Engineering Sustainability: Drilling Jack-Up Rig Viability in Renewables

An Industry Discussion

Dr. Peter Hone

Energy Consulting Group Pte. Ltd

Singapore

Abstract

The jack-up drilling rig is a familiar entity within the drilling industry; however, the future trajectory of these rigs remains less explored. As the oil and gas sector approaches a potential decline, many in the industry are stating that it is imperative to consider the adaptation of jack-up drilling rigs for a sustainable future in renewable energy.

This paper investigates the feasibility of repurposing jack-up drilling rigs as mobile wind farms, maintenance vessels, or accommodation units. It examines the current utilization of these rigs in renewable energy applications and identifies the necessary modifications for their transition into this new environment.

For the purposes of this paper, the term **"MODU"** (Mobile Offshore Drilling Unit) will be used to refer to drilling jack-ups, while **"MOU"** (Mobile Offshore Units) will denote non-drilling jack-ups.

Contents

Abstract 1

Introduction 3

Executive Summary 4

Questions 5

Discussion 6

1. Is there a role for jack-ups being used in renewables? 6

2. What's Blocking The Transition? 6

3. Industry Coordination and Regulation 8

4. What Needs to Happen Next? 10

5. Conclusion 11

Acknowledgements 12

References 13

Introduction

This paper will employ the transcripts from a series of dialogues with industry peers and representatives to critically examine the current methodologies used in the selection and inspection of Mobile Offshore Drilling Units (MODUs) for the drilling market. The objective is to assess their suitability and readiness for transitioning into the renewables market. Some of these dialogues are anonymized, while others include direct quotations, provided permission has been granted.

Executive Summary

The narrative surrounding renewable energy is exerting a significant influence on the oil and gas industry at various levels. At the macro level, this influence is manifested through reduced investment (Economist, 2016) and stock-market volatility (Kaul, Brüggemann, Leuz, & Werner, 2013). At the micro level, it is evident in the migration of skilled labor to wind farms (Browne, 2022), the pursuit of lucrative service contracts by supply vessels, and the adaptation of service companies to provide the necessary training for the emerging renewables market.

However, the role of the Mobile Offshore Drilling Unit (MODU), a fundamental asset in the drilling industry, remains under scrutiny within the renewables sector. While its reliability is often taken for granted in offshore drilling, its potential application in the renewables market is still being evaluated.

This paper, based on discussions with various stakeholders including industry bodies, drilling contractors, rig movers, inspection companies, and operators, reveals a growing awareness of the sustainability imperative. Despite this awareness, actual conversion to renewable energy use remains rare. The discussions also highlight current barriers that could impede the transition to renewables for the Jack-Up rig. These barriers are both technical and regulatory, with limited standardization and industry alignment.

Questions

A series of questions was presented to all participants to establish a foundation to guide the discussion. These questions were slightly modified to ensure their relevance to the services provided by the discussant to the industry. In every case the discussions included other relevant subjects, but for this paper only those discussions relevant to the topic are included.

1. Have you discussed or planned to utilize your Mobile Offshore Drilling Unit (MODU) for purposes other than drilling?
2. Have you moved or inspected a MODU for purposes other than drilling?
3. Have you managed deals for MODUs transitioning from drilling to other sectors within the energy stream?
4. Are you aware of any MODUs that have transitioned from drilling operations to renewable energy sectors?
5. Are you cognizant of any Class Rules that would affect your assets being used for renewable or non-drilling activities?
6. Are you aware of any differences in selection criteria for rigs that may be required for assets transitioning to renewable or non-drilling activities?
7. Are you familiar with any specific inspection criteria required for non-drilling activities or renewable energy contracts?
8. Does the renewable energy sector have governing or advisory bodies similar to the International Association of Drilling Contractors (IADC) or the American Petroleum Institute (API)?

