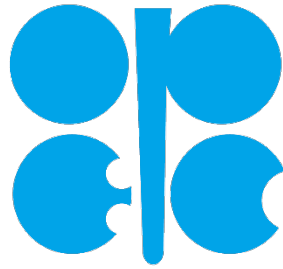


Organization of the Petroleum Exporting Countries (OPEC)



Input to the Standing Committee on Finance (SCF)

OPEC Secretariat

Research Division

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Investments in the Energy Security to Support Global Climate Actions

Introduction

The global energy landscape is undergoing significant changes driven by geopolitical tensions and, economic uncertainties. With the global push towards sustainable energy systems, there is still a critical need to sustain and even increase investments in both upstream and downstream oil and gas, to meet current and future energy demands. Assessments by the OPEC Secretariat¹ indicate that sustained investment in hydrocarbons is necessary and vital to ensure energy security, especially for developing countries. If these investments do not materialize, it represents a considerable challenge to market stability and energy security globally.

Historical Context and Investment Requirements

Oil and gas wells naturally experience decline rates, where production decreases over time. Without continuous investment in new exploration and enhanced recovery techniques, the overall production capacity diminishes. The upstream industry relies on constant capital infusion to maintain and increase output. Reduction in investment leads to faster depletion of existing fields and lower overall production.

Reduced investment in the related infrastructure can lead to decreased production capacity, contributing to higher and more volatile energy prices. This can affect both developed and developing countries, particularly as demand in regions like Asia remains robust due to industrial growth and transportation needs.

Global oil upstream investments have peaked in 2014, with global upstream investments reaching approximately \$900 billion. However, since then, investment levels have significantly decreased. [The World Oil Outlook 2023](https://www.opec.org/wooo/outlook/2023/) by OPEC indicates that upstream investment is projected to require \$11.1 trillion between 2023 and 2045, averaging \$480 billion annually (<https://woo.opec.org/chapter.php?chapterNr=1769&chartID=5708>).

In contrast, recent years have seen a decline in required investments, exacerbated by the pandemic and economic uncertainties, with 2020 seeing a low of around \$330 billion. Investment requirements for the overall oil sector, between 2022 and 2045, are estimated at a cumulative \$14 trillion (in 2023 \$US), or around \$610 billion per

¹ https://www.opec.org/opec_web/en/index.htm

annum on average. Downstream and midstream requirements are estimated at \$1.7 and \$1.2 trillion, respectively.

Such decline threatens the ability to meet both current and future energy demand. The World Oil Outlook (WOO)² highlights that without adequate investment, there could be severe supply constraints as the global economy recovers and energy demand increases.

As traditional oil and gas investments decline, capital may not be sufficiently redirected to other energy projects due to various challenges, including technological, regulatory, and market uncertainties. This could have the effect of slowing down the overall energy system transformation and its resilience, and hamper efforts to achieve climate goals and sustainable development.

Demand and Supply Dynamics

Global oil demand is expected to continue growing, driven by sectors such as road transportation (highest with a growth of 4.6 mb/d), petrochemicals (4.3 mb/d), and aviation (4.1 mb/d). (<https://woo.opec.org/chapter.php?chapterNr=1768&tableID=2998> , <https://woo.opec.org/chapter.php?chapterNr=1768&chartID=5675>).

OPEC's projections show that the global oil demand will increase from 99.6 million barrels of oil equivalent per day (mb/d) in 2022 to 116 mb/d by 2045. This growth underscores the necessity of sustained investments in oil to meet future demands and prevent supply shortfalls in both the medium and long term. (<https://woo.opec.org/chapter.php?chapterNr=1768&tableID=2991>, <https://woo.opec.org/chapter.php?chapterNr=1768&tableID=2997>)

These figures stress the importance of maintaining a balanced energy mix. Having a diverse mix of energy sources is crucial for long-term sustainability, and the current technological limitations and continued increasing energy demand means that all forms of energy and all relevant technologies will be needed to ensure a stable and reliable energy supply, particularly for developing countries. Such trend would in turn supports a sustained and reliable response to climate change.

Refining industry implications

According to the findings of OPEC's WOO 2023, the global downstream oil market faces significant uncertainties in the medium and long term. Oil demand in

² <https://woo.opec.org/>

developing countries is expected to grow strongly, tightening downstream markets with rising utilization rates. This trend is particularly pronounced in the Asia-Pacific region, where oil demand growth outpaces refining capacity additions.

