

Powering an Offshore Platform using Renewable Energy

Presentation ties in with report

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Project Brief

“To research, design, and evaluate renewable energy solutions for powering an offshore platform, using engineering analysis and structured comparison to identify the most suitable option”

Objectives

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

Why switch to renewables?

- Paris Agreement
- UK's 2050 net zero target
- UK's current energy mix

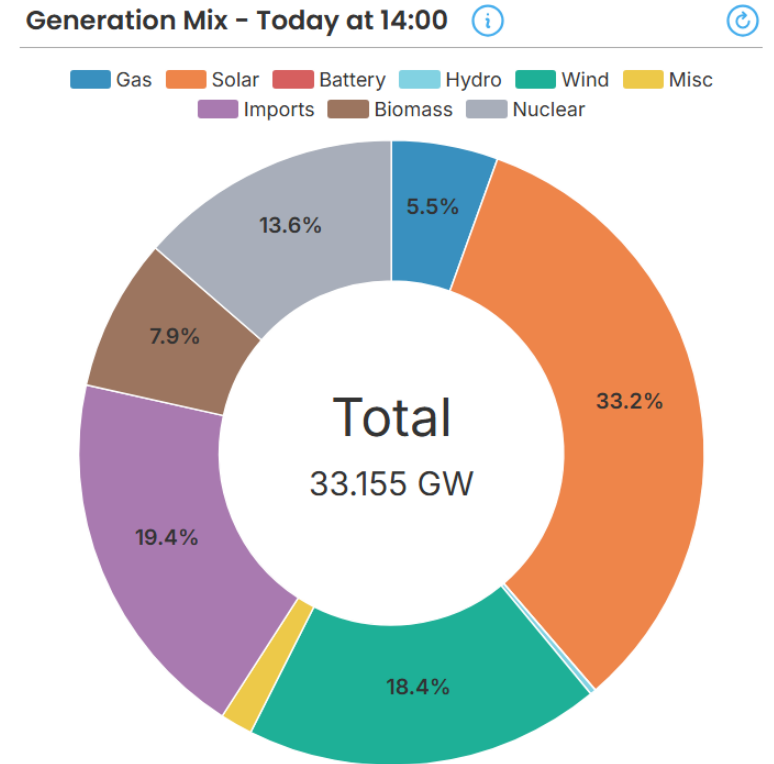


FIGURE FROM ENERGY DASHBOARD

Planning

TASKS	DAYS	WEEK 1					WEEK 2					WEEK 3					WEEK 4				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Initial mindmap of what to include																					
Research types of energy																					
Research current power consumption																					
Create first draft of report																					
Finish drafts and details of report																					
Create presentation																					
Evaluate and reflect on the project																					
Time for if it takes longer than predicted																					
Time in which I want to complete task																					

SEE APPENDIX A IN REPORT FOR INTERNSHIP TIMETABLE

Scoring System

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

SEE APPENDIX B IN REPORT FOR SCORING SYSTEM BREAKDOWN

Current power generation methods

DIESEL GENERATORS

- Main source of energy generation
- Reliable
- Fast start up time
- Frequent maintenance checks

MICRO GAS TURBINES

- Typically used on larger platforms
- Require an energy source to start
- Self-sufficient

SHEQ Regulations

- Health and Safety at Work Act (1974)
- Pipelines Safety Regulations (1996)
- Prevention of Fire and Explosion, and Emergency Response on Offshore Installations (1995)
- Conservation of Offshore Marine Habitats and Species Regulations (2017)

People

Environment

Assets

Reputation

REJECTED : Wave Power

- Form of hydroelectric power generation
- Different to tidal power

ISSUES:

