MAHATMA GANDHI MISSION

Assignment -2

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A) 5 Major Companies working on Wind energy are.

1) Suzlon Energy limited.

It is one of the leading wind turbine manufacturers in india. Know for its indigenous technology. Suzlon focus on developing high - capacity turbines suitable for India's diverse wind conditions their technical expertise lies in the design and manufacturing of robust wind ~~condition~~ turbine components, including blades, towers, and nacelles. Suzlon also offers comprehensive wind farm solutions, including site selection, installation, and maintenance services.

2) Siemens Gamesa Renewable Energy.

It is renowned for its cutting-edge wind turbine technology. The company emphasizes research and development in gearless direct-drive turbines, enhancing energy conversion efficiency while minimizing maintenance needs. Their focus extends to offshore wind farms, where they excel in designing and installing large-scale turbine capable of

withstanding harsh marine environments.

3) Adani Green Energy limited (AGEL).

It is one of the largest renewable energy companies in India, with a growing portfolio of wind power projects. AGEL utilizes advanced wind turbine technology to harness clean energy from the wind. The company focuses on developing both onshore and offshore wind projects to diversify its renewable energy portfolio. AGEL emphasizes technological innovation and operational excellence to maximize energy yield and ensure sustainability of its wind projects.

4) Greenko Group.

It is major player in India's renewable energy market, with a significant presence in wind power generation. The company utilizes state-of-the-art turbine technology to harness wind resources effectively. Greenko focuses on developing integrated renewable energy solutions, including hybrid wind-solar projects and energy storage systems. They also invest in grid infrastructure to facilitate seamless integration of wind power into india's energy grid.

MAHATMA GANDHI MISSION

5) Tata Power Renewable limited (TPREL).

It is subsidiary of Tata Power Company limited, dedicated to renewable energy generation. It has significant presence in the Indian wind energy sector, with a focus on developing and operating wind power projects across the country. The company leverages cutting-edge turbine technology and best-in-class practices to optimize the performance and efficiency of its wind farms. It is committed to contributing to India's clean energy transition by expanding its wind energy portfolio and promoting sustainable development practices.

B) Enhancing Energy Efficiency and Renewable Energy Penetration in large Data Centres.

1) Adoption of liquid Cooling System.
liquid cooling system offer higher energy efficiency compared to traditional air-based cooling systems. By circulating coolant directly to heat-generating components, such as CPU's and GPU's, consumption for cooling.

2) Green Roof Implementation.
Installing green roofs on data centre building can provide insulation, reducing the needs for heating and cooling systems. Additionally, green roofs can absorb and utilize rainwater, reducing stormwater runoff and alleviating strain on municipal water system. The vegetation on green roofs can also act as natural air filters, improving air quality and reducing need for mechanical ventilation system.

3) Power purchase Agreement (PPA's) for Renewable Energy
Entering into long-term Power purchase agreement (PPA's) with renewable energy providers can ensure a stable and cost-efficient supply of clean energy for data centers.

By committing to purchasing renewable energy directly from wind or solar farms, data centers can support the growth of renewable energy infrastructure while reducing their carbon footprint.

4) Utilization of Waste Heat for Heating Application.

large data centers generate significant waste heat, which is typically dissipated using cooling system By capturing and repurposing this waste heat for heating application within the facility or nearby building, energy efficiency can be substantially improved. for instance, utilizing waste heat for space heating can reduce the demand for traditional heating systems.

5) Implementation of Dynamic ~~Power~~ power Management system.

Dynamic power management algorithm can optimize the allocation of computational tasks based on real-time energy availability and demand. By intelligently distributing workloads across servers and adjusting their power states, data centers can minimize energy consumption while maintaining performance levels.

6) On-site Renewable Energy Generation.

Investing in on-site renewable energy generation, such as solar photovoltaic (PV) panels or wind turbines, can significantly reduce carbon footprint of data centers. By generating renewable energy on-site, data centers can offset their grid electricity consumption and contribute to sustainable energy production.