to generate electricity, fuel a vehicle, or heat a home. People outside the energy business often don't consider this, and wonder, for instance, why all the electricity in the United States can't be made from renewables. (Soeder and Borglum, 2019).

SDG 7: Affordable and Clean Energy

SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all. Renewable energy solutions are becoming cheaper, more reliable and more efficient every day.Our current reliance on fossil fuels is unsustainable and harmful to the planet, which is why we have to change the way we produce and consume energy. Implementing these new energy solutions as fast as possible is essential to counter climate change, one of the biggest threats to our own survival (The Global Goals, no date).

SDG 7 focuses on people's access to affordable energy, improving energy efficiency, using sustainable and renewable energy. SDG 7 also aims to reduce energy use with energy efficiency technology to reduce the use of non-renewable energy. Technology in environmentally friendly buildings can utilize renewable energy to turn a building into zero net energy to reduce costs. In addition, with the SDG 7 goal of realizing clean energy, fossil fuels are expected to shift to renewable energy (SDGs Center Universitas Airlangga, 2025).

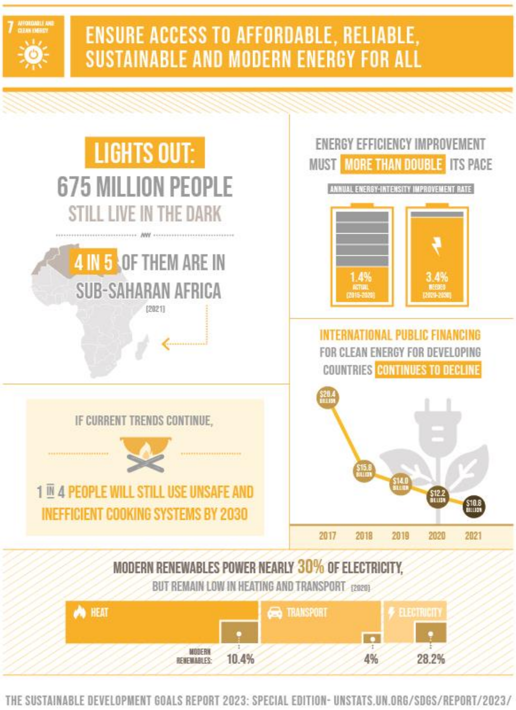

Figure 1. Goal 7 Infographic

Source: (United Nations Department of Economic and Social Affairs Sustainable Development, 2021)

RESEARCH METHOD

The methodology used in this research is a qualitative approach with a literature review. This study aims to examine and analyze various relevant sources, including scientific articles, reports from international organizations, government data, and case studies related to emission reduction efforts and supporting the achievement of the Sustainable Development Goal (SDG) 7 (Affordable and Clean Energy). Through this approach, the author seeks to provide a comprehensive overview of the current situation in this sector and the steps that can be taken to achieve emission reduction goals in support of clean energy.

RESULTS & DISCUSSION

Gas flaring is a method frequently used to dispose of excess gas generated during oil production processes. This process has the potential to produce harmful greenhouse gas emissions, especially CO_2 and methane, both of which significantly contribute to global warming.

According to the World Bank (2020), global gas flaring accounted for approximately 1,3% of total global CO_2 emissions in 2019. Countries such as Russia, Iraq, and regions with high flaring intensity in Africa and the Middle East are the main contributors. In many developing countries, achieving SDG 7 faces additional challenges, such as limited infrastructure and dependence on conventional energy resources that are cheaper but environmentally damaging.

Guilhot (2022) indicates that starting from 2011, with the Twelfth and Thirteenth Five-Year Plans, China's energy policy has focused on addressing climate change. This shift in policy reflects the country's move toward a low-carbon energy transition. The government has supported the development of renewable energy with a focus on high economic efficiency. The Chinese government has played a crucial role in providing policy support and financing for renewable energy projects, helping to advance the achievement of SDG 7. These findings suggest that policies offering fiscal incentives and subsidies for renewable energy can significantly speed up the transition to cleaner energy.

