FOUNDING PARTNERS
ieema your link to electricity | IEEE Advancing Technology for Humanity | IEEE PES Power & Energy Society® | 15th Edition ELECRAMA Powering the Future of Energy

4th Edition World® Utility Summit
20 - 21 February 2023
Sustainable Transformation of Utilities

Utility Industry and Sustainability Pathway

Dr Surekha Deshmukh
Chair-PES India Chapters Council
Chair- IEEE Pune Section

Agenda and Context

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

Utility Industry- Sustainability Aspects

UPSTREAM

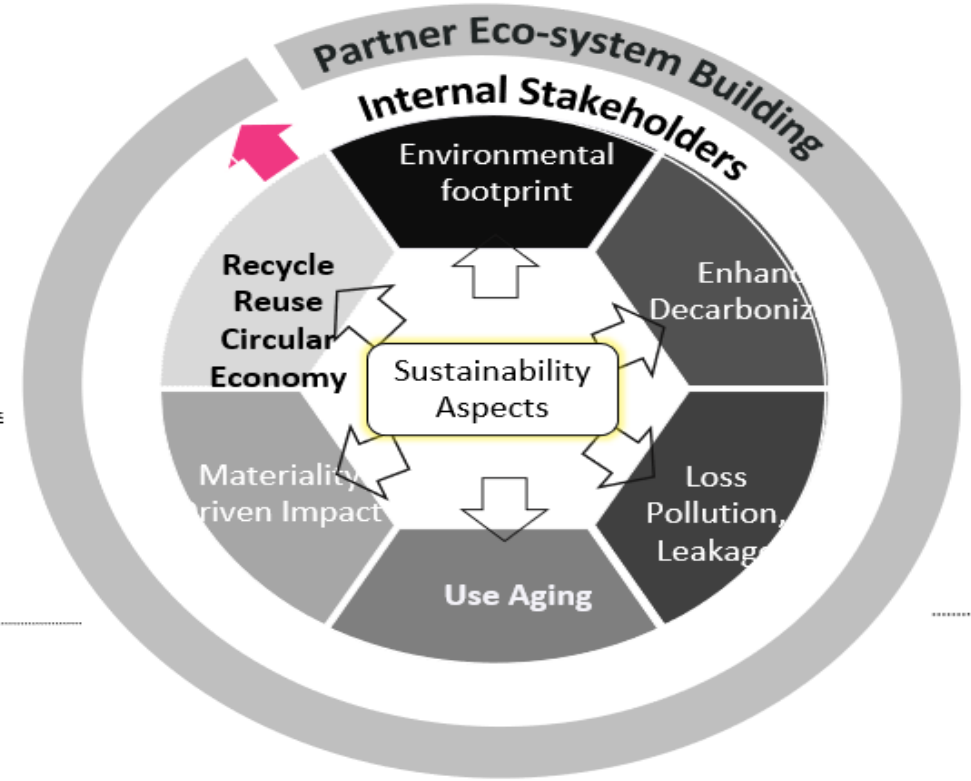
Impacts from materials and inbound supply chain

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*



CORE – Capital + Operational

Impacts from operations

High GWP* impact of Network, Sub station, Assets & processes

Power Transfer across Network

- Energy inefficiencies, losses
- Type of energy procured

Power Transfer **through Decarbonization**

energy procured from lateral countries- Inter-connectors, HVDC etc , Off shore wind

Product Safety & Hazard

- Human Toxicity impacts in products
- Leakage of SF6, oil

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*

Scope 1, Scope2, Scope 3 Emission Assessment + Management

Circular Economy Recycle-Reusability

Minimize Leakage , Waste, Loss, Pollution

Environment, Community, Governance, Bio diversity

Network, assets, process, people, Technology, Data

References - https://group.vattenfall.com/nl/siteassets/vattenfall-nl-site-assets/wie-we-zijn/corp-governance/annual-reports/vattenfall-nv-annual-report-2019.pdf
vattenfall-annual-and-sustainability-report-2020 .pdf

https://www.nationalgrid.com/document/146726

Electricity Utility Value Chain and Key Focus Areas

Customer Portfolio	Generation	Transmission & Distribution	Retail -Customer Management	Corporate Functions
	 Smart Generation with centralized monitoring and control	 Smart transmission & distribution with continuous monitoring	 Interconnected Solutions with Self service & management	 Special Projects and Efficiency Improvement Initiatives across
Strategic Focus	Reducing Scope1, Scop2 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 infrastucture 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	• CE model for new expansions • Repository of reusable parts (Roster – Common Data) • Circular economy -recycle of office, depot and network waste • Re-use of street works material /replaced parts during maintenance (Sourcing+AMC+Refurbish/reuse etc)	• Regulatory Reporting and Disclosures • Zero Accident /failures • 100 percent safety • Power Purchase Contract • Carbon-free Green-Price Control Deliverables (Affordability) • Minimize network /asset loss • Uninterrupted Power supply (Reliability + Power Quality) • Skilled field force • Substation offices, command & control stations : No use of plastic , Energy optimization • Bio-diversity Concern • Impact on aqua life , birds etc
Enablers	Sustainability-Data Orchestration	Asset and Network Life Cycle Impact insights	Hot spot identification & Solution Roadmap	Circular Economy Market	Materiality-driven Scenario -Solution

