Solar Powered Hydraulic Bridge

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Abstract- *Generation of electricity will be takes place at affordable cost. This paper deals with the generation of electricity by using two sources combine which leads to generate electricity with affordable cost without damaging the nature balance. Index terms-electricity, hybrid, solar, power, wind. In our thesis A survey study of renewable resources for tunnels' we have tried to find out which resources are selected for generation of electricity in today's scenario. Parallel with this work, analyses of wave and currents have been performed for the fjord crossings. The results from this work indicate low levels and inaccessible amounts of energy potentials. Some of the fjords may have current velocities up to 12 m/s, but the mean value is expected to significantly lower than 1 m/s. The feasibility study conclusions show there are few synergies and added value with wind and solar energy conversion technologies along E39 fjord crossings. There are different levels of synergies depending on where the technologies are integrated, e.g. in the immediate surroundings of the bridge, but not directly on the construction, in connection with the bearing constructions and on the bridge span*

Keywords- Solar, Electricity, Construction, Bridge

I. INTRODUCTION

A bridge which permits entry of the watercrafts or freight boats is normally known as the movable bridge. At the point when development depends on the water driven frameworks then it is classified as Hydraulic Bridge. For building a model. regularly utilized pressure driven gear are syringes. As the bridge is over and again opened and shut, fatigue failure is the most concerning factor than failure under steady load. Additionally, the framework is more complex because we cannot provide any footing (other than the pylon support) in order to permit watercrafts/boats to pass

The purpose of HDS 7. Hydraulic Design of Safe Bridges, is to provides technical information and guidance on the hydraulic design of bridges HDS 7 replaces the HDS I manual "Hydraulics of Bridge Waterways" (FHWA 1978) for guidance of bridge hydraulic analyses. Bridges should be designed as safely as possible while optimizing costs and limiting impacts to property and the environment. Many significant aspects of bridge hydraulic design are discussed. These include regulatory topics, specific approaches for bridge hydraulic modelling, hydraulic model selection. bridge design impacts on scour and stream instability, and sediment transport.

The impacts of bridge design and construction on the economics of highway design, safety to the traveling public, and the natural environment can be significant. An economically viable and safe bridge is one that is properly sized, designed, constructed, and maintained. In general, although longer bridges are more expensive to design and build than shorter bridges, they cause less backwater, experience less scour, and can reduce impacts to the environment. Increased scour from too short a bridge can require deeper foundations and necessitate countermeasures to resist these effects. A properly designed bridge is one that balances the cost of the bridge with concerns of safety to the traveling public, impacts to the environment, and regulatory requirements to not cause harm to those that live or work in the floodplain upstream and downstream of the bridge. 2.1 Solar.

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged, connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 365 Watts (W). The efficiency of a module determines the area of a module given the same rated output- an 8% efficient 230 W module will have twice the area of a 16% efficient 230 W module. There are a few commercially available solar modules that exceed efficiency of 24%.

II. STATE OF DEVELOPMENT

Prof. S. K. Mr. Ajinkya Patil At present, the solar tracking system use electrical energy for tracking operations and this electrical energy for operations is supplied by same solar panels or by external electrical storage or supply lines, this reduces efficiency of the solar panels. Using mechanical energy for tracking will increase the output of solar panels and remove the constraint on the location of the tracking system Available solar energy is often expressed in units of energy per time per unit area, such as watts per square meter (W/m2). The amount of energy available from the sun outside the earth's atmosphere is approximately 1367 W/m2. 'Some of the solar energy is absorbed as it passes through the Earth's atmosphere. As a result, on a clear day the amount of solar energy available at the Earth's surface in the direction of the sun is typically 1000 W/m2. The level of solar radiation a region receives depends on latitude and local weather conditions.

Shubham Kadam P The basic problem associated with conversion of solar energy into useful form is that the solar modules used are stationary so during the morning and evening hours the sun rays falls at an angle upon the module. This decreases the efficiency of system. Thus, the conversion efficiency of solar panel to charge the batteries in solar farm is not up to the mark. There are many problems associated with conventional solar panel because they are fixed in one direction. The positions of the sun keep on changing every day, along with the sun, solar panel have to move in same direction. The other system also used for solar tracking but they consume most of the energy produced by solar panels for tracking, which effects the efficiency of solar panel.

Ham Abu P This paper focuses on discussing a hydro-pneumatic hybrid (Gas/Oil), passive technique for sun tracking and orientation of solar panels, collectors and food dryers. The technique depends on utilizing the natural expansion of gases caused by temperature increase. The pressure produced by gas expansion causes a force exerted on hydraulic oil contained in the same vessel with the gas and separated from it by a diaphragm. Hydraulic fluid is used here for the stroke control because of its advantage over gas in terms of incomparability and controllability. The exerted force caused a 50 mm displacement of the actuator which can be improved by decreasing the bore diameter of the piston and by using gases with higher expansion coefficient.

