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**DOCUMENT TITLE: POWERING AN OFFSHORE PLATFORM**

**USING RENEWABLE ENERGY**

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## 1.0 INTRODUCTION

The aim of this study is to investigate how renewable energy can be integrated into offshore platforms, whether it is through making new platforms entirely or adapting existing ones. As climate change becomes increasingly extreme, changes in energy systems should be made to work towards net zero.

This aim will be achieved through these goals:

- Investigate current energy sources and create comparisons between present and future technologies
- Describe the advantages and limitations of existing renewable energy sources
- Propose solutions for a range of offshore scenarios

## 1.1 OBJECTIVES

- Research various renewable energy sources and determine whether they could be used offshore
- Research how an offshore platform functions and the energy requirements for various pieces of equipment
- Score the energy sources on various categories and determine their best uses
- Form conclusions based on the scorings

## 1.2 BACKGROUND

The UK has signed international agreements as well as created their own legislation for their aims towards net zero. One of these treaties is the Paris Agreement[i], which is an international document on climate change and the recent aims to prevent the average global temperature rise. It acknowledges various barriers that countries face when tackling climate change, but the main text strives to mitigate global emissions (as stated in Article 6). Furthermore, with the Climate Change Act (2008)[ii], the UK has its own internal target of reaching net zero by 2050 showing that getting the oil and gas industry to shift to renewable sources is a vital part of reaching that net zero goal.

Currently, the UK runs with a mixture of renewables and natural gas, with 50% of the National Grid being run by renewables as an annual average in 2024[iii]. However, these numbers tend to fluctuate as renewable sources have various peak cycles dependent on their respective weather necessities. For example, wind energy can produce as little as 2% of the UK's entire energy demand to percentages as great as 95% during especially windy days. Extra demand will either be catered for through natural gas or interconnectors between other European countries (such as Belgium or Denmark).[iv]

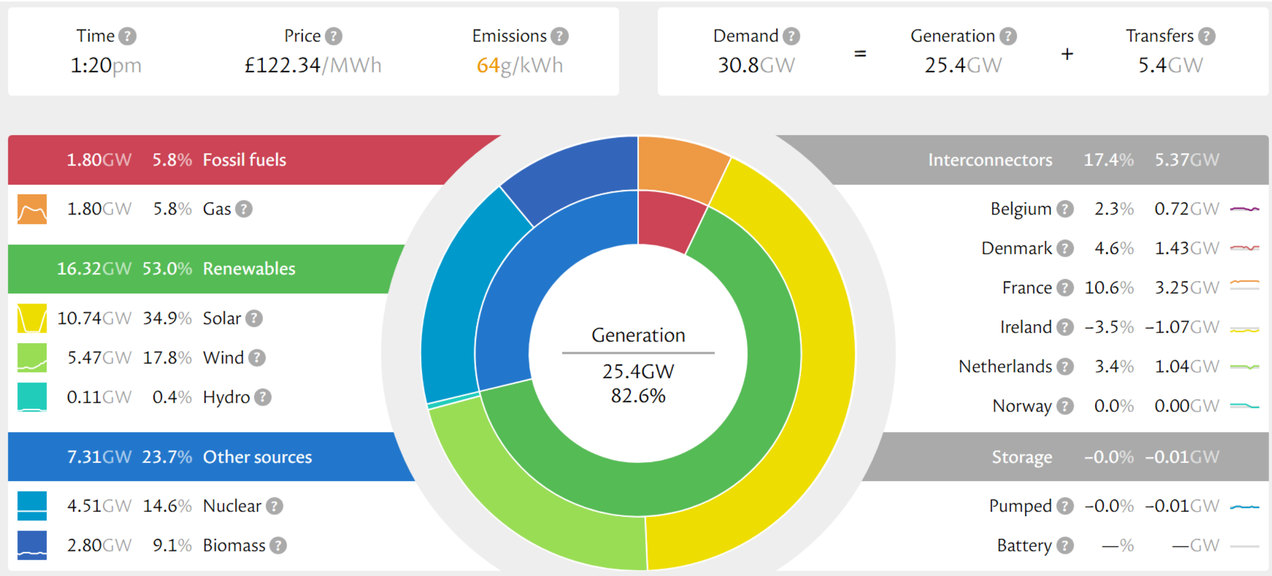


**Figure 1-1 UK's energy mix from 24/08/2026** [v]

# 2.0 LITERATURE REVIEW

## 2.1 HEALTH AND SAFETY REGULATIONS

When considering the creation or maintenance of an offshore platform, SHEQ (safety, health, environment and quality) must be considered to ensure legal compliance in health and safety regulations. Testing new energy sources brings health and safety issues, from fire hazards to environmental risks, meaning that some energy sources are not feasible for an offshore setting but with further research could become compliant with the current restrictions.

### 2.1.1 Health and Safety at Work Act (1974) [vi]

This act gives a general overview into the general duties of employers and employees to ensure safe practices within the workplace. This includes training, regular maintenance checks to ensure a safe working environment, and health and safety checks on a regular basis. All of the objectives within each regulation specify that actions should be "so far as is reasonably practicable", giving employers the decision to set their own safety limits as they deem fit.

