

# “The Hybrid Boat System”

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**Abstract**— The research works says that the impacts of facts devices changes with the change of their location on transmission line. Basically in power system we have two types of compensation devices. First is series facts devices, second is shunt facts devices by using these devices controlling of transmission line voltage and power flow is possible. Facts devices are also very useful to control the reactance power of transmission line and damping of power system oscillation for high power is possible. Series facts devices are connected in series of transmission line and works as a controllable voltage source. Shunt facts devices are connected in shunt with power system line.it works as a controllable current source. During the SLG fault,shunt capacitance of SSSC-compensated line affects the performance of distance relay. Research also shows the impact of ignoring the shunt capacitance of the line on the distance relay over and under reach conditions. By using MATLAB we can study the effects of series and shunt compensation according to the variation of location of these in transmission line. We can find the most suitable and optimal location of series, shunt or the combination of both compensation

**Index Terms**—SLG, Capacitance SSSC, oscilation.

## I. INTRODUCTION

Hybrid boats are electrical boats, with independent, quiet and clean engines, whose batteries store free energy from the sun and wind energy.

On the seas and inland waters as well as along their banks there are only a few connections to public electricity mains. People who live on inland waterway crafts, sailing boats, space stations and houseboats, are dependent on batteries, just as the owners of electrically propelled boats. But batteries sometimes discharge and must be replenished. One of the most elegant solutions for this is solar electricity. Solar modules on a ship can charge the batteries on the spot - cleanly and efficiently with free energy from the sun. Solar & wind electricity plants are reliable and durable. There are ever more areas of application for solar and wind electricity, due to lowering prices and improving technologies. Right now we have Photovoltaic modules which are setin the roof of the ship (see picture below).



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## II. CONCEPT AND TECHNOLOGY OF FACTS:-

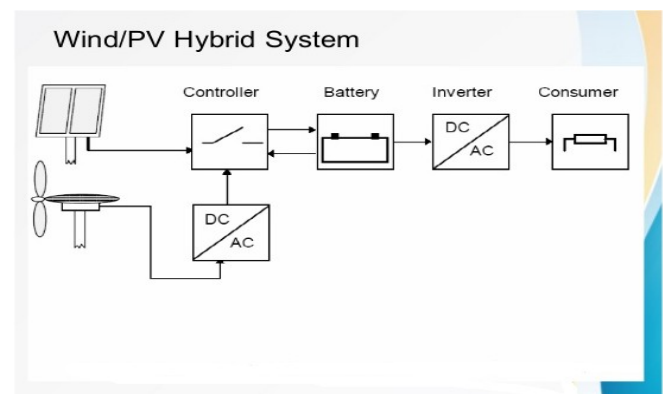
### HYBRID SYSTEM:-

History shows that e-boats are nothing new, but hybrid drive systems are an interesting development. Onboard solar generators allow independence from the plug socket. Solar plants produce a safe, self-sufficient source of energy. Emission-free drive systems not only of protect the environment, but they increase the quality of the boating experience - for example, in protected areas it is possible to approach water birds very closely.

E-drives are very efficient. The torque exists over the entire speed range, so that large propeller diameters can be driven slowly. Thus, shaking, rattling and the stench of fuel are eliminated, so that one can breathe deeply, enjoy conversation and experience more pleasure in the ride. The beautiful animal world is hardly disturbed and can be observed from a short distance.

Solar energy can be harnessed for the unrestricted travel of larger sail yachts if an vegetable oil generator is used. For port maneuvers etc. the batteries, loaded by solar energy, are sufficient

### Block Diagram: \_



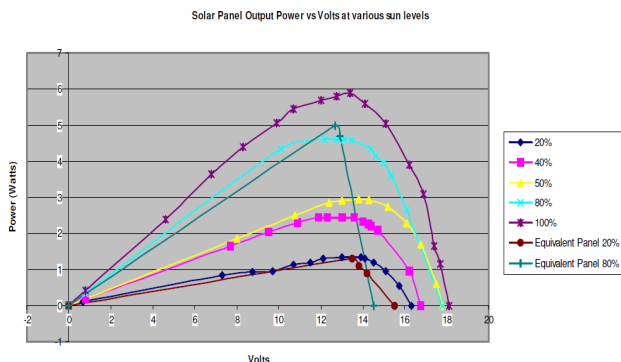
### Construction:-

- The hybrid boat requires the following components:
  - solar panel
  - Motor
  - Battery
  - A propeller
  - Generator
  - Hull (frame)

### SOLAR PANNEL:-

- ❖ A solar panel is a packaged, connected assembly of photo Voltaic cells.
- ❖ Solar panels use light from the sun to generate electricity through photovoltaic effect.
- ✓ The graph shows the solar panel output power vs. volts at various sun levels

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### MOTOR:-

- The motor used in solar boat is essentially driven by magnetic attraction and repulsion between the permanent magnets in the motor stator and the rotor which is an electromagnet powered by solar and wind energy.
- ✓ The motor RPM varies directly with voltage.
- ✓ Torque varies directly with current.

Matching the motor load to the available power output is critical for best performance.



### HULL:-

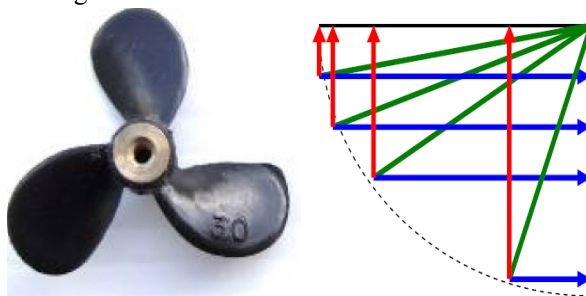
- Hull is the watertight body of ship or boat.
- The line where the hull meets water surface is called waterline.
- The structure of hull varies depending on vessel type. The basic considerations are:
  - Must float and requires to carry motor and solar cells.
  - Must be constructed from water resistant materials.
  - Must be stable .



### PROPELLER:-

- A propeller is a type of fan that transmits power by converting rotational motion into thrust.
- A conventional water propeller is the most commonly used type of propeller.
- The propeller must transfer all the power to the water to drive the boat.
- Keep the shaft angle low to maximize forward thrust component and minimize the vertical thrust component.

- ✓ The figure shows the variation of thrust with shaft angle.



### COUPLING:

- Connecting the motor to the propeller is essential if the boat is to function.
- This area has the potential for high power loss if not done properly.
- ✓ Figure shows motor and propeller mounted in holder.



Motor and propeller mounted in holder.

### ADVANTAGE:-

- Save the fuel
- Hybrid power boat
- Clean and efficient
- Virtually no environmental impact
- Produce no atmospheric emission
- Produce no green house gases that are harmful to the earth<sup>5</sup>. producing no atmospheric emissions or greenhouse gases that are harmful to the earth.

### DISADVANTAGE:-

The output will depend on the site's solar and wind resources

Prices of hybrid system are higher than simple system will depend on the site's solar and wind resources.

### REFERANCE

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