References - https://group.vattenfall.com/nl/siteassets/vattenfall-nl-site-assets/wie-we-zijn/corp-governance/annual-reports/vattenfall-nv-annual-report-2019.pdf
vattenfall-annual-and-sustainability-report-2020 .pdf

https://www.nationalgrid.com/document/146726

FOUNDING PARTNERS
ieema your link to electricity | IEEE Advancing Technology for Humanity | IEEE PES Power & Energy Society | 15th Edition ELECRAMA Powering the Future of Energy

Opportunity 1 : Unlocking potential towards Decarbonization and Sustainable Environmental footprint

4th Edition World Utility Summit
20 - 21 February 2023
Sustainable Transformation of Utilities

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

Proposition- Data , Analytics , Engineering Solutions

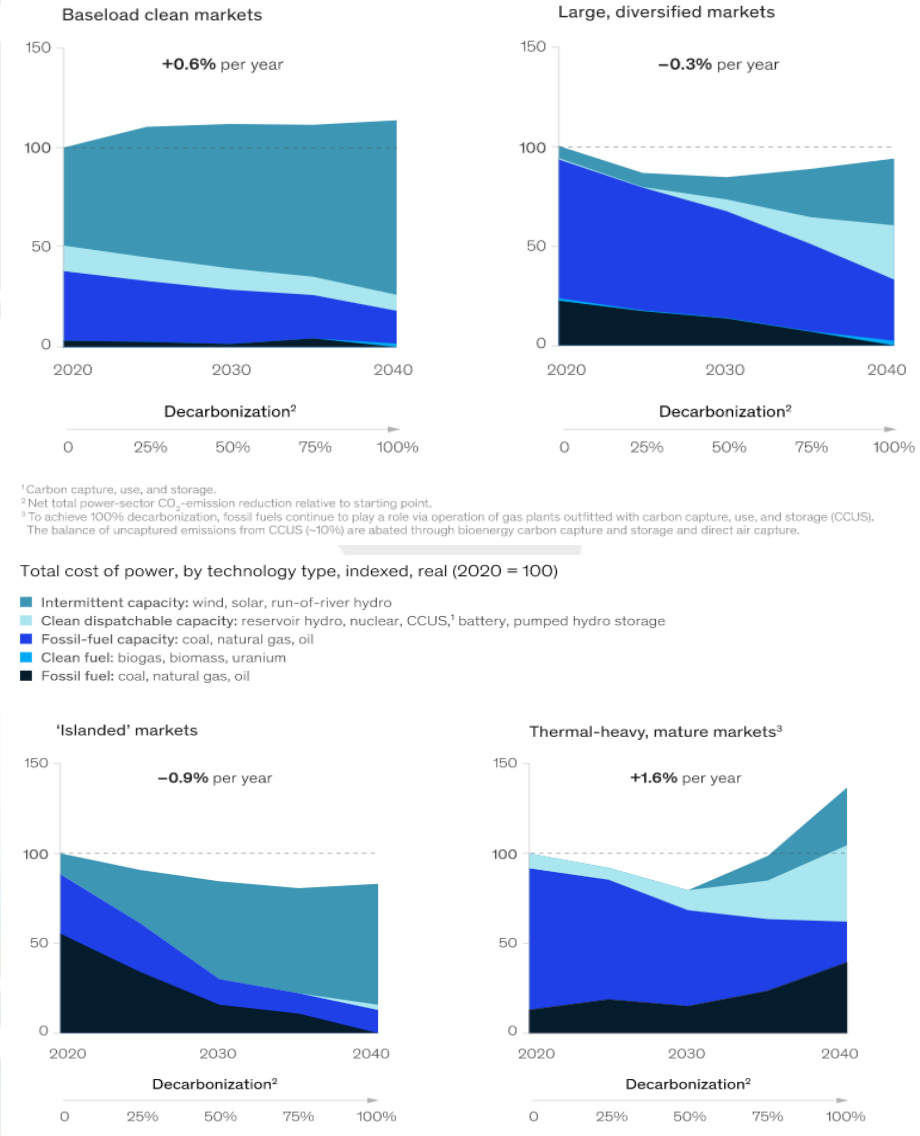
1. AI-ML Predictive Models, Data driven Analytics, Digital Twin etc
2. Leveraging DERMs
3. Leveraging Asset health monitoring capability
4. Leveraging Techno-financial portfolio solution accelerator
5. Wind Park Optimization modelling
6. Smart Meter Analytics and Outage Management

