Session 8: Roadmaps and Implementation Strategies

Part A

Agenda

- ✓ Long-term Corporate Planning
- ✓ Smart Grid Roadmap
- ✓ Smart Grid Maturity Model (SGMM)
- ✓ Digitalization Roadmap
- ✓ IT Roadmap for Electricity Utilities
- ✓ Content for Transformational Roadmap
- ✓ Key Takeaways for Developing the Plans and Roadmaps

Speaker:

Gökhan Tosun

Director of Smart Grids and R&D

MRC Türkiye

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Long-term Corporate Planning

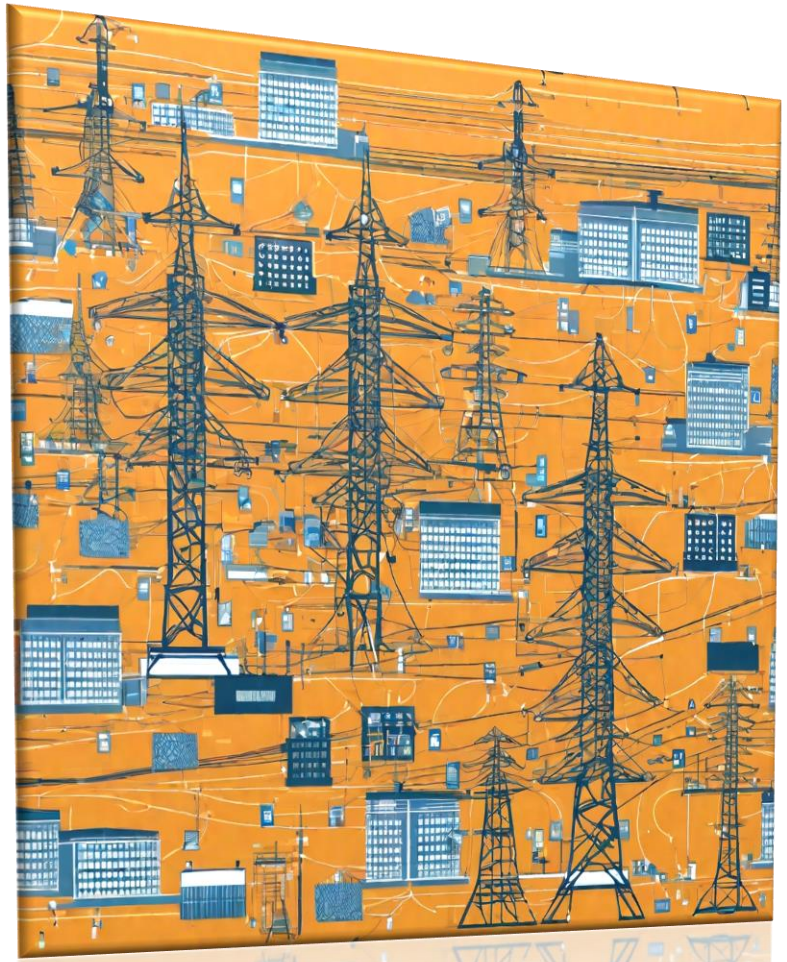
The Role of Long-term Planning

- Achieving digital transformation in electricity utilities.
- Roadmap for implementing digitalization initiatives and ensures alignment with corporate strategy and objectives.

To successfully incorporate digitalization into corporate strategy, utilities need to:

- Identify key digitalization opportunities and prioritize them based on their potential impact and feasibility.
- Define clear objectives and KPIs for digitalization initiatives to track progress and measure success.