Discussion

1. Is there a role for jack-ups being used in renewables?

This report finds that there is a role for MODU in renewables, whether it be as hotel accommodation or as offshore wind farm maintenance vessels. Currently the direct use of MODU in renewables is minimal. There are no MODU being reported as fully transitioned to renewable energy projects. On the same subject there was an interesting conversation with Chris Wilson, Managing Director of Labrador Petro-Management who asked a pertinent question "Could we or should we be looking at utilising rigs that are currently stacked for drilling, to be reactivated for contracts in the renewables space? Some rigs have never even left the shipyard. In a truly reduce and recycle world surely, we can repurpose them…...?

There was considerable debate regarding the lack of transparency and the lack of a structured methodology for determining which Mobile Offshore Drilling Units (MODUs) should transition to the Plug and Abandonment (P&A) sector, which are suitable for renewable energy applications, which should remain within the drilling fleet and which should be scrapped.

From an operator perspective, there are some concepts and discussions for MODU to be used for CCUS and wind farm maintenance. (LinkedIn video showing jack-ups joined for turbine installation). Several MODU owners have expressed views that they see potential in repurposing older assets for accommodation, P&A, or CCUS.

Finally, from an inspection standpoint, Steve Nally from ModuResources, a leading industry inspection company, highlighted that the wind sector demands the same training and certification for its employees as the offshore oil and gas sector. Notably, there has been a significant migration of newly certified wind sector employees to the oil and gas industry once they realize their certifications are valid for offshore work, where they can earn higher salaries. The training discussion was enforced by Anthony Brewer from leading Hazardous Area inspection company and industry training provider Eutex International who noted that there had been no enquiries from the renewables sector for Hazardous area training.

2. What's Blocking The Transition?

This paper identifies three primary challenges impeding the transition of Mobile Offshore Drilling Units (MODUs) to the renewables sector.

Technical Challenges: The utilization of jack-ups as temporary wind farms presents significant challenges, including deck reinforcement, structural limitations, and stability concerns. Additionally, differences in rig classification must be addressed by jack-up owners before they can secure contracts in the renewables sector. Another technical risk involves Spud Can issues, where variations in soil history and spud design can lead to safety concerns. Some of the spud can issues discussed with relevant parties were linked to geotechnical risks like punch through risks and sliding etc.

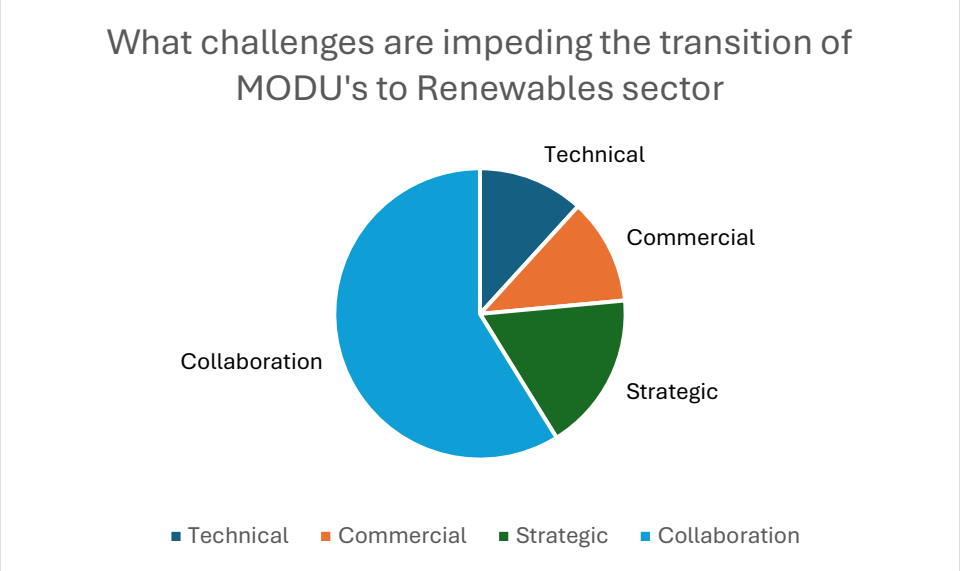
Knowledge and Criteria Gaps: One drilling contractor suggested that only minor to moderate modifications would be necessary for conversion to the renewables market. Conversely, another rig owner highlighted the lack of selection or inspection criteria for renewables. Other drilling contractors expressed

the need for addressing the subjectivity observed in drilling inspection and selection criteria for renewables inspections. Several inspection companies acknowledged the existence of different criteria for selecting and inspecting vessels for the offshore wind sector, but not for Carbon Capture, Utilization, and Storage (CCUS). Operators and brokers also noted a general lack of clarity regarding the differences between current and renewable-sector inspection protocols.