### 2.1.2 Pipelines safety regulations (1996) [vii]

This legislation goes gives overall guidance on how to handle dangerous fluids or which materials can be used to prevent major accident hazards. When creating a new platform, although it is feasible to reduce the number of transmitters or indicators to save money, safety equipment like emergency shut down valves are non-negotiable for the safe transportation of corrosive fluids like methanol.

### 2.1.3 Prevention of fire and explosion, and emergency response on offshore installations (1995)[viii]

This piece of legislation provides guidance on emergency protocols in case of a fire or explosion; it details the various permits and training to go offshore as well as pieces of equipment that are required on every platform, such as the need for a Totally Enclosed Motor Propelled Survival Craft (TEMPSC) on the side of a platform, or a standby vessel for the case of someone falling off the platform.

A notable regulation is the 'Prevention of Fire and Explosion', which makes it a requirement to not allow any substances or equipment that are flammable. This means that types of energy storage such as hydrogen or lithium-ion batteries are not feasible due to their high flammability (which is detailed in 9.1).

Furthermore, the need for need for standby vessels and TEMPSCs (seen in regulation 15 and 17) would also need to be considered when creating a new offshore platform. Even when minimising the amount of equipment on a small platform to be cost effective, these need to be catered into the overall budget.

### 2.1.4 The Conservation of Offshore Marine Habitats and Species Regulations (2017)[ix]

This goes into depth about the various species and areas that are protected by the government. This limits the areas in which an offshore platform can be placed, as well as using tidal power as it disrupts the surrounding ecosystem and the submerged turbines could cause harm to marine life.

## 2.2 CURRENT METHODS OF POWERING AN OFFSHORE PLATFORM

### 2.2.1 Diesel Generators

Diesel generators are the most common type of energy generation, for both large and small offshore platforms. For smaller platforms such as Blythe, these generators will run 24/7, meaning that refuelling is around every 3 months (which would go into the cost considerations). Typically, platforms will have two main generators and one emergency so that processes will not have to stop if one needs servicing.

Other than the environmental downsides of diesel generation, a downside of diesel generators is how often they need to be serviced. Unlike solar panels or geothermal, generators often require regular filter and oil changes alongside any checks for leaks and other anomalies. This not only brings up costs but also increases emissions as offshore crews require helicopter and vessel transportation for supplies and equipment for servicing (which are not currently powered by renewables).

On the other hand, diesel generators are incredibly reliable unlike renewables such as wind or solar that require specific weather conditions for efficient usage. If a platform were to shift towards renewables, it would most likely still require a diesel generator or some way of storing excess energy in the case of a major accident hazard as they have a quick start up time of 15-30 seconds[x].

