Large Power Transformers are a critical component of a Highly Interconnected Grid System. They help Step up the voltage produce at the Power Plant and step down the voltage received by the customers. They can sometimes be used mid-way to step up voltage during transmission to mitigate the power loss incurred by at the transmission line, therefore LPTs are critical components of the Grid system without which the grid system would not work efficiently.[1]

Since LPTs are critical to the grid system, LPTs maintenance should be established and coordinated to avoid power outages that can last for days.

Developing a Preventive Maintenance (PM) Schedule is the most important part of maintenance of any equipment. PM schedule will help prevent or lower the need for costly maintenance that arises from over used and unmaintained equipment. Activities of PM schedule on LPTs can differ from region to region but they mostly include maintaining the cooling system, checking cablings and torquing bolts on Bus bars.

In addition to a Good PM schedule a condition Base Maintenance (CMD) should be established by upgrading LPTs to have sensor (digitalization) that can collect data to analyze abnormal behavior of LPTs and feed that data to controlled Network. Where Technicians can be dispatched to fix the issue before it turns into a costly maintenance. AI tools can be used with LPTs to compare sensor data to data collected from other industries that have machines closely related to that LPTs to determine the issues and establish service code for LPTs. These codes can help Technicians to diagnose the actual problem, rather than turning a simple fix into a costly repair.

When LPTs are connected to networks, cyber security should be taken into consideration to prevent sabotage activities. Special Tunnelling or network channels should be established for the grid system to make sure only certain ports operating from authorize facilities or computers running on certain firmware can connect to LPTs or anything on the grid network for either monitoring or diagnoses, these will provide traceability and prevent unauthorize computers from accessing LPTs or the Grid network.

<https://www.energy.gov/sites/prod/files/2017/01/f34/Assessment%20of%20Large%20Power%20Transformer%20Risk%20Mitigation%20Strategies.pdf> [1]