Supply Chain Carbon Emission Monitoring

via 0G Technology for TVS

Objective:

1. To fulfill the regulatory requirement of declaring carbon of sold vehicles TVSM is exploring different cost-effective solutions & 0G Technology is one of them.

2. Utilize 0G technology to monitor and track carbon emissions across TVS's supply chain, covering inbound and outbound logistics, as well as emissions tracking after delivery to customers.

Use Cases of 0G Technology in the TVS Supply Chain

1. **Inbound Logistics**
   Track suppliers' vehicles delivering parts to TVS and collecting raw materials from their suppliers.
2. **Outbound Logistics**
   Monitor TVS vehicles responsible for delivering manufactured vehicles to warehouses and dealers worldwide.
3. **Post-Delivery Monitoring**
   Track emissions from TVS vehicles after delivery to customers or dealers for lifecycle emission monitoring.

Possible Devices & Sensors Planned

1. **CO_2 Emission Sensors**: Track carbon emissions from vehicle exhaust.
2. **Fuel Consumption Meters**: Monitor fuel usage and calculate vehicle efficiency.
3. **GPS/GPRS Trackers**: Capture routes, idle times, and delivery milestones.
4. **Onboard IoT Devices**: Installed in post-delivery vehicles to monitor emissions and driving behavior.

0G Network Modules

- **Sigfox/LoRaWAN Transmitters**: Integrated into sensors for **low-power, long-range** data transmission.
- **Intermittent Transmission**: Emission and GPS data sent periodically (e.g., every hour or trip completion) to conserve battery.

- **0G Fallback**: Ensures data capture in **remote areas** or when cellular networks (GPS/GPRS) are unavailable.

Initial Survey of 0G Technology for Implementation

- **Network Suitability**: Ideal for **low-bandwidth, intermittent data** such as emissions and route tracking.
- **Coverage**: 0G networks like Sigfox offer **global coverage**, ensuring connectivity even in remote regions.
- **Power Efficiency**: Sensors with **0G modules have multi-year battery life**, reducing maintenance.
- **Cost-Effective**: Lower operational costs compared to cellular networks, making it viable for large-scale logistics.

Applications Achieved via 0G Technology

1. Continuous Emission Tracking across Supply Chain Phases
2. Reliable Data Transmission in Remote Areas
3. Energy-efficient Operations