However, in recent years, the industry has begun adopting various technologies to reduce flaring. Notable advancements include the implementation of gas flaring recovery systems (FGRS), the use of micro-turbine power plants, and the development of small-scale gas-to-liquid (GTL) technologies. These technologies allow gas that would otherwise be flared to be converted into valuable products or used to generate on-site energy. For instance, Norway is committed to eliminating routine flaring by 2030 by making significant investments in gas recovery technologies and converting flaring gas into energy (Equinor ASA, 2015; Norwegian Ministry of Climate and Environment, 2021).

Saleh and Hassan (2024) highlights several key challenges in the transition to clean energy, such as the high capital and technology requirements, long project durations, and significant upfront costs. As a result, a strong political and regulatory framework is crucial for attracting large-scale investments in renewable energy. The renewable energy sector's high capital demands and lengthy payback periods can pose a significant economic burden for developing countries. Additionally, the substantial initial costs and resource consumption needed to establish the market may reduce the motivation for these countries to invest in renewable energy. In the short term, relying solely on renewable energy development could potentially hinder economic growth in developing nations. This is a significant obstacle to achieving SDG 7, which mandates affordable energy access.

Achieving zero flaring and widespread adoption of CCS (carbon capture and storage) requires cross-sector collaboration. Many oil and gas companies are partnering with technology providers, governments, and environmental organizations to share knowledge, reduce costs, and scale up these solutions. Major oil companies have committed to working toward zero routine flaring and expanding CCS projects. The Saudi Arabian Government and Saudi Aramco have endorsed zero-routine flaring by 2030. Additionally, The Government of Oman and Petroleum Development Oman have endorsed zero-routine flaring by 2030 (United Nations, 2019).

Governments are increasingly supporting CCS through subsidies, grants, and favorable policies. The International Energy Agency (IEA) and various national energy ministries have recognized CCS as a key element of global climate strategies, helping to drive its implementation. Policies supporting renewable energy and energy efficiency are key aspects in achieving SDG 7. policies that reduce the production costs of renewable energy and improve energy efficiency can accelerate the achievement of SDG 7 while reducing dependence on expensive and polluting fossil fuels (United Nations, 2018).

The foundation of any sustainable energy strategy is a clear vision for improving energy access and use in a way that supports sustainable development. To achieve this, policies must focus on expanding access to reliable and affordable modern energy while minimizing the negative health and environmental impacts associated with energy consumption (Jefferson, 2000). Increasing energy supplies and improving the efficient distribution of resources across sectors are key steps. With the right framework established by the government, featuring competitive pricing and effective regulations, many of the goals of sustainable energy can be successfully met.

Gas flaring represents a significant environmental issue, both in terms of direct emissions and the economic value of the gas that is lost and could otherwise be sold. According to the World Bank (2020), global gas flaring accounted for around 1,3% of total global CO_2 emissions in 2019, with countries like Russia, Iraq, and regions with intensive flaring in Africa and the Middle East as the highest contributors. However, recent years have seen substantial progress toward achieving zero flaring. Recent advancements in gas flaring recovery systems (FGRS), micro-turbine generators, and small-scale gas-to-liquids (GTL) technologies have allowed oil and gas companies to capture and utilize gas that would otherwise be flared. These technologies enable the conversion of waste gas into valuable products or its use for on-site power generation.

The path toward zero flaring and widespread CCS adoption requires cross-sector collaboration. Many oil and gas companies are partnering with technology providers, governments, and environmental organizations to share knowledge, reduce costs, and scale these solutions. Carbon capture and storage (CCS) is one of the most promising technologies for achieving net-zero emissions, especially in sectors that are difficult to decarbonize, such as oil and gas (Equinor ASA, 2023). However, from an economic perspective, the implementation of CCS faces significant challenges related to high costs and the development of complex infrastructure.

High capital and operational costs are the main barriers to the implementation of CCS technologies. Investment in the infrastructure required to capture, compress, and store CO_2 requires substantial funding. For example, large-scale CCS facilities like ExxonMobil's LaBarge, which captures more than 7 million tons of CO_2 per year, require substantial investment and high operational costs (ExxonMobil, 2025). This is a major obstacle, especially in countries or regions with low carbon prices, where companies may prefer to invest in cheaper renewable energy solutions.