Collaboration Challenges

Three main challenges have emerged from the valuable discussions that were a significant part of this research, with collaboration standing out as the most critical. The oil and gas sector possesses the expertise to overcome technical issues and address criteria gaps. Industry figures like Mike DuBose, Paul Handidjaja, Chris Wilson, Amit Kulkarni, Tommy Sutherland, and Steve Nally have provided valuable insights into subjects such as electrification, future footprint concerns, managing safety during the energy transition, and cyber security issues, as well as cross-sector training and inspection. These topics merit collaborative discussion. The insights from these technical leaders underscore the sector's depth of knowledge, which is likely mirrored in the renewables sector, raising an important question for further consideration

Do they have the cultural humility to want to understand how this transition is affecting the other party?



3. Industry Coordination and Regulation

One of the major subjects discussed was the necessity for collaboration and meaningful dialogue between leaders in the oil and gas sector and those in the renewables sector. This topic was frequently raised during all of the various discussions.

The discussants unanimously indicated that the oil and gas sector face significant internal collaboration challenges, with minimal cross-peer group discussions. The prevailing consensus was that the transition should be non-competitive, while the services facilitating the transition should remain competitive. It was emphasized that industry-led, structured dialogue is essential to establish guidelines conducive to sustainability.

Several discussants interviewed were from esteemed industry peer groups such as DrillSafe and the International Association of Drilling Contractors (IADC). Both groups confirmed that they had not participated in any transition discussions with similar entities from the renewables sector. This lack of engagement between oil and renewables bodies can be argued as a significant barrier to the establishment of a clear regulatory pathway for the transition of jack-up rigs.

Prominent industry bodies for drilling that could and should be involved in these discussions include:

- **DrillSafe**: An industry peer group dedicated to improving safety and working practices in Australia. Senior executives regularly volunteer their time to make this peer group one of the best in the industry. Chris Wilson, the CEO of Labrador Petroleum, along with a team of volunteers, delivers highly valuable quarterly seminars at no cost to attendees.

- **IADC**: An industry peer group with chapters around the world. IADC committees guide industry practices towards safer and more effective operations. Mike Du Bose is one of many executives who work tirelessly for the industry's cause. Recently, Mike has been working on sustainability initiatives, collaborating with students entering the industry from around the world. IADC also has geothermal and sustainability committees.

- **Society of Petroleum Engineers (SPE) –** A non-for-profit organisation**.** The Society of Petroleum Engineers (SPE) connects professionals from all corners of the oil and gas sector, fostering collaboration, innovation, and growth. Whether you're advancing innovative solutions, building your career, or seeking to make a lasting impact, SPE provides the platform and tools to help you thrive

Existing bodies for renewables include:

- **Renewable UK**
- **International Renewable Energy Agency (IRENA)**
- **Sustainable Energy Development Authority (SEDA) Malaysia**
- **Society of Naval Architects and Marine Engineers (SNAME)**: Used in some wind-related vessel classification, as per Sterling.
- **Offshore Industry Regulator (OIR) Australia**: Part of the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)

These renewables peer groups and bodies were not contacted for this research but have been included for context. One of the outcomes will include reaching out to these groups.

