# DEEPWATER – A NEW FRONTIER FOR ENERGY PRODUCTION

Estimated read time: 6 min

# KEY TAKEAWAYS

*In the energy industry, 'deepwater' generally refers to water depths from 1,000 to 5,000 feet below sea level, while 'ultra-deepwater' designates everything beyond that threshold.*

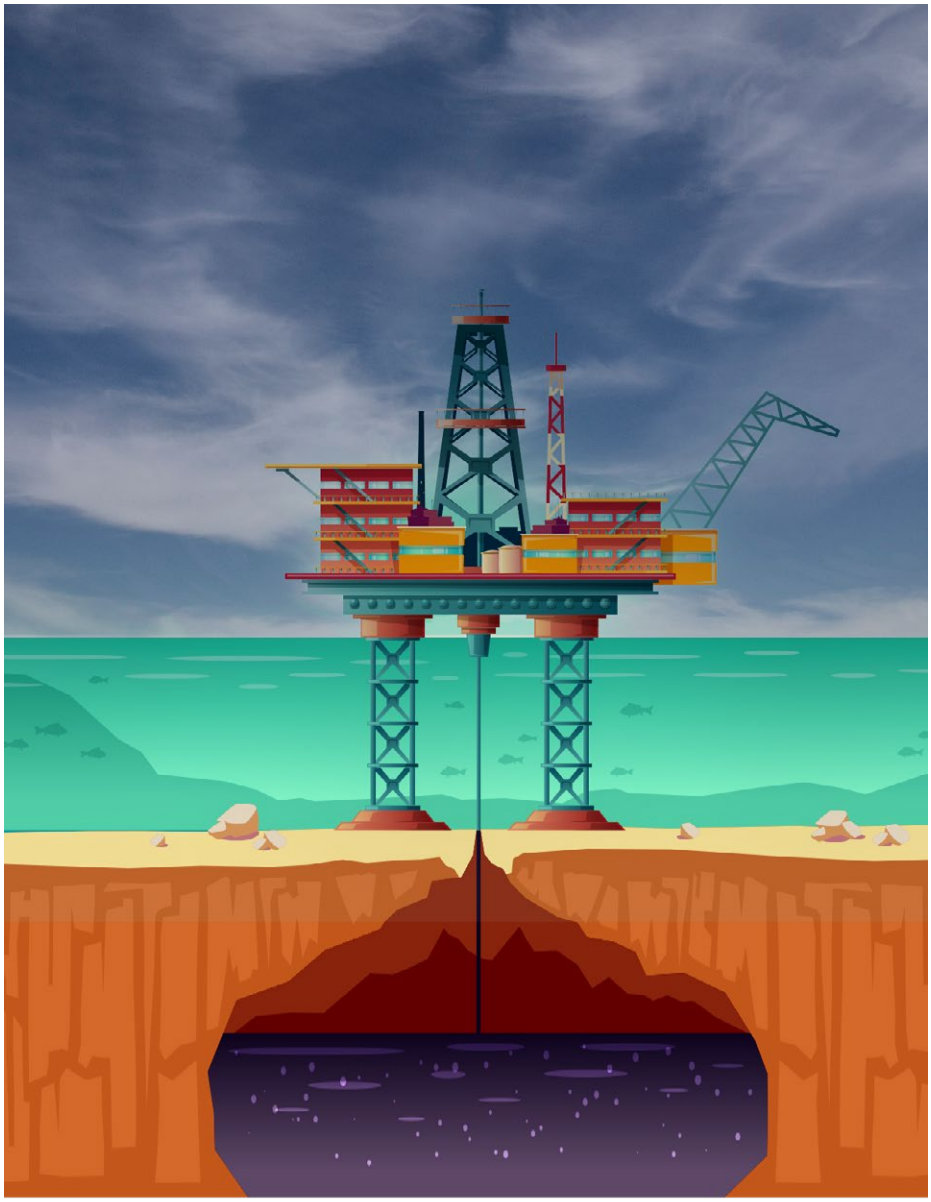
*There are significant logistical and economic challenges associated with developing deepwater fields.*

*Production from deepwater reserves is nevertheless expected to increase significantly in the coming years due to technological advancement and high resource potential.*

By the UN's tally, the population of our planet is expected to close in on 10 billion within the next three decades.[1] With that demographic growth will come a similar surge in energy demand. Even with the landscape of energy changing to accommodate alternative fuels, it is projected that oil and gas will have a life for some time yet, to help meet those burgeoning energy needs. Since modern oil and gas production has been ongoing for well over a century, easier-to-access onshore and nearshore reserves have been considerably depleted. As a result, producers have increasingly been looking to develop offshore deepwater and ultra-deepwater acreage as options to offset historical production declines.

