

## Design and Analysis of Intelligent HES Mental Health Treatment Ship

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### ABSTRACT

*Mental health is a very important issue for many reasons. Unfortunately, developing countries hardly place much importance on it. People living among us—1 in 5 people—have a mental health issue. But very little importance is given to it. As a result, small problems later create big crises. Residents living far from cities are further behind in these mental health treatments. This research aims to ensure this basic mental health treatment is available to people living in remote areas. Work is being done here for them, where it is not easy to come to the hospital. Unfortunately, not all cities have qualified doctors to treat mental problems. The result is suffering. Post-Covid-19, this problem has become even bigger. This research project is being worked on to give them the minimum treatment. This ship goes to the river's wide area. People there are examined for mental issues and given appropriate treatment. A special ship has been built for this purpose. Keeping in mind the global energy crisis, the facilities of this ship have been provided with sunlight. The ship will have all the necessary medical facilities run by solar energy instead of fuel. Here is a detailed analysis of the operations of this project.*

*Keywords: Mental health; intelligent system; HES System; Treatment Ship; intelligent boat*

### INTRODUCTION

Mental health refers to a person's emotional, psychological, and social well-being. It encompasses how individuals think, feel, and behave, as well as their ability to cope with everyday stressors, handle relationships, and make decisions. Good mental health allows individuals to realize their full potential, cope with life's challenges, and contribute positively to their communities. Mental health is important at all stages of life, from childhood and adolescence through adulthood. It is influenced by various factors, including biological, genetic, and environmental factors, and can be affected by mental disorders or conditions such as anxiety, depression, or schizophrenia (Shoib et al. 2022). Taking care of mental health involves seeking support, practicing self-care, maintaining healthy relationships, and accessing appropriate treatment if needed. Mental health treatment refers to the interventions and therapies aimed at improving a person's mental well-

being and managing mental health conditions or challenges. It's important to note that mental health treatment should be personalized, and the specific approach will depend on the individual's diagnosis, symptoms, and preferences (Chaaya et al. 2022).

Seeking help from qualified mental health professionals is crucial for an accurate assessment and appropriate treatment plan. Signal of neuron of a patient is collected and analyzed (Figure 1) to diagnosis the disease. Psychiatric medications, prescribed by a qualified healthcare professional, can help manage symptoms of mental health disorders (Hasan et al. 2024). These medications may include antidepressants, anti-anxiety drugs, mood stabilizers, or antipsychotics. Supportive interventions mean support groups, peer counseling, and self-help techniques can provide individuals with a supportive network and coping strategies (Ali et al. 2024). Lifestyle changes refers adopting healthy habits such as regular exercise, balanced nutrition, sufficient sleep, stress management techniques, and avoiding substance abuse can

contribute to better mental health. Alternative therapies mean complementary approaches like mindfulness, meditation, yoga, art therapy, or music therapy can be used

alongside traditional treatments to promote relaxation, self-expression, and emotional well-being.