However, the long-term economic benefits of this technology cannot be ignored. CCS can help oil and gas companies reduce their emissions and remain operational within increasingly strict regulatory limits. Additionally, CCS opens opportunities for enhanced oil recovery (EOR), which can economically extend the life of existing oil resources and increase oil production. Some major companies, such as Chevron and Petrobras, have begun implementing this technology at their facilities to not only reduce emissions but also boost their operational output (Chevron Corporation, 2023). From a macroeconomic perspective, the implementation of CCS can help countries that depend on the oil and gas industry maintain their competitiveness in the global energy market, which is increasingly shifting toward clean energy. With subsidies and supportive government policies, CCS could become an integral part of the overall energy sector decarbonization strategy (Yasemi *et al.*, 2023; Dongo and Relvas, 2025).

Acemoglu, Aghion and Hémous (2014) emphasized the importance of effective policy measures in promoting environmentally friendly technologies and reducing the environmental harm caused by industrialization and economic growth. Achieving a decarbonized economy requires a major shift towards sustainable practices, which calls for policies that encourage the sharing of knowledge across different clean technology sectors. These knowledge spillovers are crucial as they improve research productivity, particularly for less developed technologies, by transferring innovations and discoveries across sectors. This process not only bridges the gap between emerging and established technologies but also drives overall innovation. Evidence shows that well-designed environmental policies can significantly enhance these knowledge exchanges, helping cleaner technologies to develop more quickly and collaboratively. This approach is vital for achieving SDG 7, which calls for cooperation between the public and private sectors to provide clean and affordable energy solutions. The Oil and Gas Climate Initiative (OGCI), a group of major oil companies, has committed to working toward zero routine flaring and expanding CCS projects. In 2023, OGCI's member companies increased low-carbon investment to a record $29,7 billion – a 15% increase compared with the previous year (OGCI news, 2024).

Several case studies have been conducted, one of which is Norway. Norway has committed to eliminating routine flaring in its operations by 2030. The country has invested in gas recovery systems and new technologies that convert flaring gas into energy (Equinor ASA, 2015; Norwegian Ministry of Climate and Environment, 2021). Furthermore, The Saudi Arabian Government and Saudi Aramco have endorsed zero-routine flaring by 2030. Additionally, The Government of Oman and Petroleum Development Oman have endorsed zero-routine flaring by 2030 (United Nations, 2019).

In Economic and Environmental Implications of Renewable Energy for Sustainable Development and SDG 7, the development of renewable energy resources has a significant impact on economic growth, offering benefits beyond environmental sustainability (Dirma *et al.*, 2024). By reducing greenhouse gas emissions, renewable energy helps mitigate climate change. Additionally, renewable energy projects create job opportunities and support local and regional development, as they often require skilled labor for design, construction, and maintenance. Renewable energy also plays a key role in promoting recycling by providing sustainable power. Recycling processes, which require large amounts of energy, can benefit from solar, wind, and hydroelectric power, reducing reliance on fossil fuels and lowering carbon emissions. For example, solar-powered recycling plants and wind turbines near industrial hubs can enhance efficiency, reduce costs, and contribute to the achievement of SDG 7 by improving access to affordable, sustainable energy (Dirma *et al.*, 2024).

Many countries have introduced stricter regulations to address gas flaring. For example, the European Union and the United States have implemented regulations that require operators to reduce flaring through technological innovation, infrastructure improvement, and financial penalties for excessive emissions. Additionally, the Global Gas Flaring Reduction Partnership by the World Bank collaborates with governments and industry stakeholders to provide technical support and funding for flaring reduction projects (World Bank, 2020). Although significant progress has been made, the main challenge in implementing flaring reduction and CCS technologies is the high initial costs and the development of adequate infrastructure. Therefore, it is essential for oil and gas companies to have a long-term vision and plan these investments as part of a broader sustainability strategy. In many cases, these technologies may require long-term investments before the full economic benefits are realized. However, with increasing awareness of climate change and stricter regulations, these technologies are expected to become increasingly cost-competitive in the future.