III. METHOD

The bridge members are divided into 2 major categories: the superstructure and the substructure. Superstructure The superstructure is the upper portion of the bridge above the beam seats where you drive or walk. Its members include:

[1] Light weight Beams
[2] Light weight steel, Bearings
[3] Curbs
[4] Deck
[5] Deck wearing surface
[6] Floor beams, Piles
[7] Girders, Truss
[8] Parapets
[9] Bubble duck slab
[10] Piers.

Solar Panel Members

[1] Panels, Wiring
[2] Inverters, Batteries
[3] Monitoring, Charge controller

IV. RESULTS AND DISCUSSION

Solar energy production today is done mainly i in two ways; i heaters or Solar cells (photovoltaic PV, electricity). Freely hanging bridges have large areas without a lot of shadow and is well suited for solar collectors for thermal energy production or solar panels for electricity generation. This is the case for suspension bridges and floating bridges which have large available areas. The climate in Norway is not well suited for solar energy, because of little direct sunlight, but there is still much indirect diffuse sunlight that might lead to some production, especially for thermal solar collectors.

Norway can easily be done with available software. In Norway the radiation is approximately 1000 kWh/m2 in total during a year. The levels are about 150 kWh/m2 during the summer, but almost zero in December and January. In contrast, Spain has double the radiation annually and varies from around 100 to 200 kWh/m2 on a monthly basis.

A. Attachment of Solar Panel to Hydraulic

Different solar panels have different system efficiency and thus the amount of electricity produced per area. The area can typically range from ca. 5-10 m2 per kept.If a bridge includes 200 m2 of PV panels with I kept per 10 m2 (20 kept power), an energy production of 10.000 15.000 Khel each year should be expected. A bridge might include up to 1000 m2 of PV panels and the energy production in this case will be close to 75.000 Khel each year, which accounts for the annually energy consumption for approx. three average Norwegian households. Below is a table of two identical plants, one located in Sognefjord (Norway) and one in Madrid (Spain). The plant size is 200 m2, and the. Panels have a 35° slope and are oriented 5 against south. The power output of the photovoltaic system in this case is 20 kW (crystalline silicon). Estimated losses due to temperature relative to the local ambient temperature is 11%. Losses associated with mirroring are estimated at around 3%.

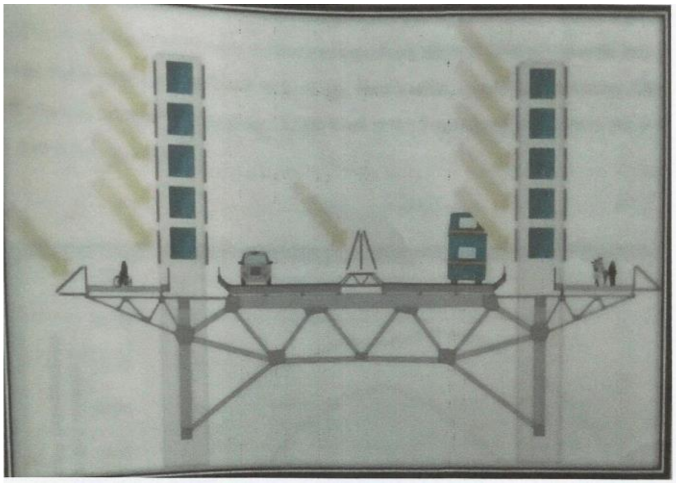

Fig 1 Attachment of Solar Panel to Hydraulic

Other losses from cables, inverter, etc. are estimated at 14%. System losses in total are estimated at 26%. A solar cell in Norway is likely to transform about 5-10% of the solar energy to power but it depends heavily on technology, localization, system maintenance, climate etc. The plant is estimated to produce 15.000 Khel at the Sognefjord, and almost the double,
30.000 Khel, in Madrid