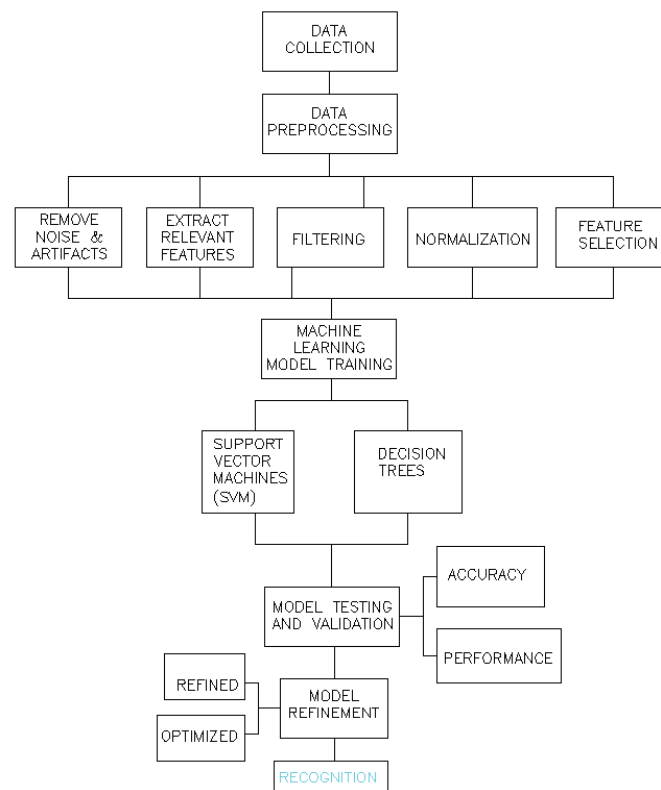


FIGURE 1. Signal recognition from neuron

### IMPORTANT OF MENTAL HEALTH AFTER COVID-19

The importance of mental health is heightened after COVID-19 as a result of the profound impact the pandemic has had on individuals' psychological well-being and the imperative need for prioritizing emotional resilience and recovery (Hasan et al. 2022). After the COVID-19 pandemic, the world witnessed unprecedented levels of stress, fear, grief, and uncertainty (Jalal et al. 2023). The prolonged periods of isolation, social distancing measures, economic disruptions, and the overwhelming loss of lives have taken a toll on the mental health of individuals globally (Jamaludin et al. 2022). Consequently, recognizing the significance of mental health in the aftermath of the pandemic is paramount for fostering healing, restoring stability, and rebuilding communities (Imran et al. 2024). One reason mental health assumes increased importance is the widespread prevalence of psychological distress experienced by individuals. Many people have faced symptoms of anxiety, depression, post-traumatic stress disorder (PTSD), and other mental health conditions in the

wake of the pandemic (Jamaludin et al. 2020). Addressing these challenges requires creating a supportive environment that acknowledges the impact of COVID-19 on mental well-being and promotes access to appropriate resources and care (Chekole et al. 2021). Moreover, the recognition of mental health's importance after COVID-19 stems from its interconnectedness with overall well-being. Mental health influences physical health, immune function, and the ability to cope with other health conditions (Ahmed et al. 2022). Neglecting mental health concerns can have long-lasting effects on individuals' overall quality of life, hindering their capacity to reintegrate into daily activities, work, and social interactions effectively. Furthermore, the pandemic has shed light on the need for community-wide resilience and support systems.

Recognizing the significance of mental health creates opportunities to build and strengthen these systems, ensuring that individuals have access to the necessary resources, including counseling services, helplines, and support groups (Aroyewun et al. 2022). It enables communities to foster culture of understanding, empathy, and collective healing, thereby facilitating the recovery

process. Another critical aspect of mental health's importance after COVID-19 lies in its impact on vulnerable populations. The pandemic has disproportionately affected marginalized communities, including frontline workers, healthcare professionals, essential workers, individuals with pre-existing mental health conditions, and those experiencing socioeconomic disadvantages. Prioritizing mental health provides an avenue for addressing these disparities, promoting equity, and ensuring that everyone has access to the support they need to heal and rebuild their lives.

## DESIGN STRATEGY OF THE TREATMENT SHIP

There are several aspects to consider when designing a ship for treatment. First of all, it is necessary to confirm what kind of facilities should be kept in the ship (Arshad et al. 2022). First of all, it is not known what kind of therapy is given in the ship. There are some compartments in the ship to ensure all facility of the treatment (Muffih et al. 2021). Depending on functionality, some electrical load is required here. Details is mentioned below in Table 1 and Table 2.