Long-term Corporate Planning



Case Studies of Successful Long-term Planning

- **Eskom Holdings SOC Limited, South Africa**
- **Kenya Power and Lighting Company (PLC), Kenya**
- **National Grid (United Kingdom)**

Eskom

Kenya Power

nationalgrid

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Smart Grid Roadmap

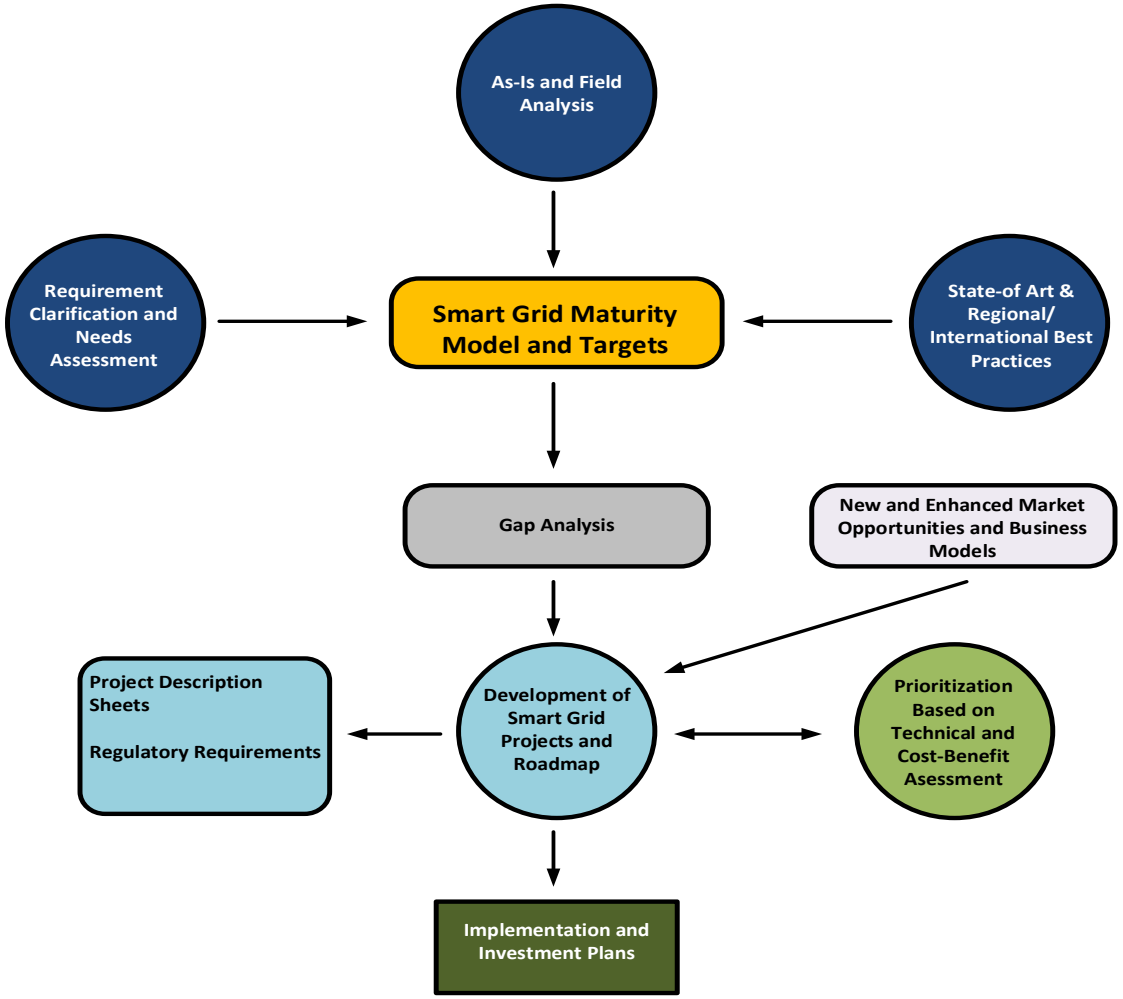
Importance of Smart Grids

Improved Reliability
- Better monitoring, control and self-healing capabilities, reducing power outages and improving overall reliability

