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**Assessment – 1**

**Identifying Streaming Data Sources for Power Grid Corporation of India Limited (PGCIL)**

**Introduction:**

In the energy sector, real-time monitoring and decision-making are critical to ensure uninterrupted power supply and grid stability. Power Grid Corporation of India, being the backbone of India’s electricity transmission network, manages massive amounts of data from various substations, transmission lines, and renewable integration points. Using streaming data allows Power Grid to monitor operations live, respond to faults immediately, and maintain system reliability.

**Objectives:**

1. To identify key streaming data sources in the power transmission sector.
2. To understand how these data sources support grid reliability and stability.
3. To highlight how real-time monitoring can reduce outages and improve efficiency.
4. To explore the role of streaming data in integrating renewable energy into the grid.

| **Streaming Data Source** | **Purpose** | **How it Helps** |
| --- | --- | --- |
| **Smart Meters & Consumer Usage** | Capture real-time electricity consumption at household/industry level | Helps in demand forecasting, reducing power theft, and planning load distribution |
| **SCADA Systems (Supervisory Control & Data Acquisition)** | Monitor substations, transformers, and power flow live | Enables quick fault detection, remote monitoring, and grid stability |
| **IoT Sensors on Transmission Lines** | Track voltage, temperature, and line health | Predicts failures, reduces downtime, and ensures safety |
| **Renewable Energy Feeds (Solar/Wind/Hydro)** | Collect data on real-time power generation from renewable sources | Helps balance supply-demand and integrate renewable energy efficiently |
| **Weather Data Streams** | Track temperature, storms, rainfall, and wind conditions | Assists in predicting outages and estimating renewable generation levels |
| **Customer Complaint Portals & Call Centers** | Gather live feedback and outage complaints | Supports faster issue resolution and improves consumer satisfaction |

**Conclusion:**

* Streaming data enables continuous monitoring of the grid, ensuring reliability and preventing failures.
* Smart meters and SCADA systems provide valuable live insights for efficient demand and supply management.
* IoT sensors and weather data help predict faults and reduce downtime.
* Renewable energy integration becomes smoother with real-time production feeds.
* Customer complaints can be addressed quickly, improving service delivery.
* Overall, streaming data strengthens operational efficiency, reduces risks, and supports India’s goal of sustainable energy.