TABLE 1. Basic compartments and their required load

COMPARTMENT		LOADS
1	Registration	A. LIGHT: 2X10watt= 20watt B. FAN: 2X12watt= 24watt C. PC: 1X65watt= 65watt
2	Emotion Testing Lab	A. LIGHT: 2X5watt= 10watt B. FAN: 2X12watt= 24watt C. PC: 1X65watt= 65watt
3	Counseling Room-1	A. LIGHT: 2X5watt= 10watt B. FAN: 2X12watt= 24watt
4	Counseling Room-2	A. LIGHT: 2X5watt= 10watt B. FAN: 2X12watt= 24watt
5	Counseling Room-3	A. LIGHT: 2X5watt= 10watt B. FAN: 2X12watt= 24watt
6	Seminar Room	A. LIGHT: 6X5watt= 30watt B. FAN: 6X12watt= 72watt
Total watt=		412 watt

TABLE 2. Types of mental issue

SL	Types	Description
1	Behaviour therapy	an umbrella term for types of therapy that treat mental health disorders
2	Psychoanalysis & psychodynamic therapies	draws on theories and practices of analytical psychology and psychoanalysis
3	Cognitive therapy	a talking therapy that can help you manage your problems by changing the way you think and behave
4	Humanistic therapy	focuses on free will, human potential, and self-discovery
5	Holistic therapy	a type of therapy that address the "whole" person

### DETAILS CALCULATION OF THE SYSTEM IF THE SHIP

Calculation is most important think while designing a treatment ship (Mujungu et al. 2022). Here details calculation has been shown.

### POWER CONSUMPTION

A motor Load -4,000W = 4kw = 6HP  
 Lighting Load – 416W = 0.416kW  
 Other Load – 1000W= 1kW  
 Total Power consumption = 5416W =5.416kW  
 Working Hour of Ship 6 Hrs / Day  
 Energy Required for Ship= Power x Hrs/day  
 = 5.416kW x 6Hrs/Day  
 = 32.49 kWh / Day

INVERTER SIZE CALCULATION

In general Losses = 20% = 0.2  
 Here, inverter Loss = 32.49\*0.2 = 6.49 kWh / Day  
 Input to Inverter = 6.49 + 32.49  
 = 38.98 kWh / Day  
 Inverter Sizing = Total Load Power = 5.416 kW  
 Inverter = 6 kw 6 kVA Selected  
 Battery Output = Inverter Input  
 Input To Inverter = 6.49 + 32.49 = 38.98 kWh / Day

DEPTH OF DISCHARGE (DOD)

Battery Specifications:  
 12v, 240Ah  
 DOD = 0.5 for —Lead Acid  
 DOD = 0.9 for —Li-ion  
 Battery Storage = 38.98 / 0.5 = 77.96 kWh/Day  
 Battery Storage = 38.98/ 0.9 = 43.31kWh/Day  
 Li-ion Battery is selected for Marine Applications.  
 No. of Batteries Required = Battery Storage / 2.4 = 43.311 / 2.4 = 18.04  
 No. of Batteries Required 18  
 For One Day Storage 18 batteries are required  
 Assume Battery Losses -15%  
 Input To Battery = 38.98 x 0.15 +38.98  
 =44.827 kWh/Day

MISCELLANEOUS SIZING

General Losses in Electrical Circuits – 4%  
 Losses Electrical Circuits = 44.827 \*0.04 = 0.179 kWh/Day

PANEL SIZING

Panel Output = 44.827 + 0.179 = 45.006 kWh/Day  
 General Panel Losses – 25% (Dust & Temperature)  
 Losses in Panel = 45.006 \*0.25 = 11.25 kWh/Day  
 Energy Generated by Solar Panel = 45.006 + 11.25 = 56.25  
 ~ 27.17 kWh/Day  
 Project location Solar Radiation = kWh/ / Day = 5.5 kWh/m2 /  
 Day Power of Solar Panel = 27.17 / 5.5 = 4.94 kw 5 kW  
 Here, 250W Panel –Standard from Market was selected  
 No. of Panels = Power of Solar Panel / 250  
 i.e. 5,000/250 = 20

DESIGN DETAILS

Such a ship’s design is very compact. With limited space, all facilities must incorporate (Kumar & Shivashankar, 2022). So the design strategy is very technical for such a kind of water vehicle with medical facilities. The necessary compartments of this ship are shown in Table 3, and the design has been shown here (Figure 2).