[1] https://www.un.org/en/desa/world-population-projected-reach-98-billion-2050-and-112-billion-2100#:~:text=Calendar-, World%20population%20projected%20to%20reach%209.8%20billion%20in%202050%2C%20and,Nations%20report%20being%20launched%20today.

Trinidad and Tobago finds itself with mature basins and in need of new supply sources to feed gas-based industrial, power generation and LNG sectors. For state energy company NGC, deepwater development is a promising new horizon being watched with cautious optimism.



## WHAT IS DEEPWATER PRODUCTION?

For much of the twentieth century, global offshore exploration has focused on shallow waters, on continental shelves near the coast, at depths less than 1,000 feet.[2] From around the late 1970s, however, with the advance of technology and human enterprise, fields were discovered further from shore, giving rise to a new frontier of production.[3] Further out at sea, the seabed slopes and water becomes much deeper. In the energy industry, 'deepwater' generally refers to water depths from 1,000 to 5,000 feet below sea level, while 'ultra-deepwater' designates everything beyond that threshold.[4] The latter has been the focus of increased investment attention in the past fifteen years.[5]

From just 300,000 barrels of oil equivalent per day (boe/d) in 1990, production from deepwater is projected to surpass 17 million boe/d by the end of this decade, signaling both the interest in and resource potential of this new frontier.[6]

## CHALLENGES IN THE DEEP

Accessing hydrocarbons from deepwater reserves is no easy task, for some obvious reasons.

Firstly, there is the challenge of distance. In shallower water, drilling platforms are typically fixed directly to the ocean floor using either metal and concrete foundations or tethering cables. As you go further and deeper, however, it becomes impractical — if not impossible — to ground platforms on the seabed in the same way. More sophisticated mobile drilling platforms are required, with specialised appendages that can moor the floating platform or "floater" to the ocean floor.[7] Distance from shore is also a factor. Oil and gas produced from marine basins must be piped ashore for processing or moved via floating storage vessel. The further from land you drill, the longer the pipeline you need to construct, or greater the logistical challenge of transporting the product you extract.