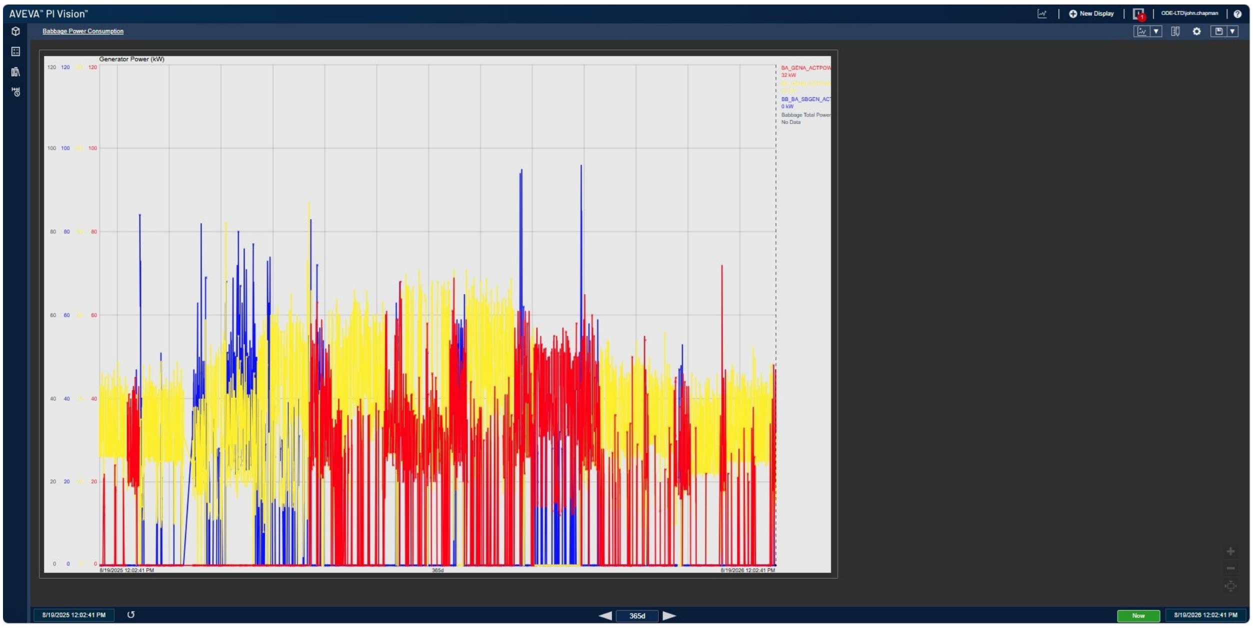


**Figure 2-1 One year power load and generation of diesel generators on Babbage Platform**

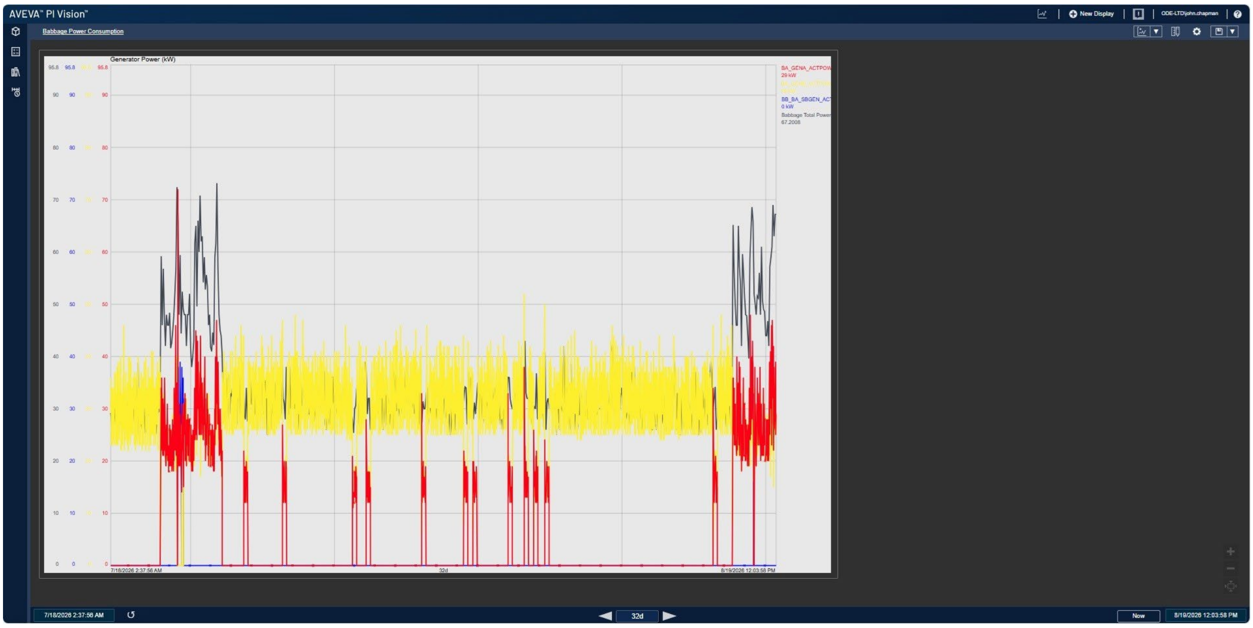


**Figure 2-2 One month power load and generation of diesel generators on Babbage Platform**

In Figure 2-1 and Figure 2-2, the colours are sorted by the type of generator, as well as the black line which is the peak load. The yellow is for generator B which runs 24/7; occasionally there's red spikes, signifying the start of generator A which runs if there is a greater load than the capacity of generator B. The blue line is for the standby generator. The peak load generally increases when the platform is manned; as Babbage has accommodation, this load will include things such as heating, showers, cookers, etc.

### 2.2.2 Micro gas turbines

Micro gas turbines (MGTs) are less harmful to the environment than diesel generators as the gas comes from the platform itself, letting them be self-sufficient instead of needing a specialised vessel to transport the fuel. However, these are typically used in larger offshore platforms such as Tolmount as fuel gas conditioning systems are required to get the gas to the right specifications for turbine use.

Moreover, an academic journal from the University of Stavanger on the ‘Role of Micro Gas Turbines in Energy Transition’[xi] provides details on increasing performance and efficiency of MGTs which would in turn decrease greenhouse gas emissions. Furthermore, by implementing MGTs into more offshore platforms, it decreases the reliance on diesel generators and helps bring the UK closer to net zero.