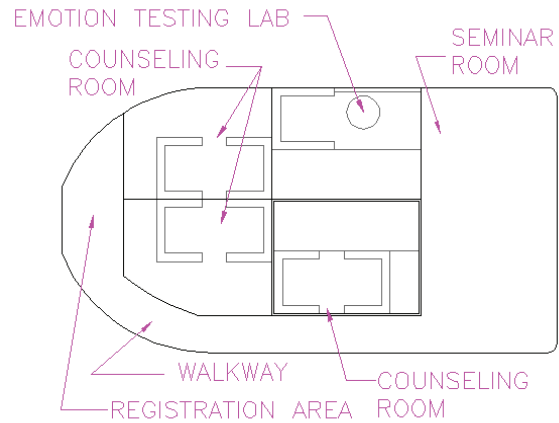


FIGURE 2. Design of hybrid energy system mental health treatment ship

This is the representation of mental health treatment ship. The best way to make ship improved performance is to keep size of the ship compact (Hao et al. 2022). Here the maximum facility incorporated in minimum space (MFIMS). This is the strategy that has been used here.

COMPARISON WITH RECENT RELEVANT RESEARCH

Due to the use of some idiosyncratic features in this ship, there is a significant improvement in ship performance compared to a recently developed system (Praveenkumar et al. 2022). A clear comparison has been shown in this section.

TABLE 3. Compartments of recently developed water vehicle system

Method	Systems Efficiency	Distance per hour
T. Daniel (2018)	90.00%	9 knots
W. Swe (2019)	90.00%	9 knots
A. Roy (2020)	90.30%	14 knots
Mehedi (2021)	90.50%	14 knots
K. Sornek (2022)	90.50%	18 knots
Proposed (2023)	91.00%	19 knots

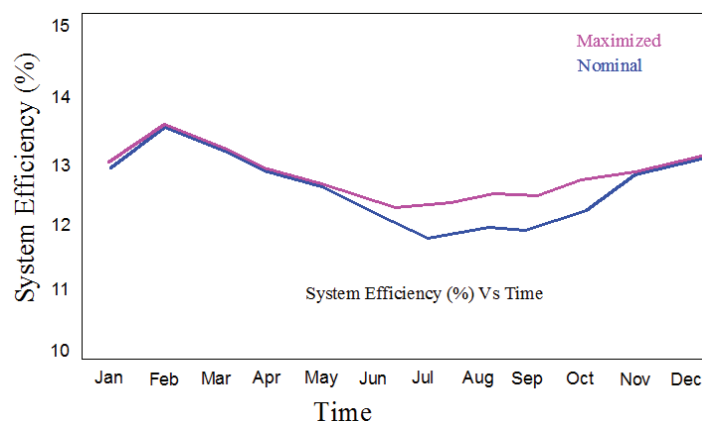


FIGURE 3. Improvement of system efficiency

As some distinct improvements are made, the efficiency of the ship increases, and this improvement can be tracked using an efficiency graph (Figure 3). The efficiency graph improvement help identify which improvements have had the greatest impact on the overall efficiency of the system (Goh et al. 2022). So, an efficiency graph improvement of a ship system is a valuable tool for monitoring and improving the performance of the system, ensuring that it is operating as efficiently and effectively as possible. By tracking the efficiency of the system over

time and implementing strategies for improvement, system owners and operators can maximize the energy production and financial returns of their solar system.

The graph displays the energy output of the system on the vertical axis, with time on the horizontal axis. The energy output of a solar system can vary based on several factors, such as the quality and efficiency of the solar panels, the amount of sunlight that is available, and the orientation and tilt of the panels. Here pink color line is improved than recently developed system (blue clor).