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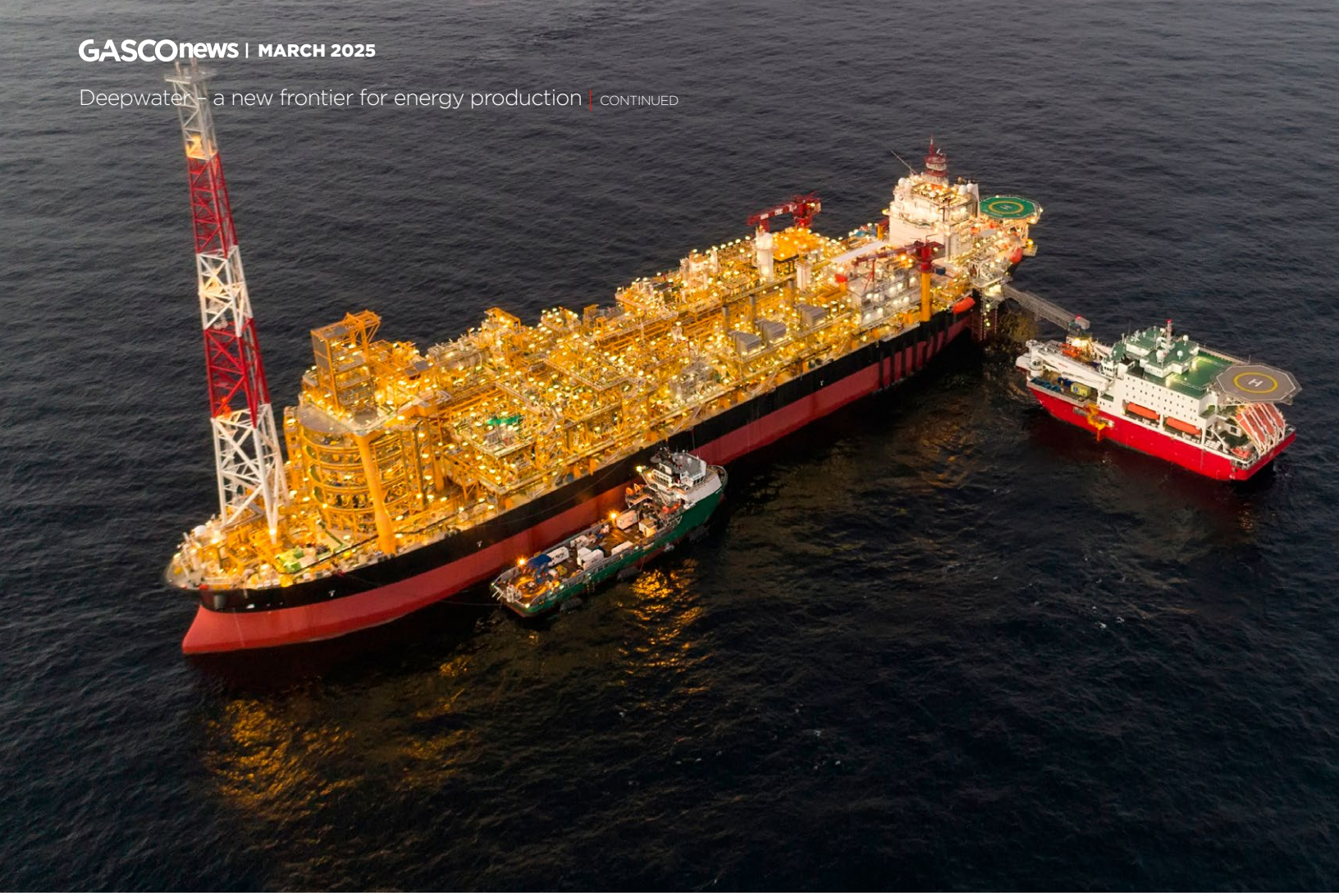
[2] https://www.dnv.com/article/modelling-different-upstream-oil-and-gas-operations-207958/
[3]https://www.sciencedirect.com/science/article/pii/S1876380423604495?ref=pdf_download&fr=RR-2&rr=918074eee828c859
[4]https://www.dnv.com/article/modelling-different-upstream-oil-and-gas-operations-207958/
[5]https://www.sciencedirect.com/science/article/pii/S1876380423604495?ref=pdf_download&fr=RR-2&rr=918074eee828c859
[6]https://www.woodmac.com/news/opinion/global-deepwater-production-to-increase-60/#:~:text=Deepwater%20is%20the%20fastest%20growing,pass%2017%20million%20boe%2Fd.
[7]https://science.howstuffworks.com/environmental/energy/offshore-drilling.html



Floating Production Storage and Offloading facility located at offshore oil field

Then there are other challenges associated with ocean depth. The deeper you travel below sea level, the lower the temperatures and higher the pressure. In fact, deep-sea waters reach nearly freezing temperatures, contain pressures great enough to crack iron casings, and are subject to rough, deep-sea currents.[8] Oil bubbling up from underground reserves could solidify in pipes due to frigid ocean temperatures, introducing the risk of pipeline rupture.[9] Extreme conditions in deepwater also complicate maintenance activities, and heighten the risk of equipment failure and accidental release of oil and gas.

THAT SAID, ADVANCEMENTS IN TECHNOLOGY, EQUIPMENT AND SAFETY SYSTEMS MEAN DEEPWATER DEVELOPMENT CAN STILL PROCEED AND SUCCEED IN SPITE OF THESE CHALLENGES, BUT IT IS NATURALLY FAR MORE EXPENSIVE THAN SHALLOW WATER DEVELOPMENT. THE WORLD'S BIGGEST OFFSHORE RIG CONTRACTOR PROJECTS THAT GIVEN STRONG DEMAND, THE RENTAL COST FOR DEEPWATER DRILL RIGS COULD CLIMB TO US$600,000 A DAY.[10]

***Deepwater becoming more attractive***

Despite the high costs, Rystad Energy estimates that companies will pump over US$100 billion into deepwater development this year, with that figure approaching US$140 billion by 2027.[11]

This is because the economics can ultimately be favourable. According to Wood Mackenzie, only the best subsurface plays typically become commercial in very deep water due to their exceedingly high-pressure regimes, which usually makes these basins 'hyper-productive' — operators can recover huge volumes of oil and gas from each well.[12]