- Very unreliable
- Technology is in early stages

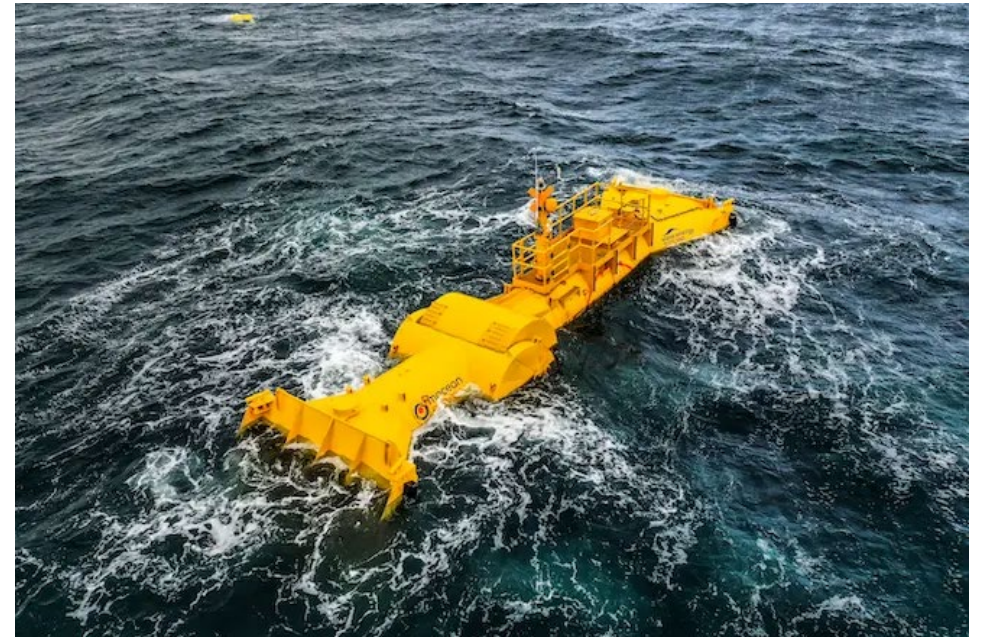


IMAGE OF WAVE ENERGY CONVERTER (WEC)

REJECTED : Solar Power

- Solar panels need to face south
- Consume lots of space
- Can't block equipment that requires maintenance
- **ALTERNATIVE** Can be used for navaid systems

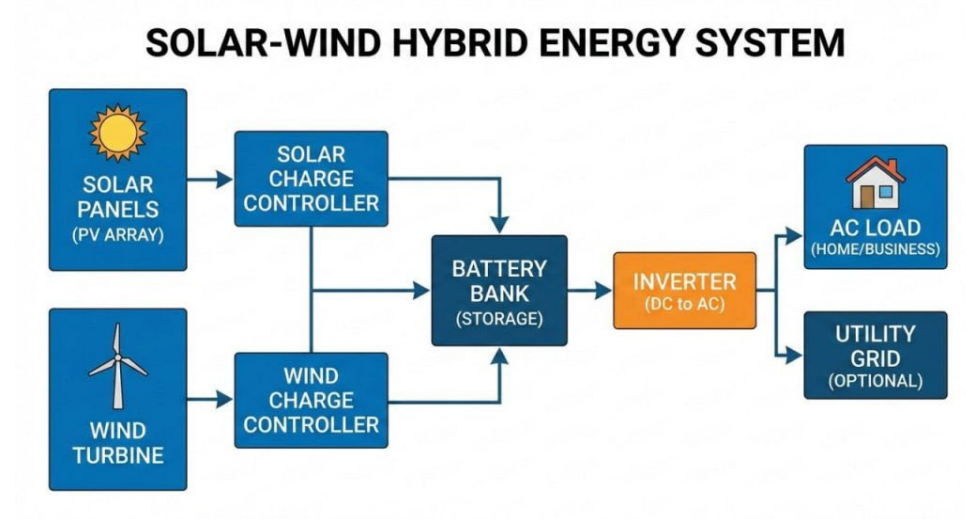


NEW PLATFORM : Curtailed Wind Power

- Take energy from wind farms to power offshore platforms
- Requires subsea cables and transformers
- Can be unreliable
- **ALTERNATIVE** place wind turbines directly on the platform

NEW PLATFORM : SolarWind Hybrid

- Use both curtailed wind energy and solar panels
- Increased reliability
- Requires a storage system for excess energy



NEW PLATFORM: Battery Storage

NiCad Batteries	Lead-Acid Batteries
Expensive	Cheap
Higher Energy Density	Lower Energy Density
Longer Lifespan	Shorter Lifespan
Capacity remains the same	Capacity decreases over time

ISSUES:

- Weight of batteries
- Space for a battery room
- Chance of overheating

EXISTING PLATFORM : Renewable Diesel

- Renewable diesel isn't the same as biodiesel
- Similar specifications to regular diesel
- Can be used as a start up source for the micro gas turbines
- Produces 60%-80% less emissions than regular diesel

EXISTING PLATFORM : Geothermal

- Used instead of fuel gas heaters
- Best use in northern North Sea platforms
- Main issues come from cost
- Difficult to complete maintenance

Recommendations & Conclusion

- Research needs to go into making renewables safe for use in offshore settings
- Wind energy is the best for a new platform
- Renewable diesel is the best for an existing platform

Thank you :)