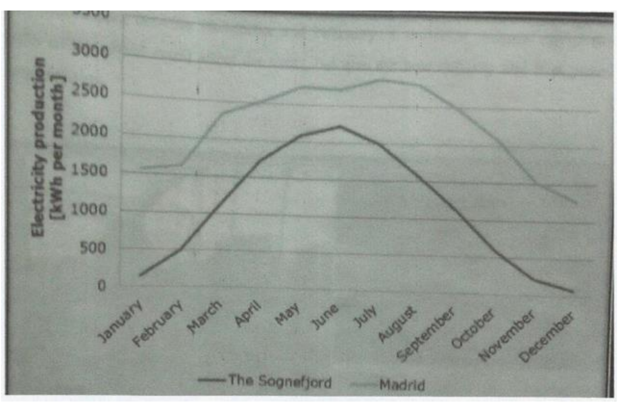

Fig 2 Electricity Production Per Month

B. Solar collectors

Large solar collector plants (1.000 - 10.000 m2) deliver up 430-450 kWh/m2 annually for district heating in southern parts of Scandinavia. The advantage of district heating system in for instance Denmark is the low return temperature (30-40 degrees) which make more heat transferable to the district heating system from the collectors. In Denmark large seasonal storage pools are being built to use solar heating all year round. In Norway, a collector facility of 10.000 m2 in Diestrum is being built.

This will be connected to the district heating system during 2012 and is expected to produce 350-400 kWh/m2 on average per year. Solar collectors can convert more solar energy than panels measured in kWh, but the heat has lower energy quality. If the heat had to be converted into electricity, the losses would have been very high, not to mention the physical constraints of producing electricity without steam or high temperatures.

Empirical data from flat solar collectors. at facilities with 5,000-15,000 m2, mounted on horizontal and even ground, costs approx. 2000 or/m2, all included. Integrating this kind of facilities to a bridge would probably result in higher costs. A 1000 m2 installation can thus deliver approximately 350,000 kWh of heat with a temperature range of 30-80 ° C, but little or no heat supply between November and February. A collector contains glycol and the quality of the glycol could affect the costs, but also the heat delivery and frost protection characteristics.

C. Result

The bridge suitable at light movement number of traffic of boats which is below bridge, On above bridge the movement of traffic must low Bridge can construct in season where sun light available average 320 days in year. On l0MW energy the weight bridge can lift is This type of bridges is constructed where more amount of sunlight is present. As solar energy is renewable energy whose limitation is not fixed. And we all know that solar energy is eco-friendly.

A solar power plant will be easy to install on a bridge, but the solar system will have little benefit of a bridge construction. How this can be utilized is uncertain and involves great challenges. One solution might be to make sure that additional loads from energy installations are low in relation to the overall loads on the bridge. This means that weight, location, shape and surface area of the exposed nature of the loads (wind, currents and waves), is not determining the bridge construction, but is within the construction specification. But its maintenance value is also more.

V. CONCLUSION

1. The existed paper presents Fabrication of an automate movable bridge powered by using conventional energy sources like solar energy. Has been successfully designed and implemented, integrating features of all the hardware components been used and developed
2. The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for a building a

newly designed bridge that would automatically retract to give way for the ship to pass by controlling using DC motor interfaced with H-bridge has been designed perfectly. For demo purpose a retractable moving bridge is designed that slides to the other side of the river water passage to pass through the road traffic.

3. The same mechanism can be implemented for all the other platforms with little modifications. Secondly, usage of non-conventional energy sources like wind energy and solar power along with the help of growing technology, the project has been successfully implemented.
4. Thus, the project has been successfully designed and tested. The microcontroller which acts as the mediator between the input module and output module has been successfully programmed using Keil u vision compiler software using Embedded C language.

REFRENCES

[1] Prof S.K. Mr. Ajinkya Patil. Mr. Sachin B. Patil, "Tracking of Solar panel hydraulic system "UIFR Vol-2 Issue-8 Apr-2015

[2] Shubham Kadam, Amol Shinde "Design And Development of Hydraulic Solar Tracking System IRJET Volume:04

[3] Ham Abu. Fluid Power Control for sun track Ahmed Abu Hani. "Fluid Power Control for Sun tracking of Solar panels, Modelling and Simulation UAMEC ISSN:2147-8228www.ijera.com, 2010.

[4] Krishnarayalu M S. Prasanth N.L., Rajiv "Photovoltaic Solar Plant During Dark Periods in a Distribution Network", IEEE Trans, Vol.1, no. 9, November 2012.

[5] Manikandan A. Murali G Analysis of Power Quality Problems in Power Distribution System IEEE Trans., Vol.2, no. 3. May-June 2013.

[6] Rajiv K Varma, Shah Raipur Rahman, Vinay Sharma "New Application of a PV Solar System as STATCOM (PV-STATCOM to Prevent Destabilization of Critical Induction Motor Load) 2012

[7] E. Courteously. "Development of Microcontroller"-Based Photovoltaic Power

[8] Point Tracking Control Transaction Son Power Electronics, Vol. 16, No l, pp.46-54, January 2001. Photovoltaic Power Processing Transaction. On Industrial Electronics Vol.55. no.7, pp. 25692580, July 2008 PUBLICATIONS