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Sustainability Frameworks and the Offshore Energy Sector: Implications for Energy Transition and Technological Adoption

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Abstract Summary.

- This study investigates the influence of sustainability reporting frameworks, particularly the TCFD recommendations, on the offshore energy sector's ability to align with energy transition goals.
- A mixed-methods approach was adopted, including document analysis of 19 companies, semi-structured interviews, and a public questionnaire.
- Companies were grouped into high, moderate, and basic performers based on their compliance with the four TCFD pillars: governance, strategy, risk management, and metrics/targets.
- The results reveal a significant variation in disclosure quality, with high-performing companies often showing external assurance, board oversight, science-based targets, and full emissions reporting.
- Interviews and surveys indicated public skepticism toward sustainability reports, reinforcing concerns about greenwashing and highlighting the importance of transparent and standardized disclosures.
- From a technological perspective, improved disclosure practices may facilitate the adoption of more sustainable operational technologies, including lower-impact geophysical practices.
- The study contributes to discussions on legitimacy, public trust, and the strategic role of sustainability reporting in the offshore sector amid the global energy transition.

Introduction

The offshore energy sector is at the crossroads of two major pressures: meeting growing energy demands and aligning operations with global sustainability goals. In this context, sustainability reporting frameworks like the Task Force on Climate-Related Financial Disclosures (TCFD) play a crucial role in shaping corporate strategies and investment decisions. While much attention has been paid to emissions and financial risks, there is growing recognition that sustainability frameworks also influence the adoption of technologies used in exploration, monitoring, and field revitalization. This paper examines how these frameworks affect strategic planning and geophysical practices in offshore energy contexts.

Methods

This study employs a mixed-methods approach. We analysed the sustainability reports of nineteen companies operating in the offshore energy sector to assess the level of compliance with TCFD recommendations. Interviews with professionals from the industry and structured questionnaires applied to stakeholders further enriched our understanding of perceived versus actual sustainability performance. Companies were categorized into high, moderate, or basic performers based on governance practices, external assurance, and science-based target implementation.

Results

The analysis revealed considerable variability in the application of sustainability frameworks. Companies with higher alignment to TCFD recommendations showed stronger board-level governance and were more likely to incorporate third-party assurance and long-term climate targets. These companies also demonstrated a greater propensity to invest in innovative, lower-

impact geophysical methods aligned with decarbonization goals. The companies analyzed were grouped according to their level of alignment with TCFD pillars, based on governance, strategy, risk management, and metrics/targets. The following table summarizes the classification:

Performance Level	Companies
High	Santos, EnQuest, Vattenfall, RWE, CIP, Harbour Energy, Total Energies
Moderate	Serica, Ithaca Energy, Jersey Oil and Gas, CNOOC, Equinor, SSE, Fred Olsen Renewables
Basic	Hibiscus Petroleum, Mitsubishi, Scottish Power, ENI, Mainstream Renewable Power

Table 1: Grouping of offshore companies according to TCFD alignment criteria. Source: Adapted from Macedo (2024).

Conclusions

Frameworks like TCFD can be instrumental in promoting sustainable practices and influencing technological pathways within offshore operations. However, the variability in disclosure and the prevalence of practices like greenwashing suggest a need for greater standardization. From a geophysical perspective, the adoption of sustainable reporting can indirectly promote the use of advanced, less environmentally invasive technologies, particularly in mature or complex fields where risk management is paramount. Future research should explore direct correlations between disclosure maturity and the deployment of specific geophysical techniques.

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