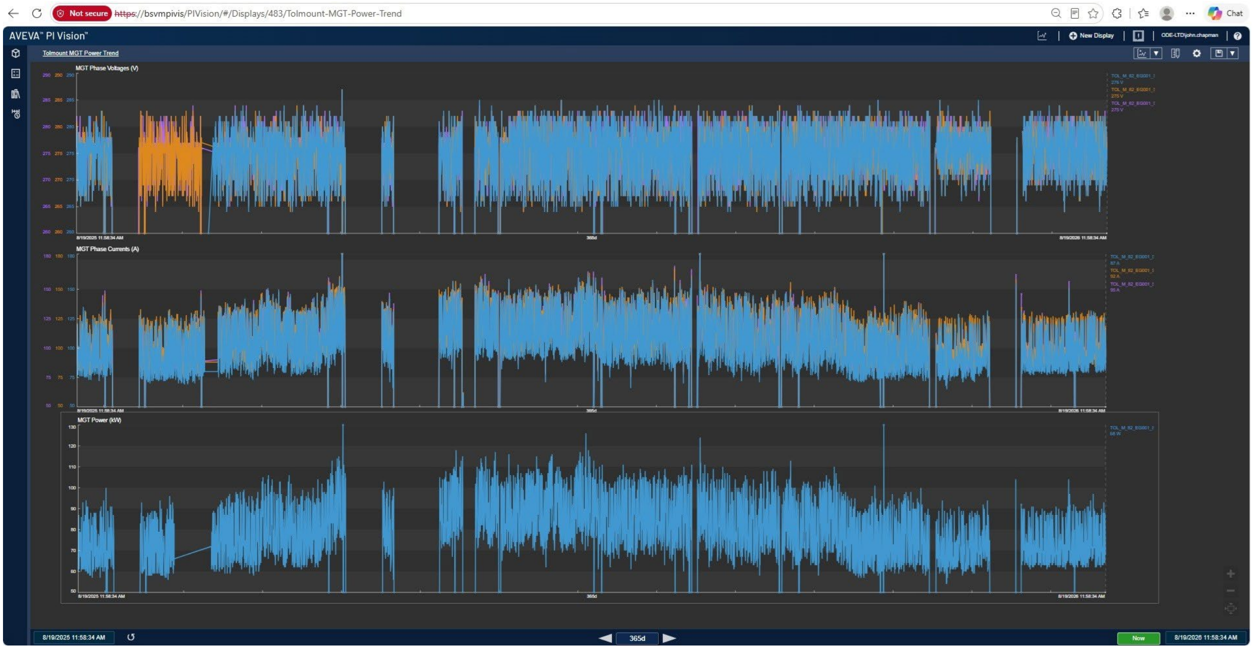


**Figure 2-3 One year power load for the MGTs on Tolmount Platform**

Figure 2-3 gives an overview of the load of Tolmount, which predominantly uses MGTs for energy generation. The breaks in the graph are either when the diesel generators are running instead of the MGTs, or during a shutdown and the various colours are the three phases of power. The middle of the graph is during winter, hence the higher load than the ends of the graph (which are summer months). Winter has a higher load due to the increased use of heating and lights.

## 2.3 PLATFORMS THAT HAVE USED RENEWABLE ENERGY

### 2.3.1 HORNE AND WREN PLATFORM

Active from 2005-2015, the Horne and Wren offshore platform was a small two-well normally unmanned installation (NUI)[xii] run by renewable energy. Due to the size of the platform and lack of amenities such as kettles or showers, the platform was able to run on a few wind turbines that were installed on the top of the platform; these were able to generate the 2kW needed for gas production. This proves that renewable energy has been able to power an offshore platform, it is just the case of scaling that up to larger platforms like Babbage and then Tolmount.

### 2.3.2 SHELL LEMAN PLATFORMS

The Shell Leman platforms[xiii] were transformed to accommodate renewable energy sources by removing helidecks and equipment that wasn't vital to gas extraction. On Shell Leman Bravo, Delta and Echo, the originally manned platform became an NUI with the removal of the helideck and various other equipment and instead replaced with a group of solar panels along with battery storage. These battery systems also take energy from offshore wind projects and wave power. This further proves that renewable energy is capable of powering offshore platforms in a safe and efficient manner.

## 3.0 METHODOLOGY

### 3.1 PLANNING

I structured my project into three main sections: researching how offshore platforms currently run, comparing renewable energy sources I could use, and writing my report. However, I left the timings for these quite broad as I gained information for the different sections throughout my project from the different departments.

To plan my work in more detail, I created a GANTT chart to give a rough display of my own internal deadlines, leaving in space for if I required more time to work. Due to time and availability constraints, I was not able to implement any CAD or 3D models. See Appendix A for my timetable during the internship.

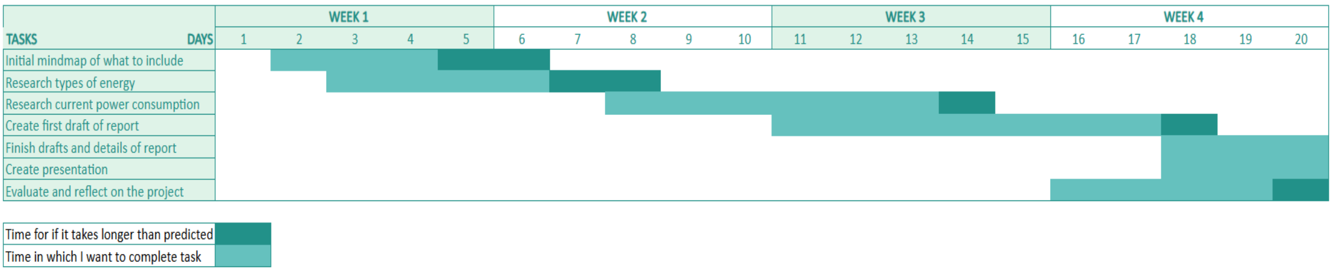


**Figure 3-1 GANTT chart**

## 3.2 SCORING SYSTEM

When it came down to considering my renewable energy sources, I decided to create a scoring system to rank them based on categories such as feasibility, energy density, efficiency, and cost effectiveness. These categories were chosen to maximise energy output without compromising large amounts of space and money for energy storage and generation. Furthermore, by also factoring in advantages and drawbacks of each energy source, I could allocate different uses for each type instead of being limited to powering the platform using one source specifically.

