Utility Industry and Sustainability Pathway

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Agenda and Context

1. Introducing Sustainability Aspects for Utility
2. Key Focus Priority Area
3. Solution Approach and Insights
4. Q&A

Sustainable Transformation of Utilities

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Utility Industry - Sustainability Aspects

UPSTREAM
Impacts from materials and inbound supply chain

Significant GWP* impact of materials & source, transport
- Construction, Substation, Assets across network
  - Assets Choices (type, source, transport)
  - Supply-chain = need for embedding circularity principles
  - Visibility into upstream suppliers, activities & transportation from ESG perspective

Downstream
- Impacts from operations,
- Distribution Utilities, Customers

Scope 3 - Indirect
- Impacts from supply-chain
- Impact from construction
- Impact of maintenance supply-chain
- Business Travel, Employee commute,
- Inflow of goods, services
- Downstream sold electricity to DNO, customer usage
- Waste generated in value chain
- Material impact of new HVDC, interconnectors

Scope 2 - Indirect
- Impacts from energy consumptions
- Line losses
- Power Purchase, Interconnectors

Scope 1 - Direct
- Impacts from operation
- Network and Assets Operations-Live
- Power Flow
- Line losses
- SF6, Oil leakage
- Renewable Power injection
- Fleet vehicle use
- Maintenance operations

CORE – Capital + Operational
Impacts from operations
High GWP* impact of Network, Substation, Assets & processes

Power Transfer across Network
- Energy Inefficiencies, losses
- Type of energy procured
- Power Transfer through Decarbonization
  - Energy procured from lateral countries, HVDC etc.
  - Off shore wind

Product Safety & Hazard
- Human Toxicity impacts in products
- Leakage of SF6, oil

https://www.nationalgrid.com/document/146726
Electricity Utility Value Chain and Key Focus Areas

**Customer Portfolio**
- Smart Generation with centralized monitoring and control
- Smart transmission & distribution with continuous monitoring

**Strategic Focus**
- Reducing Scope 1, Scope 2 and Scope 3 emission
- Enhanced Decarbonization
- Minimize Loss/Leakage / Pollution
- Opportunity of Circular Economy
- Materiality Driven Impact

**Key Aspects**
- Clear picture of carbon footprint (N.A, suppliers, transport)
- Material and transport supply-chain impact
- Core & Use phase emission impact
- Maximize green energy, storage
- Long term investments in infrastructure expansion – Green Interconnectors, HVDC etc.
- Grid Modernization - EV adaptation
- Business transport-E fleet/biofuel
- Low embodied carbon supply-chain
- Water, heat, air, energy wastage /leakage
- Toxic SF6 gas leakage control
- insulation Oil leakage control
- Nox emission control

**Enablers**
- Sustainability-Data Orchestration
- Asset and Network Life Cycle Impact Insights
- Hot spot Identification & Solution Roadmap
- Circular Economy Market

**References**
Opportunity 1: Unlocking potential towards Decarbonization and Sustainable Environmental footprint

**Green Energy Portfolio**
- Renewable energy sources – Wind, Solar, Biomass, Micro Hydro, Bio-gas, Storage Systems, Small nuclear Reactor etc etc

**Positive Levers**
- Regulatory support (Incentives, subsidy etc)
- Aggressive adaptation of society towards green products
- Huge investments into Potential Decarbonization portfolios
- Environmental-integrity, Social Wellbeing, Newer energies and agile Revenue models for prosumers

**Opportunities**

1. Operational Capabilities –
   - Investment Portfolio optimization
   - Handling Dynamicity in load demand, generation from green sources
   - Handling system stability, security and reliability - DERMs
   - Network and assets health monitoring and management
   - Maintenance-Field force Optimization
   - System Adequacy assessment & operational Excellence
   - Prosumer-enablement
   - Price-prediction and market operations

2. Sustainability footprint & ESG Capabilities –
   - Embodied and Operational Carbon, Assessing Scope1, Scope 2, Scope 3 emission footprint (Asset based and Activity Based footprint )
   - Sustainable Supply-chain management
   - Bio-diversity and Ecological impact
   - Reuse, Circularity and Traceability of replaced materials
   - Reporting and disclosures
   - Secondary market place – Reusing of removed /repaired parts

**Proposition - Data, Analytics, Engineering Solutions**

1. AI-ML Predictive Models, Data driven Analytics, Digital Twin etc
2. Leveraging DERMs
3. Leveraging Asset health monitoring capability
4. Leveraging Techno-financial portfolio solution accelerator
5. Wind Park Optimization modelling
6. Smart Meter Analytics and Outage Management

Opportunity 2: Bringing in Traceability & Circularity

OUTCOMES/VALUE - Traceability & Circularity of materials:

- Secondary marketplace for all, Open data platform – e.g. Offgem
- CE model for maintenance activity, C Ecosystem for Newer expansions
- Repository of reusable parts (Roster – Common Data), Attempt to Zero Waste to landfill
- Become an Industry benchmark in Circularity and Sustainability target on ZERO Waste
Opportunity 3: Materiality Driven Insights

- Zero Accident /failures
- Minimize network /asset loss
- Skilled field force
- Power Purchase Contract
- Carbon-free Green Price Control Deliverables (Affordability)
- Bio-Diversity
  - Impact on bio-life, ecological imbalance, water, land
- Safety and Wellbeing
  - Zero Accident /failures
  - Minimize network /asset loss
  - Skilled field force
- Affordability
  - Power Purchase Contract
  - Carbon-free Green Price Control Deliverables (Affordability)
- Operational
  - Contextualized Solutions
  - Uninterrupted Power supply (Reliability + Power Quality)
- Happy Workforce
- Bio-diversity, Ecological balance
Data Enabled Assessment, Sustainability KPIs, Reporting and Disclosures

Global Warming Potential – tCO2 eq

Human Toxicity - CTUh

Ozone depletion

ACIDIFICATION POTENTIAL (AP) - measured in SO2 equivalents.

Eutrophication – freshwater, marine, Terrestrial

EP is measured in phosphate (PO43-) equivalents.

Photochemical ozone formation- CO,SO2,NO etc

Depletion of abiotic resources – minerals and metals

Particulate Matter (PM)

✓ GRI - Global Reporting Initiative
✓ SBTi - Science Based Target Initiative
✓ TCFD - Task Force for Climate Related Financial Disclosures. TCFD recommendations are focused on governance, strategy, risk management, metrics and targets.
✓ SASB – Sustainability Accounting Standards Board
✓ CDP – Carbon Discloser Project

https://ecochain.com/knowledge/impact-categories-lca/
Thank You

For discussions/suggestions/queries email: d_surekha@hotmail.com