[8] Ibid
[9] Ibid
[10] https://www.worldoil.com/news/2024/9/16/deepwater-oil-rigs-may-fetch-600-000-a-day-as-offshore-drilling-demand-expands noble-ceo-predicts/
[11] https://www.grip.globalrelay.com/offshore-oil-is-back-at-what-cost/
[12] https://www.woodmac.com/news/opinion/global-deepwater-production-to-increase-60/#:~:text=Deepwater%20is%20the%20 fastest%20growing,pass%2017%20million%20boe%2Fd

This translates into high economic returns.

Moreover, the economics could improve further thanks to technological advancement. For example, revolutionary seismic tools such as long-offset Ocean Bottom Node technology (OBN) — used to locate potential reserves within subsea rock — are now enabling more accurate identification of new prospects. The technologies to interpret and process seismic data also continue to advance; many of the major international oil companies have gone a step further and developed their own in-house tools and software. Higher quality seismic imaging allows for fields to be identified with greater confidence, especially in basins with complex geological features.[13] This helps producers make more informed decisions during project planning and prior to drilling, which reduces risk and cost.

DRILLING PLATFORMS, EQUIPMENT AND SYSTEMS ARE ALSO BECOMING SAFER AND MORE EFFICIENT, THANKS TO INCREASED AUTOMATION AND INTEGRATION OF NEW TOOLS AND MATERIALS.

In 2024, new equipment introduced by producer Chevron allowed oil to be pumped from a field at pressures higher than any well previously drilled. The breakthrough technology used will reportedly facilitate production from ultra-high-pressure fields, allowing up to 5 billion barrels of hitherto inaccessible hydrocarbons to be brought into production.[14]

With continued investment and innovation in this area, and greater accumulated experience operating in extreme ocean environments, the margins of deepwater production are likely to improve in the coming years.

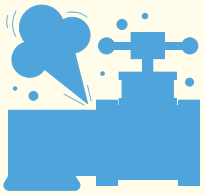
***Carbon footprint***

Besides the economics, the relatively lower carbon impact of deepwater production is another draw. Although it is a more complex undertaking than drilling close to shore or on land, deepwater drilling does offer an 'emissions advantage'. A McKinsey report indicates that deepwater basins are among the world's lowest-emitting production sources, with the North Sea, US Gulf of Mexico, Guyana and Brazil as examples.[15]

AS EXPLAINED BY MCKINSEY, THE REASONS FOR THIS INCLUDE:

**High-production throughput at each location that minimises the number of energy-intensive processes required to bring on new supply (drilling, facilities installation, fluid processing)**