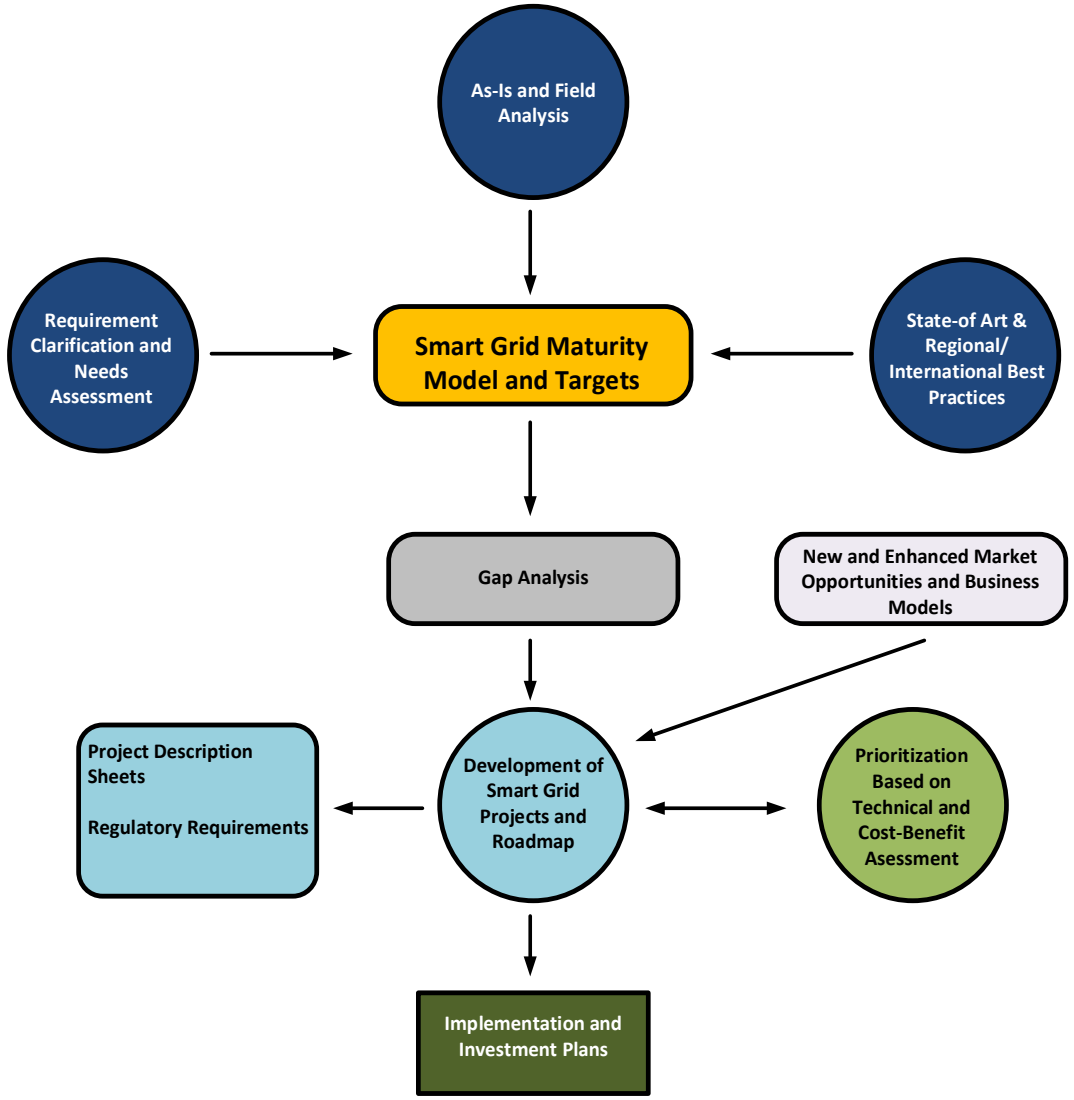
Enhanced Efficiency
- Optimize energy distribution and consumption, resulting in reduced energy losses and increased efficiency

Integration of RES
- Enabling better management and coordination of power generation and consumption

Empowering Consumers
- Enabling to make informed decisions and participate in demand response program



Smart Grid Roadmap



Key Technologies and Projects

Advanced Metering Infrastructure (AMI)

- Smart meters and communication systems enabling real-time monitoring and billing, as well as demand response programs

Grid Automation

- SCADA/DMS/EMS/OMS systems and distribution automation, improve the grid control, monitoring and fault detection