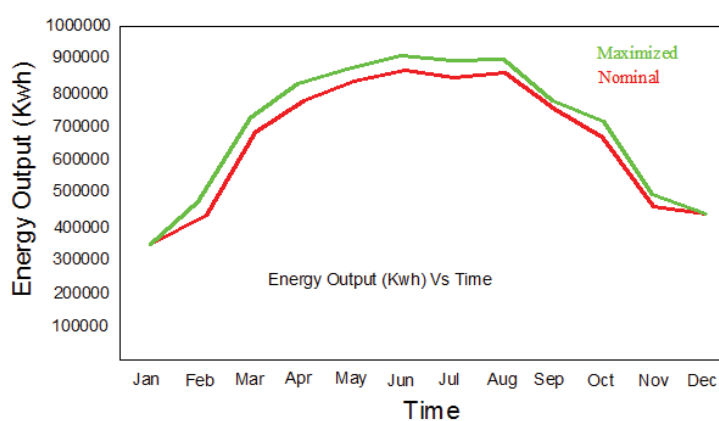


FIGURE 4. Improvement of energy output of the system

A well-performing solar system produce a consistent amount of energy over time, while a poorly performing system will show fluctuations or sudden drops in energy output (Gao et al. 2022). An energy output graph (Figure 4) improvement of a solar system helps to identify areas

for improvement and optimization of the system's performance. The green line is improved system over red color line (recent development). This graph can help to identify any issues or inefficiencies that may be affecting the system's performance, such as shading, dirt or debris on the solar panels, or malfunctioning components.

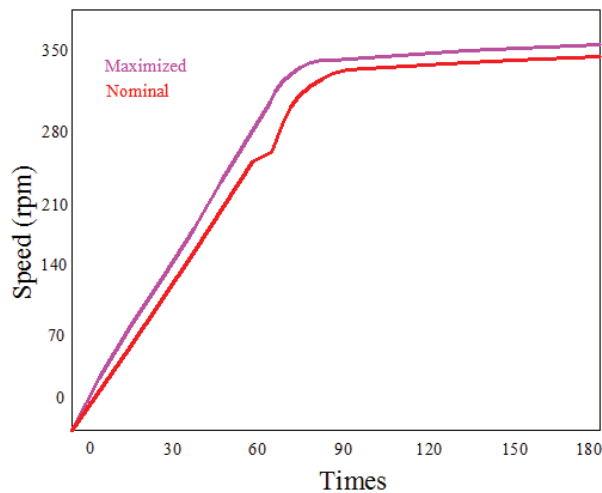


FIGURE 5. Evaluation of using intelligent unit to this system

Figure 5 displays the speed of the motor on the vertical axis in units of revolutions per minute (RPM) or meters per second (m/s), with time on the horizontal axis in units of seconds, minutes, or hours. Improvements to a solar electric motor system include the use of artificial intelligence, adjustments to the solar panels, motor components, and wiring, as well as changes to the load on the motor. These improvements result in changes in the speed of the motor over time (Huang et al. 2022). The speed vs time improvement graph helps to identify the impact of specific improvements on the performance of the motor. For example, if an improvement is made to the solar panels, the graph may show an increase in motor speed at the time the improvement is made. Similarly, if an improvement is

made to the motor components or wiring, the graph may show a more consistent speed over time with fewer fluctuations. In addition to tracking the changes in motor speed over time, it can be helpful to also track other performance metrics, such as power output or torque, and to compare these metrics to the expected values based on the solar panel specifications and load on the motor.

### STATUS OF THE SERVICE

The number of patient is important to evaluate the developed system.

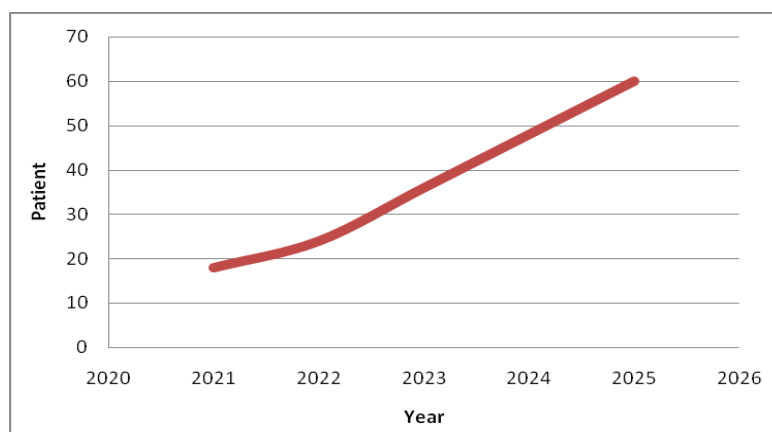


FIGURE 6. Number of patients and future forecast

Status (Figure 6) of patients who are getting support from this ship. Data from 2023 to 2025 is forecasted value and number is very satisfactory. This analysis clearly reflects these number of patients are getting treatment from