Governments are increasingly supporting CCS through subsidies, grants, and favorable policies. The International Energy Agency (IEA) and various national energy ministries have recognized CCS as a key element of global climate strategies, providing incentives for its implementation. Governments play a significant role in supporting CCS implementation through subsidies, grants, and favorable policies. The IEA and national energy ministries are increasingly recognizing the important role of CCS in global climate strategies and encouraging its development. These policies aim to create incentives for the private sector to invest in this technology (International Energy Agency, no date).

Table 1. Summary of Key Findings on Gas Flaring, Clean Energy Transition, and Policy Implications

Topic	Key Findings	Examples/Case Studies	Policy Implications
Gas Flaring and Its Environmental Impact	Gas flaring contributes to significant CO_2 and methane emissions, accounting for 1.3% of global CO_2 emissions in 2019. Major contributors include Russia, Iraq, and high-flaring regions in Africa and the Middle East.	World Bank (2020) data on global emissions; Norway's commitment to zero routine flaring by 2030 through investments in gas recovery technologies.	Stricter regulations and financial penalties for excessive flaring; incentives for adopting gas recovery systems.
Energy Policy and Renewable Energy Transition	China has shifted its policy focus toward low-carbon energy, supporting renewable energy development with fiscal incentives and subsidies.	China's Twelfth and Thirteenth Five-Year Plans; investments in renewable energy by the Chinese government.	Policies promoting fiscal incentives and subsidies for renewable energy can accelerate the transition to clean energy.
Technological Advancements in Flaring Reduction	New technologies, such as gas flaring recovery systems (FGRS), micro-turbine power plants, and gas-to-liquid (GTL) technologies, enable the conversion of waste gas into useful energy.	Norway's use of gas recovery technologies; Equinor ASA’s commitment to reducing flaring.	Governments should support technological innovation through funding and research incentives.
Challenges in Clean Energy Transition	High capital costs, long project durations, and regulatory barriers hinder renewable energy adoption in developing nations.	Saleh and Hassan (2024) on economic challenges; case of high-cost CCS facilities like ExxonMobil’s LaBarge project.	Need for strong regulatory frameworks and international financing support for clean energy initiatives.
Carbon Capture and Storage (CCS)	CCS is a key technology for reducing emissions but faces high capital and operational costs, requiring substantial investment.	ExxonMobil’s LaBarge CCS facility; Chevron and Petrobras' CCS implementation.	Subsidies, grants, and regulatory support can encourage the adoption of CCS in high-emission industries.
Cross-Sector Collaboration for Zero Flaring	Governments and oil companies are partnering with technology providers	Saudi Aramco and Oman’s endorsement of zero routine flaring by 2030; OGCI investment	Stronger partnerships between the public and private sectors

Topic	Key Findings	Examples/Case Studies	Policy Implications
	and environmental organizations to scale up CCS and zero-flaring initiatives.	in low-carbon technologies.	can enhance investment and technology sharing.
Economic and Environmental Benefits of Renewable Energy	Renewable energy promotes economic growth, job creation, and reduced greenhouse gas emissions.	Dirma *et al.* (2024) on renewable energy's impact; solar-powered recycling plants.	Policies that support renewable energy development and reduce dependency on fossil fuels can accelerate SDG 7 achievements.
Regulatory Measures to Reduce Flaring	Stricter regulations in the EU and U.S. require flaring reduction through technology and financial penalties.	World Bank's Global Gas Flaring Reduction Partnership; U.S. and EU regulations.	Enforcing regulatory compliance and financial penalties can drive the adoption of flaring reduction technologies.

Source: (International Energy Agency, no date; Jefferson, 2000; Acemoglu, Aghion and Hémous, 2014; Equinor ASA, 2015, 2023; United Nations, 2018, 2019; World Bank, 2020; Norwegian Ministry of Climate and Environment, 2021; Guilhot, 2022; Chevron Corporation, 2023; Yasemi *et al.*, 2023; OGCI news, 2024; Saleh and Hassan, 2024; Dirma *et al.*, 2024; Dongo and Relvas, 2025; ExxonMobil, 2025)

