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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Program: B.A(Hon) Energy Economics **Semester – III**
Subject (Course): Economics of Solar and Wind Energy **Max. Marks : 100**
Course Code : ECON 2003 **Duration : 3 Hrs**
No. of page/s: 4

Section – A (2 marks * 10 = 20 Marks)

Fill in the blanks with the most suitable words/figures. Correct filling of each blank will fetch 2 marks. (CO1, CO2)

1. Solar and wind power are considered as green power as they have _____________ free operation.
2. ______________ and ______________ are the two demerits of renewable power.
3. As solar PV system has no ____________ parts, its _____________ and _____________ is much easier.
4. India has set itself a target of achieving 1,75,000 MW installed capacity from renewable power by the year 2022, including _____________ MW from solar power, and ______________ MW from wind power.
5. Renewable energy is energy from those sources that are _____________ and get ______________ by nature.

Section – B (5 marks * 4 = 20 Marks)

Answer all questions in this section:

6. Briefly explain the following: (CO1, CO2)

a) Sustainable Development
b) Global Warming
c) Solar Park
d) Demand Side Management

Section – C (10 marks * 3 = 30 Marks)

Answer any three questions from this section: (CO2, CO3)

7. It has been observed that most of the solar power projects that have received very low priced bids are located in Solar Parks. Explain the reasons for such a trend.
8. Discuss the concept of sustainable development and its implications for solar and wind energy sector.
9. Among solar PV and solar thermal technologies, it is solar PV technology that has been widely adopted in India. Explain the reasons for such a trend.
10. Estimate the number of units of electricity generated annually by a 500 MW wind power plant with a capacity utilization factor of 30%. Also, justify that higher capacity utilization factor improves the economics of power generation.

Section – D (30 marks * 1 = 30 Marks)

Answer any one question from this section: (CO3, CO4)

10. Post Paris Agreement 2016, India has embarked on an ambitious journey to ensure transition to a green economy with big focus on solar and wind power. Discuss the status of solar and wind power in India and their future prospects. Also, highlight the potential drivers and barriers that are going to impact the transition towards a green economy.

OR

11. Read the below piece of information and answer the following question:

In what may further exacerbate India’s stressed power project situation, solar capacities totaling ₹28,000 crore face viability risk due to imported solar modules becoming costlier, with the continuous fall in the rupee, ratings agency Crisil Ltd said on Monday. Most solar power developers in India have been sourcing solar modules and equipment from countries such as China, where they are cheaper. This has resulted in domestic manufacturers accounting for only around 10% of the solar market in India. Nearly half of the solar power capacities under implementation worth ₹28,000 crore face viability risk because of the continuous fall in the rupee, which has made imported solar modules costlier and increased the cost of setting up solar plants. These include 5.5 GW of projects bid out in the past nine months at very low tariffs of ₹2.75 per unit or less. These projects are in the early phase of implementation and are unlikely to have bought solar modules, orders for which are typically placed 9-12 months after bids are won," the Crisil Ratings report said.

"Our analysis shows that for every 10% drop in the rupee, the cost of setting up a solar power plant increases by ₹30 lakh per MW, assuming other factors remain unchanged," Subodh Rai, senior director, CRISIL Ratings, added in the statement.

The rupee being Asia's worst performing currency of the year has put Indian developers in a difficult spot. India achieved a record low solar power tariff of ₹2.44 per unit in May 2017. India has also imposed a safeguard duty on solar cell and module imports from China and Malaysia. A majority of Indian developers have been placing orders with Chinese manufacturers because of their competitive pricing. For China's solar module manufacturing capacity, estimated to be around 70 GW per year, the major markets are the US, India and China itself.

"What was anticipated for bidding at low tariffs and has also worked for the developers is the fall in module prices. The module prices have fallen by 17% for these projects from 0.30 dollar per watt at the time of their bidding to around 0.25 dollar per watt at present (a benefit of nearly ₹34 lakhs per MW). But the arithmetic did not countenance a sharp depreciation in the rupee to more than ₹73 per dollar, which has wiped off the gains from lower module prices. That, in turn, will compress the debt servicing cushion available for these projects," the Crisil report said.

This assumes importance for the Indian power sector given that it is one of the highly stressed sectors with close to ₹1 trillion of loans having turned sour or been recast. Also, lenders have an exposure of around ₹3 trillion to these assets in the backdrop of slow electricity procurement over the last three to four years. According to RBI, the total outstanding loans of scheduled commercial bank to the power sector including renewable stood at ₹5.65 trillion as on March 2018.

"Also, developers typically do not hedge the exchange rate before placing orders for modules," the Crisil report added.

India, the world’s third-largest energy consumer after the US and China, is running the world’s largest clean energy programme. However, concerns around India’s emerging green economy remain due to the weak credit quality of off-takers such as state-owned distribution companies.

“If the rupee remains weak and safeguard duty is also levied, project costs would dart up by as much as 20%. In such a situation, viable tariff for future projects will have to be higher by 30 paise per unit,” said Manish Gupta, director, CRISIL Ratings in the statement.

India’s ministry of new and renewable energy is also planning to cap India’s solar power tariffs at ₹2.5 and ₹2.68 per unit for developers using domestic and imported solar cells and modules, respectively.

Question: Discuss the impact of changing business environment on the viability of solar power projects in India.