Looking ahead, the refining sector is expected to follow two parallel paths. Developing countries will see continued refining capacity additions through new greenfield refineries, many of which will be highly complex and integrated with petrochemical production. In developed countries, refineries will face declining demand for traditional fuels in the medium term, prompting many market participants to reinvent their business models. Efforts are underway to increase the production of biofuels, bio-methane, synthetic fuels (including methanol and ammonia), and potentially low-carbon hydrogen (green and blue). Co-processing of bio-feedstock and strategies in the plastics sector, such as recycling, conversion of plastics to fuels, and production of bioplastics, are also being explored. Implementing these new technologies and infrastructure at scale will take time and investment, indicating that traditional refining will remain a dominant part of the downstream business in these regions for the foreseeable future.

A key focus for the future, as highlighted in OPEC's WOO 2023, is reducing the carbon footprint of the downstream sector in both developing and developed regions. This can be achieved through increased energy efficiency, integration of renewables in downstream operations, and the use of carbon capture, utilization, and storage (CCUS) technologies. To meet the global challenge of reducing emissions, ensuring energy affordability, and maintaining energy security, all available technologies must be employed. The downstream sector, leveraging both established and new technologies, is well-positioned to support the ongoing development of the global oil and energy sectors.

Energy Investment Needs of OPEC Member Countries (MCs)

Overview

OPEC Member Countries are developing nations with rapidly growing populations and economies. These countries are projected to experience strong increases in total energy demand. OPEC projects that energy demand in OPEC MCs will grow by 23% by 2045, necessitating a substantial increase in energy supply to support industrialization, urbanization, and economic growth.

Investment Requirements



OPEC's investment requirements are substantial. Upstream investment needs are set to quadruple from \$35 billion annually in 2022 to \$136 billion by 2045. This increase is essential to meet the projected energy demand and support the economic growth of OPEC MCs (WOO 2023, Chapter. 4.6, https://www.opec.org/opec_web/en/publications/340.htm). The OPEC Annual Report 2023³ highlights the importance of these investments to prevent supply shortages and stabilize the global oil market.

Moreover, many energy- exporting developing countries, particularly within OPEC, depend upon the income from the export of commodities – namely, oil and gas –for their economic stability, employment, and growth. The development of local hydrocarbon industries provides jobs and stimulates economic growth. Investments in oil exploration, production, and refining can create thousands of jobs, both directly and indirectly, contributing to overall economic development.

Conclusion

Energy security and energy affordability have moved back into the central stage for policymakers across the world. Governments in some regions support their citizens with energy subsidies, while also introducing policies to reduce energy demand. At the same time, in many developing countries, governments had significantly less maneuvering and policy space. For instance, due to high prices, some countries have even to reduce their energy imports, leading to electricity supply shortages. Moreover, many developing countries in their quest to improve energy security have turned increasingly to domestic energy sources, predominantly coal. This clearly depicts the difference between developed and developing countries. Apparently, even the perception of energy security substantially differs between developed and developing countries.

(<https://woo.opec.org/chapter.php?chapterNr=1767&tableID=2983>).

In addition, the deployment of renewables is essentially capital intensive, while most developing countries do not have sufficient access to financing. This is why the increase of alternative energy sources in the mix is considerably slower, compared to developed countries.

As efficiency improves, technology advances, policy measures to reduce emissions are put in place, and consumer behavior changes, a gradual energy transformation

³ https://www.opec.org/opec_web/static_files_project/media/downloads/AR%202023.pdf

becomes possible. However, the speed of this transformation is highly uncertain and is heavily driven by fundamental factors that are not uniform across regions.

Investments in oil and gas are crucial to meet the growing energy demands in the coming decades, particularly in developing countries. The peak in oil investments in 2014 and the subsequent decline necessitate the need for renewed focus on sustaining these investments. Ensuring energy security, supporting economic development, and addressing climate change and energy poverty are all intertwined. As the global energy landscape evolves, a balanced approach that includes all available sources of energy will be essential to meet the diverse needs of all countries.

This submission underscores the importance of maintaining robust investment levels in the oil sector to avoid future supply shortfalls and ensure global energy security as the world navigates the complex energy transformation pathways.

References

- OPEC. (2023). *World Oil Outlook 2023*. <https://woo.opec.org/>
- OPEC. (2023). *Annual Report 2023*. https://www.opec.org/opec_web/static_files_project/media/downloads/AR%202023.pdf