this ship. Due to many reasons poor people cant even travel to nearest health complex. This ship is solution of this group of people. Number of patients also represented here. Now it was possible to bring more people under the facility of treatment.

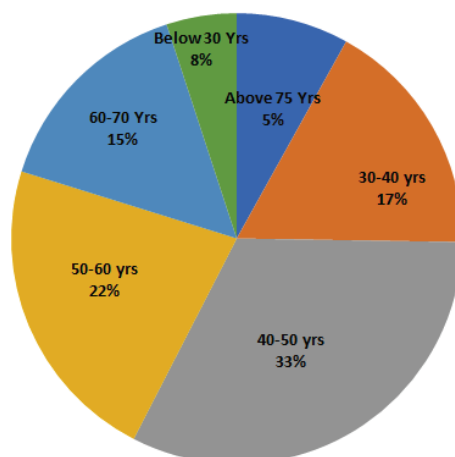


FIGURE 7. Age of patients in the ship

The service of this ship is open to all. Analysis of database of patients reflects the ration of patient is more middle age people (Figure 7). With this analysis more effective strategies can be made. A strong follow-up system

should be introduced shortly. In this research location there are many complexities for middle age groups. But lack of money and some other limitations sometimes they cannot reach hospital.

## RESULT

### AVERAGE POWER OUTPUT FIX ANGLE PV SYSTEM

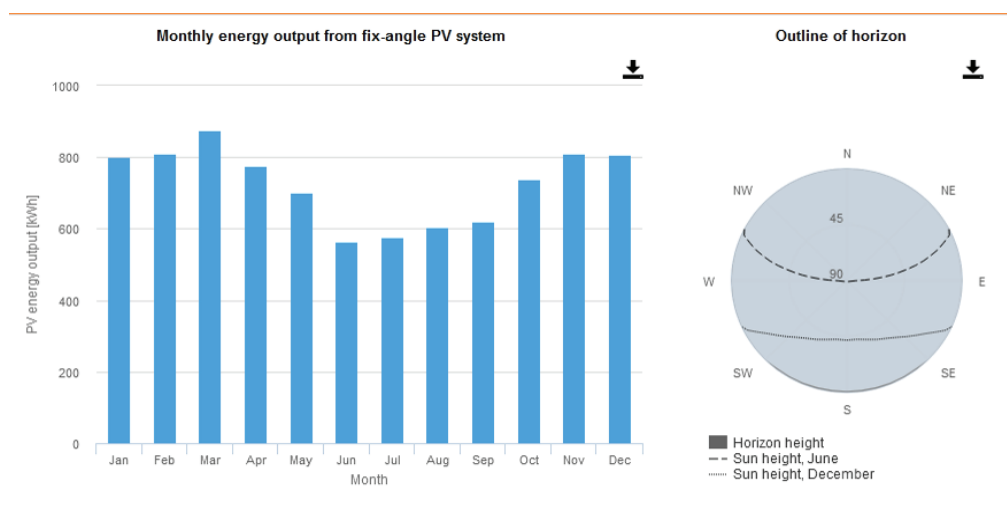


FIGURE 8. Summary of the energy simulation

The average power output (Figure 8) of a fixed-angle PV system depends on a number of factors, including the location of the system, the size and type of the solar panels used, and the angle and orientation of the panels (Mohammadi et al. 2022). In general, a fixed-angle PV system will produce the highest power output when the angle of the solar panels is optimized for the latitude of the

location (Vaithilingam et al. 2022). For example, in locations near the equator, where the sun is high in the sky throughout the year, a relatively shallow angle (around 10-15 degrees) may be optimal. In locations further from the equator, where the sun is lower in the sky during the winter months, a steeper angle (around 30-40 degrees) may be optimal.