Renewable Integration

- Solar Photovoltaic (PV) systems, wind turbines, and energy storage solutions

Microgrids

- Enhance the resilience and reliability of electricity supply, particularly in remote or underserved areas

Data Analytics and AI

- Optimize grid operations, predictive maintenance, and energy management

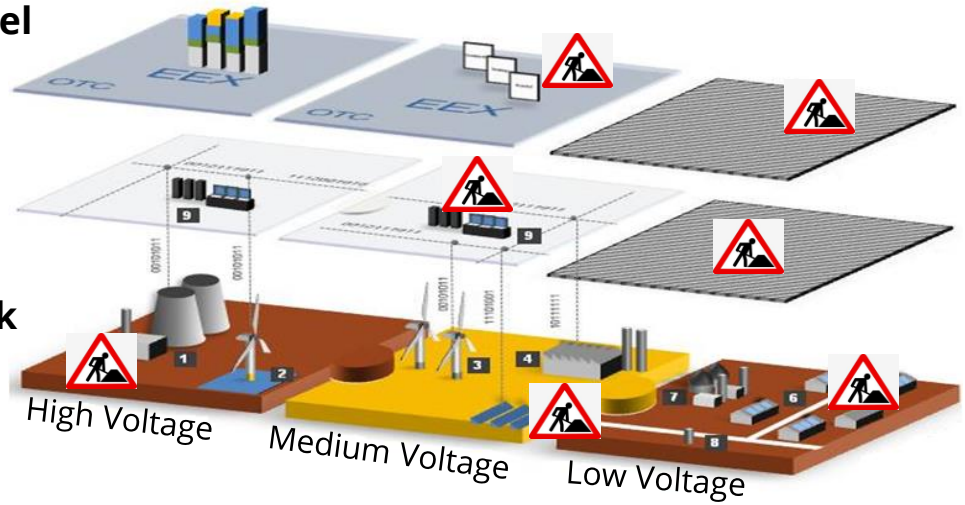
Smart Grid Roadmap

Example Smart Grids Layer Model for the Electric Infrastructure

Business Model

ICT Infrastructure

Energy Infrastructure e.g. Electricity Network



Developing Smart Grid Roadmap for African Utilities

2. Assess Current Infrastructure

3. Identify Key Technologies and Projects

5. Establish Implementation Phases

1. Define Objectives and Priorities

4. Collaborate and Seek Partnerships

Smart Grid Roadmap

Develop a Roadmap

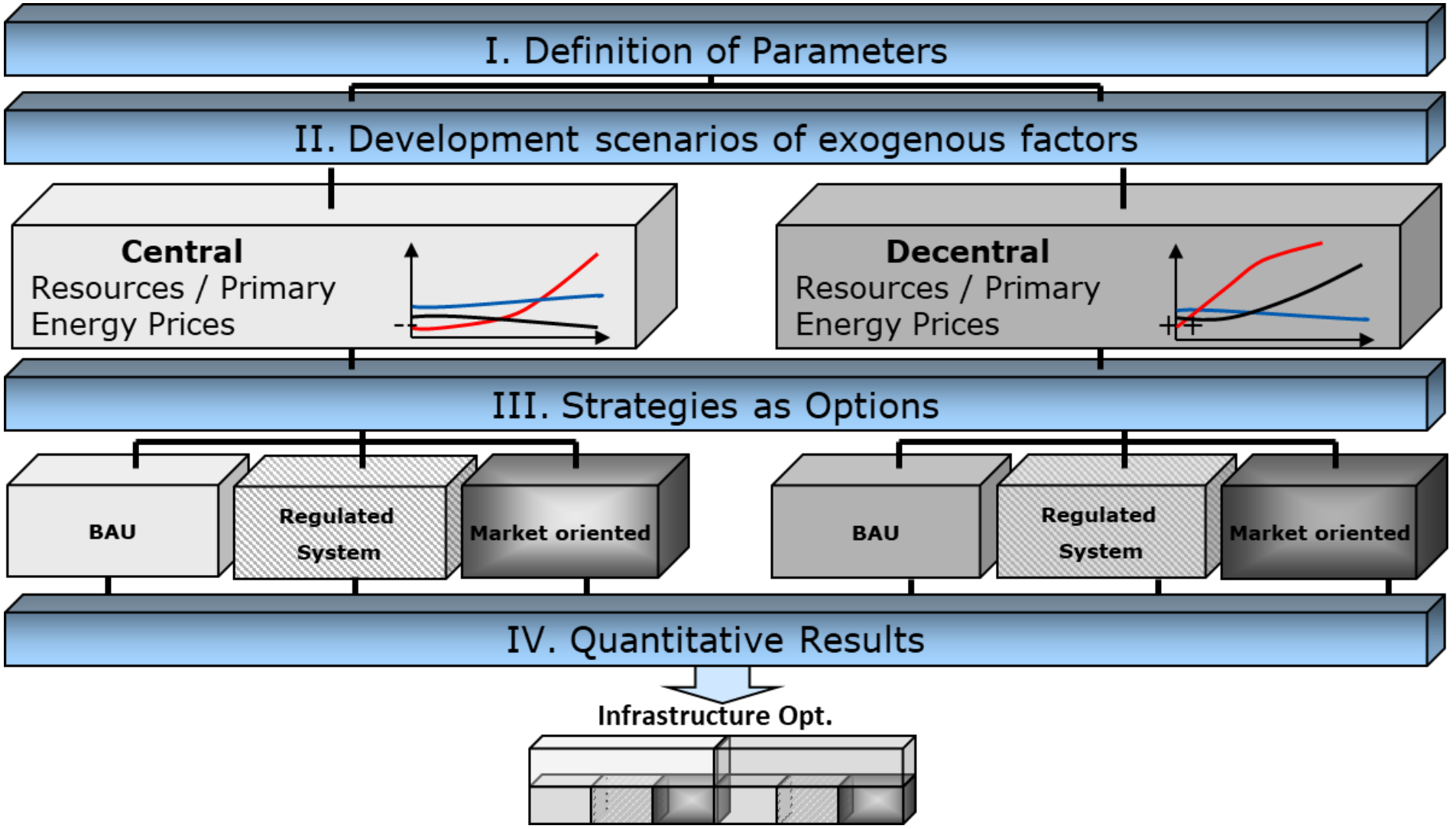
1. Phase
- Analyze the status quo of Smart Grid Technologies and Developments
- Literature and Project investigations

2. Phase
- Workshops, Interviews
- Collect and Analyze Feedbacks

3. Phase
- Development of Coordinated Roadmap

- Do they influence each other?
- Are there some preconditions which have to be solved first?
- Is it possible to define categories and classify the steps?
- The steps should become a start and end time an be put into a timeline => Milestones

Smart Grid Roadmap



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Smart Grid Maturity Model (SGMM)

SGMM is a **management tool** that:

1. Offers Utilities a common structure for identifying essential aspects of smart grid;
2. Assists Utilities in creating a systematic and prioritized strategy;
3. Allows Utilities to monitor and evaluate their advancement towards smart grid implementation.

