Date	15 February 2025
Team ID	PNT2025TMID02717
Project Name	Global Energy Trends a comprehensive analysis of key regions and generation modes using Power bi
Maximum Marks	

Definition: -

Performance testing, crucial for global energy analysis, involves evaluating systems and software under simulated real-world conditions to ensure they can handle high data volumes and user loads, preventing operational disruptions and optimizing performance.

Here's a breakdown of why and how performance testing is important in the context of global energy analysis:

Why Performance Testing is Important:

- **Ensuring System Reliability and Stability:**

  Global energy systems are complex and critical, and performance testing helps ensure they can handle peak loads and unexpected events without failures.

- **Optimizing Efficiency and Cost:**

  By identifying bottlenecks and inefficiencies, performance testing can lead to better resource allocation and reduced operational costs.

- **Improving Data Accuracy and Analysis:**

  Performance testing ensures that the data collected and analysed by energy systems is accurate and reliable, which is crucial for informed decision-making.

- **Predicting Future Performance:**

  Performance testing can help predict how systems will behave under different conditions, allowing for proactive planning and mitigation of potential problems.

Performance Testing: -

1. **Identify the Test Environment and Tools:** Determine the production environment, testing environment, and testing tools at your disposal.

2. **Define Acceptable Performance Criteria:** Establish clear performance metrics and thresholds to evaluate system performance.

3. **Plan and Design Tests:** Develop test plans that simulate real-world scenarios and workloads.

4. **Prepare Test Environment and Tools:** Set up the test environment and configure the necessary tools.

5. **Run the Performance Tests:** Execute the test plans and collect data on system performance.

6. **Resolve and Retest:** Analyse the test results, identify issues, and implement solutions, then retest to verify the fixes.

Sr. no	Test Case	Input	Expected Ouput	Result
1	Test with historical data from the last 10 years	Historical energy demand data	Forecast aligns within ±5% of actual values	Pass
2	Introduce an economic recession variable	Decreased GDP growth rate	Reduction in energy demand forecast	Pass
3	Simulate a population growth surge	Increase in long-term energy demand	Increase in long-term energy demand	Pass
4	Increase solar capacity by 30%	Updated solar energy capacity data	Decrease in fossil fuel dependency	Pass
5	Simulate low-wind conditions	Policy incentive data	Increase in backup energy sources (like gas)	Pass
6	Introduce government subsidies for solar	Energy mix data	Decrease in total CO_2 emissions	Pass
7	Transition 50% of coal to natural gas	Economic data with carbon tax rates	Reduction in fossil fuel consumption	Pass