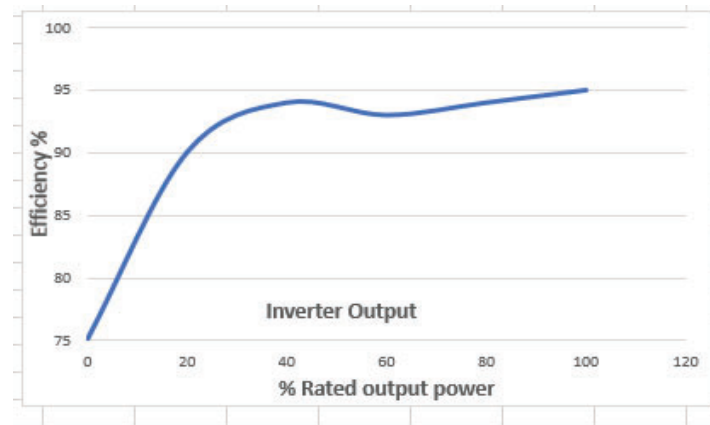


FIGURE 9. Performance of the inverter

The solar inverter output curve efficiency vs output power is a graph (Figure 9) that shows the relationship between the efficiency of a solar inverter and the output power it produces (Modgil et al. 2022). This curve is an important tool for understanding the performance of a solar

inverter, as it can help identify the point at which the inverter produces the highest efficiency and power output. Research on the solar inverter output curve efficiency vs output power has focused on a number of different areas. It focuses the improvement of the system.

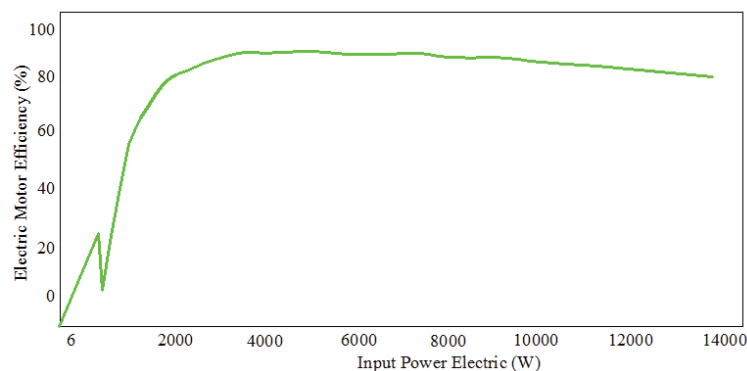


FIGURE 10. Performance of motor and power response

The power vs motor efficiency graph (Figure 10) shows the relationship between the power output of an electric motor and its efficiency (Al Radi & Ghenai, 2023). Electric motors are used in a wide variety of applications, from powering industrial machinery to driving household appliances. Understanding the relationship between power and efficiency is important for selecting the right motor for a specific application. For this research this is sailing electric ship.

## CONCLUSION

Mental health is a very important issue nowadays. Especially after COVID-19, this problem appeared in many people. Unfortunately, the truth is that in remote areas,

there are no doctors who can provide counseling for mental health problems. So many people in the village were staying away from this medical service. The research presented in this paper is quite useful. This ship goes to remote areas surrounded by rivers. Emotional testing, counseling, and treatment are provided to solve mental problems.

On the one hand, as the number of patients increases, the performance of the ship has improved compared to the others. The research is very worthwhile in both aspects. Here is a great comparison between recently developed water vessels: This paper shows a nice contrast between recent research ships and this ship. The ship on which this service is being provided has also been significantly improved. It is at the forefront of recent ship research. The functionality of the ship has been improved. It has also been proven with many graphs. The floor plan of the ship



is given in detail. Its efficient design allowed the ship to be much smaller, making it far superior to nearby research vessels. Future people working on this important issue will greatly benefit from the information in this paper.

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## DECLARATION OF COMPETING INTEREST

None.

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