Table 2. Key Aspects of Gas Flaring, Renewable Energy, and CCS Technologies

Aspect	Details
Gas Flaring Impact	Gas flaring releases CO_2 and methane, contributing significantly to global warming. In 2019, it accounted for 1,3% of total CO_2 emissions, with Russia, Iraq, and regions in Africa and the Middle East being major contributors (World Bank, 2020).
Challenges in SDG 7 Implementation	Developing countries face difficulties due to limited infrastructure and reliance on cheap but polluting conventional energy sources.
China's Energy Policy Shift	Since 2011, China has focused on a low-carbon energy transition, providing policy support and financial backing for renewable energy projects to accelerate SDG 7 achievement (Guilhot, 2022).
Technological Advancements	Companies are adopting technologies such as Gas Flaring Recovery Systems (FGRS), micro-turbines, and small-scale Gas-to-Liquid (GTL) to convert waste gas into energy. Norway aims to eliminate routine flaring by 2030 through investments in gas recovery technologies (Equinor ASA, 2015; Norwegian Ministry of Climate and Environment, 2021).

Aspect	Details
Economic and Regulatory Challenges	Transitioning to clean energy requires high capital investment, long project durations, and substantial upfront costs. A strong political and regulatory framework is crucial to attract large-scale investments (Saleh and Hassan, 2024).
CCS and Zero Flaring Commitments	Governments and companies like Saudi Aramco, Petroleum Development Oman, and the Saudi Arabian Government aim for zero-routine flaring by 2030 (United Nations, 2019).
CCS Policy Support	The International Energy Agency (IEA) and national governments recognize CCS as a crucial component of climate strategies. Subsidies and incentives can lower costs and encourage adoption (United Nations, 2018).
Economic Viability of CCS	High initial costs and infrastructure requirements pose challenges. ExxonMobil's LaBarge facility captures 7 million tons of CO_2 per year but requires massive investments (ExxonMobil, 2025). Companies like Chevron and Petrobras are implementing CCS for both emissions reduction and economic benefits through enhanced oil recovery (EOR) (Chevron Corporation, 2023).
Policy Role in Clean Energy Innovation	Policies encouraging collaboration and knowledge transfer across clean technology sectors accelerate innovation and SDG 7 progress. The Oil and Gas Climate Initiative (OGCI) invested $29.7 billion in low-carbon projects in 2023 (OGCI news, 2024).
Case Study - Norway	Norway has pledged to eliminate routine flaring by 2030 through significant investments in gas recovery technologies (Equinor ASA, 2015; Norwegian Ministry of Climate and Environment, 2021).
Economic and Environmental Benefits of Renewable Energy	Renewable energy contributes to economic growth, job creation, and reduced greenhouse gas emissions, supporting SDG 7 goals (Dirma *et al.*, 2024).
Global Regulations on Flaring	The EU and US enforce regulations requiring gas flaring reductions through technological innovation, infrastructure upgrades, and penalties for excessive emissions (World Bank, 2020).
Long-term Vision for Sustainability	Although initial investments are high, stricter climate policies and technological advancements are expected to make CCS and flaring reduction more cost-effective in the future.

Source: (International Energy Agency, no date; Jefferson, 2000; Acemoglu, Aghion and Hémous, 2014; Equinor ASA, 2015, 2023; United Nations, 2018, 2019; World Bank, 2020; Norwegian Ministry of Climate and Environment, 2021; Guilhot, 2022; Chevron Corporation, 2023; Yasemi *et al.*, 2023; OGCI news, 2024; Saleh and Hassan, 2024; Dirma *et al.*, 2024; Dongo and Relvas, 2025; ExxonMobil, 2025)

CONCLUSION

From an economic perspective, the reduction of flaring and the adoption of Carbon Capture and Storage (CCS) present significant challenges in terms of initial costs, infrastructure development, and the scale of adoption required. However, the potential long-term benefits in the form of reduced resource wastage, improved operational efficiency, and the ability to comply with increasingly stringent environmental regulations could provide substantial economic advantages for companies. Collaboration between the private sector and government, as well as sustained investment in research and technology, are key factors in accelerating the transition to a more sustainable, low-carbon oil and gas sector. With the right policies, ongoing investments, and the implementation of more efficient technologies, the world can accelerate the transition to affordable, clean, and sustainable energy.

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