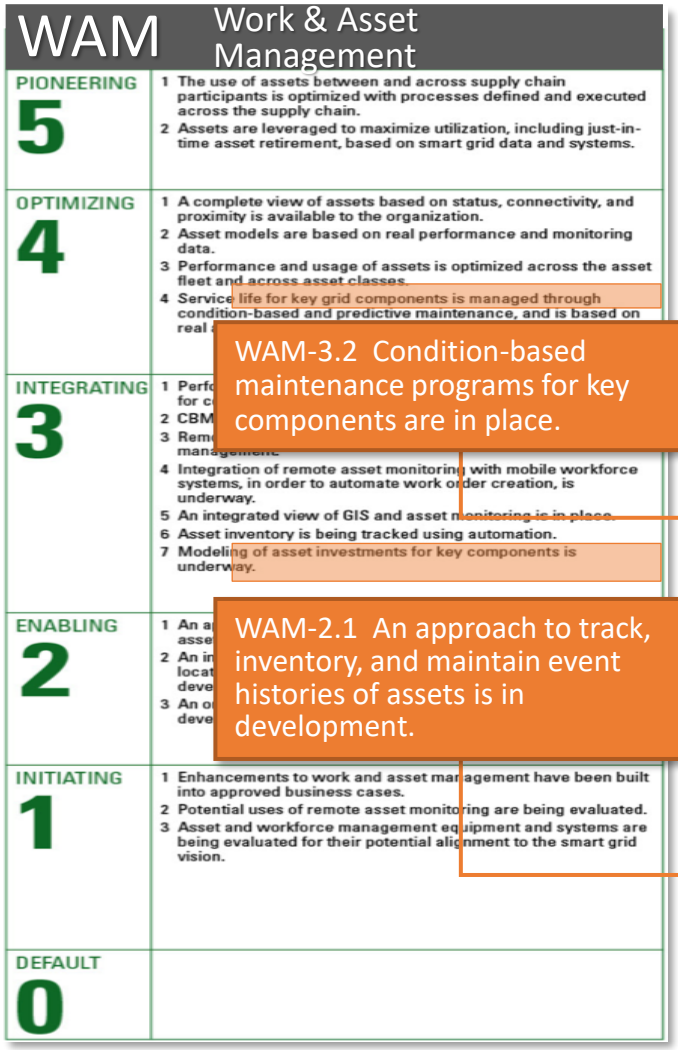
Global Intelligent Utility Network Coalition (GIUNC) developed SGMM and it is currently under the stewardship of the Software Engineering Institute at Carnegie Mellon University

Source: SEI http://www.sei.cmu.edu/smartgrid/

SGMM Domains

SMR	Strategy, Mgmt & Regulatory *Vision, planning, governance, stakeholder collaboration*	TECH	Technology *IT architecture, standards, infrastructure, integration, tools*
OS	Organization and Structure *Culture, structure, training, communications, knowledge mgmt*	CUST	Customer *Pricing, customer participation & experience, advanced services*
GO	Grid Operations *Reliability, efficiency, security, safety, observability, control*	VCI	Value Chain Integration *Demand & supply management, leveraging market opportunities*
WAM	Work & Asset Management *Asset monitoring, tracking & maintenance, mobile workforce*	SE	Societal & Environmental *Responsibility, sustainability, critical infrastructure, efficiency*

SGMM Compass Survey and Maturity Levels



WAM	Work & Asset Management
PIONEERING 5	1 The use of assets between and across supply chain participants is optimized with processes defined and executed across the supply chain. 2 Assets are leveraged to maximize utilization, including just-in-time asset retirement, based on smart grid data and systems.
OPTIMIZING 4	1 A complete view of assets based on status, connectivity, and proximity is available to the organization. 2 Asset models are based on real performance and monitoring data. 3 Performance and usage of assets is optimized across the asset fleet and across asset classes. 4 Service life for key grid components is managed through condition-based and predictive maintenance, and is based on real
INTEGRATING 3	1 Perfo for c 2 CBM 3 Remo 4 Integration of remote asset monitoring with mobile workforce systems, in order to automate work order creation, is underway. 5 An integrated view of GIS and asset monitoring is in place. 6 Asset inventory is being tracked using automation. 7 Modeling of asset investments for key components is underway.
ENABLING 2	1 An a asse 2 An in locat deve 3 An o deve
INITIATING 1	1 Enhancements to work and asset management have been built into approved business cases. 2 Potential uses of remote asset monitoring are being evaluated. 3 Asset and workforce management equipment and systems are being evaluated for their potential alignment to the smart grid vision.
DEFAULT 0	

WAM-3.2 Condition-based maintenance programs for key components are in place.

WAM-2.1 An approach to track, inventory, and maintain event histories of assets is in development.

Contains

- One question for each expected characteristic in the model and
- Attribute and performance questions

Example questions:

WAM-3.2 For what percentage of key components have you implemented condition-based maintenance that uses real-time data from asset monitoring to drive maintenance and replacement decisions?