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

Opportunities

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



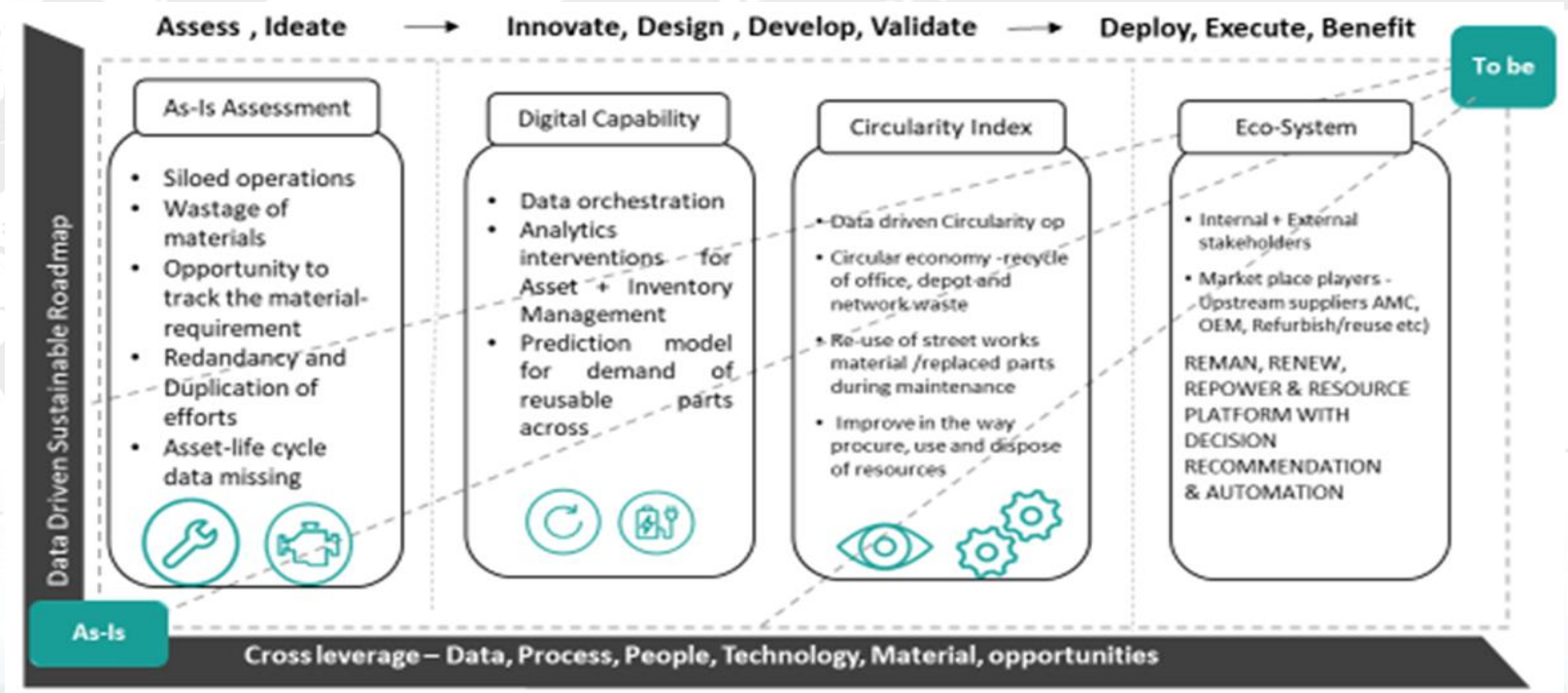
https://www.mckinsey.com/capabilities/sustainability/our-insights/powering-up-sustainable-energy

Opportunity 2 : Bringing in Traceability & Circularity

Circular Utility

Circular Electric Utilities

- Aligning on a standardized definition and methodology for evaluating circularity performance
- Developing a market and supply chain strategy to address barriers related to scale, demand, logistics, Ensure sustainable consumption from the electric utility supply chain of critical minerals needed for the low-carbon economy transition