| Type of energy | Wind | | Solar | | Renewable Diesel | | Geothermal | | Wave | |
|---|---|---|---|---|---|---|---|---|---|---|
| | BASE | WEIGHT | BASE | WEIGHT | BASE | WEIGHT | BASE | WEIGHT | BASE | WEIGHT |
| Feasibility (5) | 4 | 20 | 1 | 5 | 5 | 25 | 3 | 15 | 2 | 10 |
| Cost (4) | 4 | 16 | 2 | 8 | 5 | 20 | 1 | 4 | 3 | 12 |
| Efficiency (3) | 4 | 12 | 1 | 3 | 3 | 9 | 5 | 15 | 2 | 6 |
| Maintenance (2) | 3.5 | 7 | 5 | 10 | 3.5 | 7 | 1 | 2 | 2 | 4 |
| Capacity (1) | 3 | 3 | 5 | 5 | 2 | 2 | 4 | 4 | 1 | 1 |
| BASE TOTAL | 18.5 | / | 14 | / | 18.5 | / | 14 | / | 10 | / |
| WEIGHTED TOTAL | / | 58 | / | 31 | / | 63 | / | 40 | / | 33 |

**Figure 3-2 Scoring System for Proposed Energy Sources**

- A less frequent maintenance check grants a greater score as it reduces the inspection burden and risk of accident.
- Capacity is based on current power stations across the world. This is meant to provide an indicator for the current level of technology and development for different types of renewable energy sources; this does not mean that the platform will require that amount of energy.
- Cost factors in transportation, any equipment needed for storage usage, buying fuel, etc. A more in-depth cost breakdown can be seen in 8.0
- See Appendix B[xiv] for a breakdown of the scores from initial research

## 4.0 MAKING A NEW OFFSHORE PLATFORM

In an ideal world, creating a brand-new offshore platform and designing it with net zero in mind would be the optimal solution. Currently, the best method is to start on a small platform before expanding these implementations onto greater areas; platforms like Horne & Wren are a vital example of this as beginning with a platform like Tolmount (which requires 130kW of power) isn't a feasible option until greater technologies are created.

## 4.1 CURTAILED WIND POWER

Wind power is the most viable option due to how advanced wind turbine technology is in the UK. On a particularly windy day, wind power can provide up to 80% of the UK's electricity according to the UK grid live [xv], proving that it has similar capabilities in the capacity of energy generation as diesel and micro-gas turbines.

However, an issue that the UK currently faces with wind farms is that at times, the energy generated is too much for the mic to handle, meaning that millions of pounds are wasted each year turning off offshore wind farms[xvi]. Therefore, by taking the curtailed wind energy from offshore wind farms and using it to power nearby offshore platforms, it would solve two problems in one. Curtailment is when energy sources are intentionally restricted as the current energy generation exceeds the National Grid's capacity.[xvii]

In order to connect the platform to the wind farm, transformers and subsea cables must be implemented. Rearranging the equation for resistivity proves that transformers are vital for electricity transfer as potential difference (p.d.) is inversely proportional to the cross-sectional area of wire, meaning that using a higher p.d. prevents the need for wires being metres wide – this would therefore save money on copper wire.

The greatest drawback with wind energy is that it's unreliable. When wind speeds don't exceed a certain amount (typically 7-9mph)[xviii], the wind farm will go idle, meaning that the offshore platform won't have any supply of electricity unless a storage system is installed or the platform keeps a diesel generator for emergencies.

An alternative method is to install wind turbines straight onto the platform; this would remove the logistical issue of contracts between local projects. If the platform has a helideck, then the turbines can be installed on the side of the platform instead of the top as equipment can't obstruct the surrounding area of a helideck for safety reasons.

### 4.2 SOLAR-WIND HYBRID

Although solar and wind power are somewhat inefficient and unreliable on their own due to typical UK weather conditions, combining these two renewables can provide a consistent and reliable source of energy. This system can be created by taking the curtailed electricity from offshore wind farms and installing solar panels on any areas that aren't covered by the helideck. As solar panels require a large amount of surface coverage, this hybrid system would be optimal for a larger offshore platform.

Another method is to use vertical solar panels on the railings and install small wind turbines for if the platform was to be entirely self-sufficient and not reliant on local farms.

## 5.0 ADDING RENEWABLES TO PRE-EXISTING OFFSHORE PLATFORMS

In certain occasions, making new offshore platforms isn't feasible; it takes many different teams to locate reservoirs, collect all of the equipment for the platform and then check the cost of running it. Energy projects take years to complete, even more so with new energy systems that haven't had the same amount of research and development as oil and gas. As a faster solution, implementing renewable sources and mitigating current energy loses in existing offshore platforms means that net zero can be achieved faster with less effort.

### 5.1 RENEWABLE DIESEL

Renewable diesel is a lesser-known form of biofuel, also coming from crops and animal stocks. However, this has major advantages compared to its prevailing counterpart - biodiesel. Renewable diesel is made from treating organic stocks with hydrogen and vast amounts of heat instead of being reacted with methanol in transesterification processes (which is how biodiesel is manufactured)[xix]; when completed, renewable diesel is chemically similar to regular diesel and therefore compatible with diesel generators. Renewable diesel is also comparable in terms of energy generation with 34.4MJ/litre compared to 36MJ/litre from regular diesel. [xx]

As mentioned in the 2.2.1, diesel generators are in most offshore platforms and are used as a start-up energy source to get the gas to the right temperature and pressure meaning that renewable diesel wouldn't be used as the sole energy source. This is useful when considering cost calculations as companies wouldn't have to buy as much renewable diesel.