4. What Needs to Happen Next?

Analysing the conversations with the various personnel from within this industry highlights some critical issues for the humble jack-up entry to the renewables arena. This paper has only reviewed issues relating to MODU entering the renewables arena, but arguably there may be grey areas relating to other vessels, and personnel entering the renewables market. To mitigate these issues, this paper has delivered several recommendations that could pave a more successful and sustainable way forward

Short-Term Recommendations

In the short-term it is suggested that the following are considered:

- Conduct gap analysis between MODU design and renewable sector requirements (deck loads, emissions, footprint).
- Develop transitional inspection and selection criteria—possibly via joint task forces between IADC, SNAME, and IRENA.
- Discuss and create some case studies that would/could be used by the industry for the following:
    - MODU as accommodation and maintenance platforms for wind
    - CCUS workovers with limited retooling
    - P&A projects (already underway in SE Asia)

Long-Term Vision

- Create a “transition certification framework”—an equivalent of IADC/API for renewables.
- Define sustainability metrics: emissions, energy source (e.g., highline shore power), environmental footprint.
- Coordinate soil/geotechnical data sharing platforms to reduce jack-up instability in multiple footprint fields.

5. Conclusion

This paper contends that jack-up rigs represent a significant, yet largely unrealized, opportunity for facilitating the transition to renewable energy. Presently, progress is hampered by pronounced industry segmentation, inconsistent standards, and technical inflexibility. Nonetheless, specific applications—such as Plug & Abandonment (P&A) operations and Carbon Capture, Utilization, and Storage (CCUS) workovers—may provide valuable testbeds for early innovation. To enable the development of sustainable engineering solutions for jack-up rigs within a net-zero framework, it is essential that rigorous cross-sector dialogue and collaborative establishment of evaluation criteria be pursued. Chris Wilson, Managing Director of Labrador, notably raised pertinent questions regarding the repurposing of stacked MODUs, setting the stage for such discourse.

Steve Nally also enforced that the rigorous cross-sector dialogue recommended by this research was crucial and needs to happen if the oil and gas industry, want to adapt to service the wind industry, “we can and will’ he said. He went on the suggest that while the day rates for drilling oil outstrip the day rates to have a windmill spinning above the jack-up, or scuba divers sipping cocktails in the former sack room, or accommodate 100 construction personnel, then those jack-up rigs will drill, baby, drill. Those day rates indeed begin to look economic when the jack-up rig is older and not attracting work in the oil & gas industry.

In conducting this research, I reviewed industry documentation and received a manual titled 'Guidelines for the Selection and Operation of Jack-ups in the Marine Renewable Energy Industry Issue 2, 2013' from two independent sources. Despite extensive searches, I could not find an updated version or the original document on the Renewable UK website. This indicates that while initial communication and collaboration efforts date back to 2013, there is still a significant need for ongoing cooperation to advance sustainability objectives. One major sustainability discussion is training, and the manual includes recommendations for training but unfortunately does not cover Hazardous Areas. Hopefully, with collaboration between the energy sectors, technical leaders from inspection and training companies such as Eutex International and ModuResources can lead discussions for higher standards across the transition.

Ultimately, meaningful progress toward sustainability and the extension of operational lifespans for jack-up rigs will depend upon the willingness of all stakeholders to engage in open dialogue and to approach divergent perspectives with cultural humility and mutual respect.

Acknowledgements

This paper would not have been possible without the valuable input and time given by the following:

Chris Wilson – Labrador Petro-Management

Paul Handidjaja - Sterling Technical Services

Amit Kulkarni – ABL Group

Robert Henley – Clarkson's

Damien Ng – Borr Drilling

Keith Kotval – ENEOS

Mike Du Bose – IADC

Tommy Sutherland – EUTEX International

Anthony Brewer – EUTEX International

Steve Nally - ModuResources

References

Browne, V. M. (2022). *The Energy Paradigm Shift: Renewable Energy Technology and the Skilled Labor Shortage*. ProQuest Dissertations & Theses,

The Economist (2016). Into the twilight zone The future. *The Economist (London), 421* (9017), 11.

Kaul, A., Brüggemann, U., Leuz, C., & Werner, I. M. (2013). The Twilight Zone: OTC Regulatory Regimes and Market Quality. In: National Bureau of Economic Research.