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

Top material topics

1. Reducing CO_2 emissions and phasing out fossil fuels
2. Investing in renewable energy
3. Providing affordable energy
4. Minimising emissions of pollutants into air, water and land
5. Protecting nature and biodiversity
6. Providing affordable, stable, and flexible grid infrastructure for future needs
7. Developing innovative and sustainable services and solutions for customers
8. Employee well-being, including proper working conditions (health and safety), and fair pay
9. Ensuring sustainable use of resources of own operations
10. Fair and ethical business practices, including anti-corruption and bribery
11. Sustainable suppliers and supply chain
12. Investing in energy storage
13. Safe nuclear decommissioning and waste management
14. Sustainability in investment and divestment decisions
15. Continued operation of our Swedish nuclear plants, and potential expansion under the right conditions
16. Employee competence development and retention
17. Contributing to the circular economy
18. Openness and transparency, including on topics like tax management
19. Engaging with local communities, including through local collaborations and dialogue on project development
20. Employee engagement
21. Promoting diversity and gender equality, including among special groups such as disabled, youths, and immigrants

Bio-Diversity

- Impact on bio-life, ecological imbalance, water, land

Safety and Wellbeing

- Zero Accident /failures
- Minimize network /asset loss
- Skilled field force

Bio-diversity, Ecological balance

Happy Workforce

Affordability

- Power Purchase Contract
- Carbon-free Green-Price Control Deliverables (Affordability)

Operational

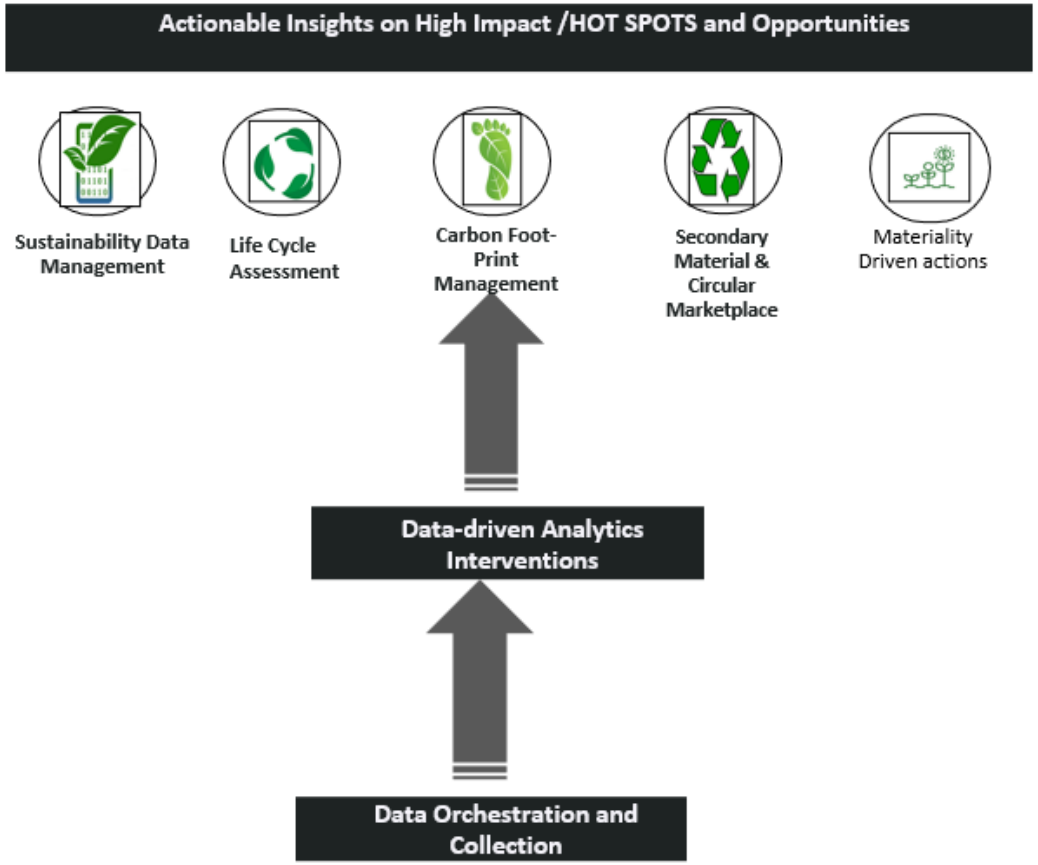
- Contextualized Solutions
- Uninterrupted Power supply (Reliability + Power Quality)

Investment Optimization Decarbonization, HVDC, Storage Green Hydrogen

Network & System Management

References - https://group.vattenfall.com/nl/siteassets/vattenfall-nl-site-assets/wie-we-zijn/corp-governance/annual-reports/vattenfall-nv-annual-report-2019.pdf
vattenfall-annual-and-sustainability-report-2020 .pdf

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/

https://www.ledvance.com/professional/company/about-ledvance/sustainability/environmental/product-lifecycle-management/method-and-definitions/environmental-impact-categories

Thank You

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