Furthermore, renewable diesel produces 60%-80% less emissions than regular diesel[xxi], making it a strong contender for implementation.

## 5.2 GEOTHERMAL

Another use of renewable energy in existing platforms is through geothermal heating. Heat can be taken from under-the-sea geothermal reservoirs and instead of being transferred into energy, it can instead be used to heat gas instead of fuel gas heaters. As climate change progresses and winters continue to change with more extreme weather events[xxii], an arising problem is that the gases coming from the reservoirs are too cold to be put through the different cleaning processes and treatments. As a temporary solution, workers have implemented fuel gas heaters to raise the temperature; however, these aren't enough to warm up the gas, meaning that more fuel gas heaters are bought and more money is spent. By using geothermal heat, there is no longer a need to continuously buy fuel gas heaters or install heat trace systems (which require electricity).

If geothermal heat pumps were to be implemented, it would be most feasible for northern North Sea offshore platforms. Platforms in the southern region of the UK typically stand 40m above the seabed whereas geothermal needs to come from 100m below sea level, meaning that funding would have to go into digging the extra 60m to pull the heat up for the gas. Northern platforms don't have this issue as they are typically situated 100m above the seabed, meaning that little to no drilling is required for geothermal to work.

## 6.0 REJECTED RENEWABLES

When considering the feasibility of various renewables in comparison to the limitations and cost calculations, these renewables wouldn't currently work in powering an offshore platform. With new developments in technology and research, these renewables could potentially become feasible, but these renewables will be rejected for the time being.

## 6.1 WAVE POWER

Wave power works by converting the kinetic energy from moving water waves into electricity through the use of wave energy converters (WECs) which are tuned to match the frequency of the waves in that area of the sea. Wave power not only relies on the wave height and frequency, but it also relies heavily on wind power and speed, meaning that it's a very inefficient source of renewable energy.

Although a viable idea in hindsight, wave power is not sufficient to power an offshore platform, due to a lack of research and development in the area; with adequate technology, wave power could be used as another possible solution but until then, wave power is not feasible enough to spend millions of pounds implementing into offshore platforms.

Another issue with wave power is with maintenance. To inspect the jacket and legs of an offshore platform, a small vessel needs to be able to go around the platform, which would be difficult to complete with a WEC in the way. Also, if the WEC was tied onto the platform then it could get in the way of oncoming vessels and potentially cause a collision.

## 6.2 SOLAR POWER

Due to the surface area coverage requirements for solar panels, solar power on its own isn't enough to power an offshore platform. Furthermore, there isn't many feasible places for solar panels as they need to face south for maximum solar coverage. If placing the solar panels in less conventional spots, such as on railings, they also must not be in the way of maintenance checks. With all of these considerations in mind, solar power shouldn't be used as a singular power source.

If solar power were to be implemented, it could be used in navaid systems, such as the flashing lights on the corners of the platform or fog horns, as they don't require large amount of energy. Another usage of solar panels is also for platforms that are now decommissioned as they only require lights to notify oncoming vessels – the solar panels can be placed anywhere on the platform as no one will be going onto it.

# 7.0 COST CONSIDERATIONS

## 7.1 WIND POWER

Any partnerships with neighbouring wind farms should be brought into calculations. Furthermore, millions of pounds from the government will be saved as there will not be as great of a need to shut down the wind farms because of excess energy.

The main costs will come from the transformers and subsea cables, which have a higher upfront cost than installing a diesel generator. However, thanks to the low maintenance frequency of these pieces of equipment (that only need to be inspected annually) in comparison to diesel generators (which need filter and oil replacements every few months), the transformers will pay themselves back over time, proving that cost is not an issue for switching to renewables in this case.

## 7.2 SOLAR-WIND HYBRID

A way of storing any excess energy should be brought into the cost calculations which is explained in further detail in 9.1. Moreover, costs for transformers, subsea cables, and solar panels should also be considered in a solar-wind hybrid system. This in total would give a greater cost than solar power or wind power alone, but this does provide more reliability – whether wind power is used or solar-wind depends on the budget and confidence in energy generation.

## 7.3 RENEWABLE DIESEL

Buying renewable diesel and transporting it from onshore to offshore should be brought into the cost calculations. As renewable diesel has similar flammability as regular diesel, platform supply vessels (PSVs) must be used for the safety of offshore crew and the surrounding environment in case of emergency. HVO fuel typically costs £1.10 - £1.90 per litre[xxiii] (before tax and profits), making it cheap to buy from third party vendors. As a comparison, the government average fuel price for diesel is 182.8p per litre[xxiv], making it comparable to HVO fuel.

## 7.4 GEOTHERMAL

If geothermal heat were to be used in southern North Sea platforms, money would have to be spent for drilling into the seabed to reach the 100m depth required. Piping with sufficient insulation is also required to reduce heat losses from the reservoir to the pipework that needs to be heated.

