Title:	Designing Oil Fired Power Plant Incorporated with Renewable Energy and Analyzing Capacity Improvement
Author(s) Name:	Engr. Bony Francis Rozario, and Dr. Mohammad Abdul Mannan
Contact Email(s):	mdmannan@aiub.edu
Published Journal Name:	International Journal of Scientific & Engineering Research
Type of Publication:	Journal
Volume:	5 Issue 7
Publisher:	IJSER
Publication Date:	July 2014
ISSN:	2229-5518
URL:	https://www.ijser.org/paper/Designing-Oil-Fired-Power-Plant-Incorporated-with-Renewable-Energy.html
Other Related Info.:	Pages 1205-1213

Citation: Engr. Bony Francis Rozario, and Dr. Mohammad Abdul Mannan, "Designing Oil Fired Power Plant Incorporated with Renewable Energy and Analyzing Capacity Improvement", International Journal of Scientific & Engineering Research (IJSER), Vol. 5, Issue 7, pp. 1205-1213, July-2014.

Abstract:

Global electricity generation contributed from Oil fired power plants is 1,103 TWh, which is around 5.5% of the total generation capacity. The amount is said to increase in the upcoming years by 2-3%. Considering the fact, gas emissions [NO_x (2,000 mg/Nm3), SO_x (2,000 mg/Nm3), and Particular Molecule (50 mg /Nm3) per 100 MW] of these plants equivalently have immense environmental impact. Rendering the consequences the design has been focused to mitigate the impacts incorporating green energies such as solar system, wind energy and cogenerations. The incorporation will also improve the overall capacity as well as efficiency. The efficiency of FO power plant is around 45% depending on the alternators' rated capacity and engine's fuel consumption ability at flat 80% plant factor. The design primarily emphasizes on 'generated heat' for certain fuel consuming engines which is to be extracted and in-conjunction of a steam turbine (referred to as 'cogeneration') the net output shall be increased by 0.38% (approx.). The gas emission velocity through exhaust stack shall also be utilized with the help of VAWT (Vertical Axis Wind Turbine) to utilize certain amount of energy. The preference has been focused to VAWT operated through emitted gas which enables the mounting at the edge of exhaust stack more feasible and practical. The design also incorporates solar panel to be placed at the roof top of power (engine) house occupying 37% of the entire plant area. These three separate energy sources can be incorporated in each of the existing plants for a comprehensive effect to overall outcome of the electricity generation. The paper has been segmented to improvise these design outcomes based on a 100 MW (Net) HFO power plant. The simulation comprises real data collected from various operating plant as to ease the merging of theoretical results with practical implications.

Index Terms: Heavy Fuel Oil, Mega Watt, Kilo Watt, Photovolatic, Wind, Cogeneration, Simulation etc.