**Minimal routine flaring, with sale of most natural gas produced into local market**



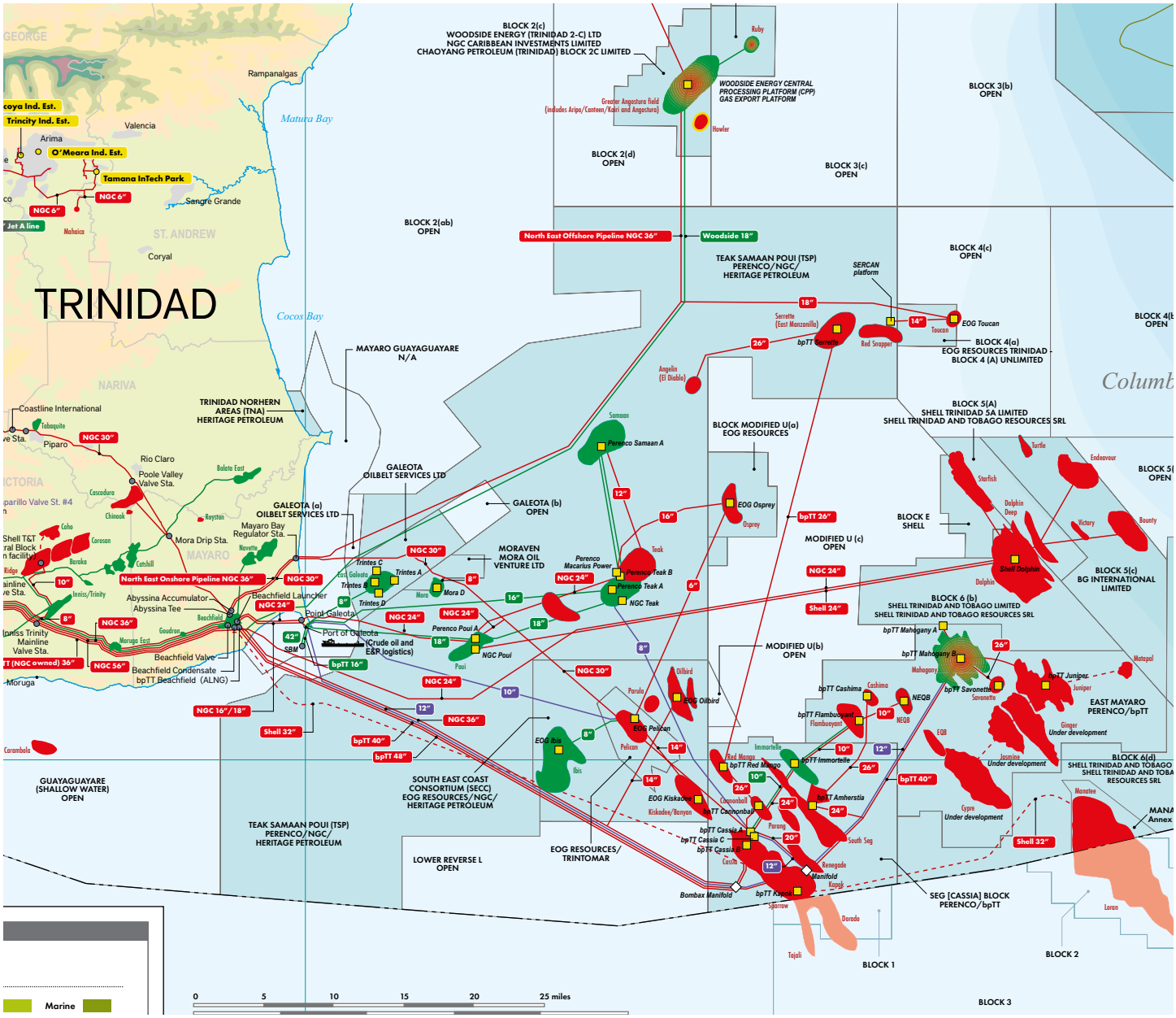
**Efficient, modern facilities that minimise methane leakage**


**Active decarbonisation efforts by operators (mostly majors, large independents and national oil companies with aggressive emissions-reduction targets).**

(Source: https://www.offshore-mag.com/deepwater/article/14285333/deepwater-oil-basins-can-help-fuel-the-energy-transition )

For these reasons, even though fossil fuels are historically notorious for their emissions intensity, deepwater oil and gas production is likely to still find accommodation in a low-carbon energy future.

[13] https://geoexpro.com/unlocking-gulf-energy-the-impact-of-advanced-seismic-technologies-on-exploration/
[14] https://www.reuters.com/business/energy/new-drilling-technology-put-billions-barrels-oil-reach-analysts-say-2024-08-14/
[15] https://www.offshore-mag.com/deepwater/article/14285333/deepwater-oil-basins-can-help-fuel-the-energy-transition




A snapshot of Trinidad's deepwater acreage, from NGC's Trinidad and Tobago Energy Map

## DEEPWATER ON THE HORIZON FOR TRINIDAD AND TOBAGO

In January 2025, the Ministry of Energy and Energy Industries launched a deepwater bid round, inviting operators to submit bids to develop the acreage off Trinidad and Tobago's east coast. Per Trinidad and Tobago's year-end 2023 Non-Associated Gas Audit conducted by DeGolyer & Mac Naughton, it is estimated that this acreage, together with onshore and nearshore acreage, could hold up to 59 Tcf of yet-to-be-discovered (or exploration) resources.

At present, the country's deepwater is still relatively underdeveloped territory, although some operators have already been granted licences for certain blocks. Given the number of companies with established infrastructure in the east coast marine area, joint venture arrangements that allow operators to leverage existing facilities, and merge technical and commercial expertise, could prove an effective model to optimise and accelerate the country's deepwater development.

With the deepwater bid round closing in July 2025, and renewed interest in oil and gas production following global geopolitical developments, there is reason to believe that deepwater hydrocarbons could soon open a new chapter for Trinidad and Tobago energy. ■