When comparing geothermal to the current fuel gas heaters or heat trace systems, there's no cost-effective way of implementing this system. Unless the geothermal is being used to power the platform (in which it would require converter systems that offshore platforms don't have the space for), solely using geothermal to heat up some pipes isn't feasible in terms of money. Moreover, maintaining geothermal systems is expensive, as the heat pumps would either have to be taken in and out of the ground, or divers would have to be sent to inspect them.

The only justifiable reason for using a ground source heat pump is if the platform will be used for decades, in which the cost for drilling will pay itself back. For platforms with a shorter lifespan, it's more cost effective to implement more fuel gas heaters.

# 8.0 OTHER CONSIDERATIONS

## 8.1 STORAGE SYSTEMS

### 8.1.1 Battery storage

Battery storage is currently the easiest and cheapest method of energy storage, with lithium-ion batteries being the most widely used due to efficiency and duration. Due to their fast start times, these would have greatest use in emergency situations or unplanned shutdowns, where fast energy generation is required to get the platform up and running as quickly as possible. However, with the current fire and explosion risks with lithium-ion batteries due to overheating (detailed in 3.1.2), these can't be implemented onto an offshore setting until the risks are mitigated.

Typically, offshore platforms will use lead-acid batteries or NiCad batteries, depending on the lifespan of the platform. As lead-acid batteries are a lot cheaper, these are typically used for short lifespan platforms as the capacity will decrease over time if overcharged. On the other hand, NiCad batteries maintain their capacity and have a longer lifespan but are expensive when compared to lead-acid batteries[xxv]. An example of battery usage is on Tolmount, where batteries are used in control rooms and navaid systems.

An issue with battery storage is how heavy they are and the amount of space they take up. It's extremely difficult to implement battery storage onto already existing platforms as the excess weight wasn't catered for in the initial plan. This type of energy would be best for a brand-new platform as weight limits and space can be factored in during its creation.

### 8.1.2 Hydrogen storage

A more costly but long-term method of energy storage is through hydrogen. Excess energy can be used in the electrolysis of surrounding seawater to produce hydrogen – which can also be used as a fuel source – and oxygen that can be transported to local hospitals for extra revenue. This hydrogen could be used for vessels or helicopters in the future if research goes into the development of hydrogen-based vehicles, further bringing the offshore platform to net zero.

A downside of hydrogen storage is cost. Although all the vital resources for producing hydrogen are near the platform, it's a very expensive process due to the various conditions and electrolysers required to split the water into oxygen and green hydrogen[xxvi]. Another method is by making blue hydrogen by using natural gas in a process called steam reforming; this also wouldn't be feasible as it would create less energy than just using the natural gas in a MGT.

However, with all of the health and safety regulations stated in 2.1, hydrogen can't be used as a storage system. Unless a hydrogen-diesel mix is used as a fuel source in generators[xxvii], using and storing pure hydrogen isn't feasible.

## 8.2 LOGISTICS

To go onto a platform, there's many logistical decisions that need to be decided before an offshore trip can be finalised. One of the considerations is transportation; as there's no easy way onto the platform, flights and vessels need to be booked ahead of time. For safety reasons, there must always be a standby vessel next to a manned platform (which is explained in 3.1.2). Furthermore, to get onto the platform itself, a helicopter or vessel needs to be acquired, as well as permits from workers for allowance to be on the platform.

# 9.0 CONCLUSION

Overall, there's still a lot of research that needs to go into renewable power before it can be implemented onto all existing platforms. Due to the nature of the offshore platforms, there's still a lot of health and safety risks that need to be mitigated; it's difficult implementing new pieces of equipment or energy sources as there's no easy escape route for if a major accident happens. However, any reduction in emissions is better than nothing as the UK continues heading towards net zero.

For a new offshore platform, wind energy is the most viable solution for a new platform as it pays itself back over time with the less frequent maintenance checks. For an already existing offshore platform, renewable diesel is optimal as there's no extra equipment needed, just a change in fuel source.

Even without immediate implementation, considering renewable sources is vital for the UK's 2050 net zero target. By delaying the increase in average global temperatures, it prevents extreme weather events and rapidly changing environments; this therefore allows animals to adapt to climate change without the threat of extinction. In addition, as heatwaves become increasingly common in recent years, many offshore processes may stop working as intended or new damage mechanisms may arise – this would not only bring financial drawbacks to companies but also threaten the UK's supply and demand of natural gas.

In terms of the internship as a whole, I have learned a lot about the various types of engineering disciplines, and how they come together to manage an asset. Teamwork is an extremely important skill in the industry so seeing it firsthand helped me gain an insight into what I could be working on in the future. If I were to do the project again, I would structure my time better, coming up with questions for each department at the start of the internship instead of coming up with it on the day. I would also focus on implementing renewable energy onto one platform instead of focusing on hypothetical scenarios as I didn't have enough concrete numbers to base my explanations on. All in all, the internship was an enlightening experience and will help me form decisions about my future in engineering.

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## APPENDIX A INTERNSHIP TIMETABLE

| DATE | DEPARTMENT | WHAT I DID | HOW IT LINKED TO THE PROJECT |
|---|---|---|---|
| 03/08/2026 | | Completed mandatory courses | |
| 04/08/2026 | SHEQ | · Looked at major accident awareness and overall health and safety<br>· Introduced to quality control and difference between hazard and risk<br>· Introduced to the project | · Gave me initial start into SHEQ regulations<br>· Started coming up with initial ideas for the project |
| 05/08/2026 | PROCESS | · Introduced to process engineering<br>· Looked at the structure of a typical report | · Helped me understand the steps in getting gas from the reservoir to the terminal<br>· Created an initial template for my report so I could target my research depending on each section |
| 06/08/2026 | PROCESS | · Went into further detail about what process engineers do<br>· Given task to turn P&IDs into PFDs | |
| 07/08/2026 | IT | · Completed a project on improving meeting effectiveness and use of AI | |
| 10/08/2026 | CAD | · Completed workbook on different types of CAD drawings and their uses | |
| 11/08/2026 | PLANNING | · Was shown a cost breakdown for the yearly budget and the plans for offshore trips | · Gave me an idea into what goes into the budget for a project |
| 12/08/2026 | INTEGRITY | · Introduced to integrity engineering and the various types of integrity operating windows (IOWs) | · Learned about risk matrices and risk-based inspections |
| 13/08/2026 | INTEGRITY | · Researched various damage mechanisms | |
| 14/08/2026 | INTEGRITY | · Presented my findings on IOWs | |
| 17/08/2026 | MECHANICAL | · Introduced to mechanical engineering and the types of systems they work on e.g. HVAC / generators | |
| 18/08/2026 | MAINTENANCE | · Introduced to maintenance and how they decide maintenance frequency based on importance | · Helped with the maintenance category of my scoring system |
| 19/08/2026 | ELECTRICAL | · Went through the electrical systems of an entire platform and the navaid systems | · Given load lists for platforms<br>· Given information on how renewable systems run along with the feasibility of each energy source |
| 20/08/2026 | PROJECT MANAGEMENT | · Given an overview into the different phases of a project and completed a proposal for a project | |
| 21/08/2026 | LOGISTICS | · Looked at flight reports and fuel usage for transportation | · Learnt about the transportation required to go offshore |
| 24/08/2026 | PROJECT | | |
| 25/08/2026 | PROJECT | | |
| 26/08/2026 | PROJECT | | |
| 27/08/2026 | PROJECT | | |
| 28/08/2026 | PROJECT | | |

## APPENDIX B SCORING SYSTEM BREAKDOWN

| Types of Energy | Feasibility | Efficiency | Maintenance | Capacity | Limitations |
|---|---|---|---|---|---|
| Wind | Most of the offshore platforms are near an offshore wind farm, meaning that it won't take as much money to transport the energy to the platforms as opposed to getting the energy from onshore | 20%-50% | Every 6-12 months | Up to 1386MW across the world | · Requires a storage method for excess energy<br>· Might not work all year round as it depends on the Uk's demand of energy<br>· Curtailed energy might not be enough to power every surrounding offshore platform<br>· During days with low wind, wind farms will go idle |
| Solar | Solar panels are 30-40mm thick, but the process of getting solar panels on and off can be difficult. Could be better for larger offshore platforms where the helideck doesn't cover the entire top of the platform | 18%-24% | Every 1-2 years | 49.6MW - 840MW across the UK<br>Up to 21000MW across the world | · A large area of solar panels is needed to power a platform so using just the extra space won't be enough to cover all the energy costs and needs<br>· Solar power isn't consistent and the UK in general isn't very sunny |
| Solar-Wind Hybrid | Both types of energy can be unreliable when on their own so reliability will increase when they're used together but they need a form of storage for days where there's neither wind nor sun | 28% (combined solar and wind efficiencies) | Every 6 months - 2 years | N/A | · It depends on how many solar panels can be installed on the platform, would it be enough to produce electricity for the off-peak wind farm hours or is wind power enough to be self-sufficient |
| Renewable Diesel | It depends on how much renewable diesel can be made in an amount of space and resources. As renewable diesel can be used in regular diesel generators, this significantly increases feasibility. | N/A | Every 3-12 months | N/A | · Renewable diesel isn't completely free of emissions<br>· There may not be enough animal fats and ethanol to sustain multiple offshore platforms, but the idea could be used for platforms that only require energy to get started before becoming self-sufficient<br>· Would need PSVs to transport the fuel offshore as it's flammable |
| Geothermal | Could work as a heat source instead of having to install dozens of fuel gas heaters because weather conditions are becoming more extreme | Use Coefficient of Performance | Every year | 1MW – 1590MW across the world | · Southern North Sea platforms are typically 40m above seabed whereas geothermal needs to be pumped from at least 100m below sea level |
| Wave | In theory, it's quite feasible as it's simple to install WECs onto the surrounding area of the platform and use that for the platform itself. | Depending on WEC | Depending on WEC | 0.02MW - 3MW across the world | · Wave power hasn't been researched as much as wind or solar<br>· High initial build costs<br>· Very unreliable |
| Battery Storage | It would work if there's enough space to have a battery room and if the platform can handle the excess weight | Lead acid: 65%-80% | Every month | 10MW - 300MW across the UK<br>Up to 700MW across the world | · Batteries are heavy<br>· Needs its own room with AC to prevent overheating |