A. 0%
B. 1 - 25%
C. 26 - 50%
D. 51 - 75%
E. 76 - 100%

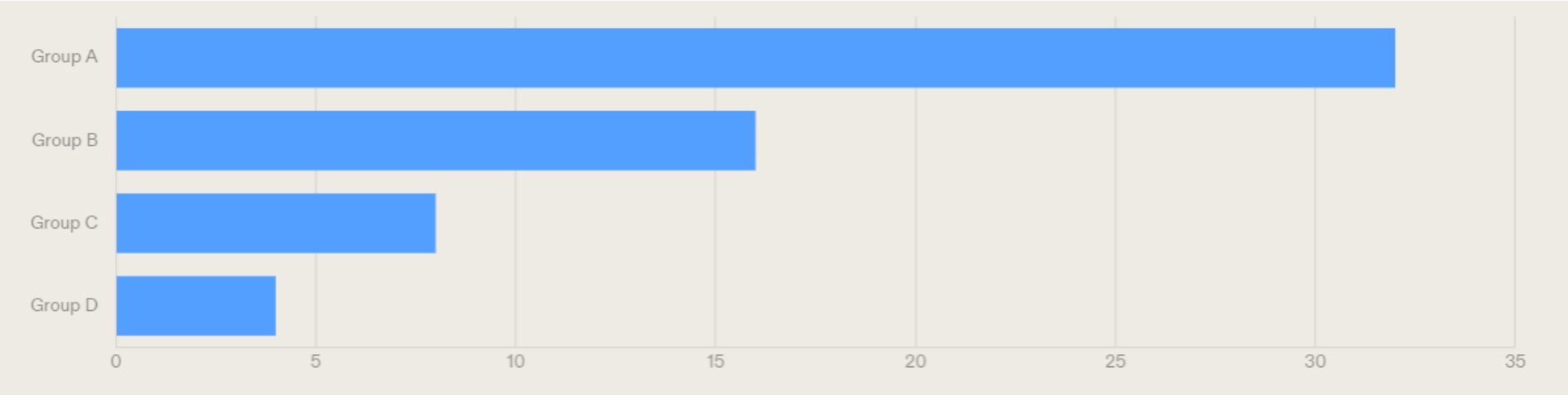
WAM-2.1 Have you established an approach to track, inventory, and maintain event histories of assets using smart grid capabilities?

A. No
B. In documented plan including committed schedule and budget
C. In development
D. Being piloted
E. Completed

SGMM Compass Survey and Maturity Levels

5 Pioneering	Breaking new ground; industry-leading innovation, benchmark.
4 Optimising	Optimising smart grid technologies to bring about measurable performance improvements.
3 Integrating	Integrating smart grid technology deployments across the organization.
2 Enabling	Capex based on clear strategy, implementing initial projects to start building smart grid
1 Initiating	Taking the first steps, exploring options, conducting experiments, developing smart grid vision.
0 Default	Default level (status quo).

Smart Grid Maturity Model (SGMM)



Relevance to Utility Digitalization

- SGMM provides a framework for assessing the current maturity level of utility digitalization and helps identify areas for improvement and pathways for advancement in adopting smart grid technologies and practices.

Customizing the SGMM for African Utilities

- The SGMM approach can be customized to address the specific challenges and opportunities faced by African utilities.
- Local factors such as limited infrastructure, varying regulatory frameworks, and unique market conditions need to be considered in the implementation of the SGMM.

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Digitalization Roadmap

Scope

- Define the areas of the electricity utility that will be digitalized
- Identify the key processes and systems that will be impacted by the digitalization efforts

Objectives

- Define the objectives of the digitalization roadmap
- Align the objectives with the overall business strategy and goals of the electricity utility.

Milestones

- Break down the digitalization roadmap into specific milestones and timelines.
- Set milestones to track progress and ensure accountability

Integration

- Assess the existing systems and processes within the electricity utility and identify the integration points with the digital initiatives.
- Ensure seamless integration between the digital systems and the legacy systems to avoid disruptions and maximize efficiency.

Prioritization

- Prioritize digital initiatives based on their impact, feasibility, and strategic importance.
- Evaluate the potential benefits and risks of each initiative and prioritize accordingly.
- Consider the resources and capabilities required for each initiative.

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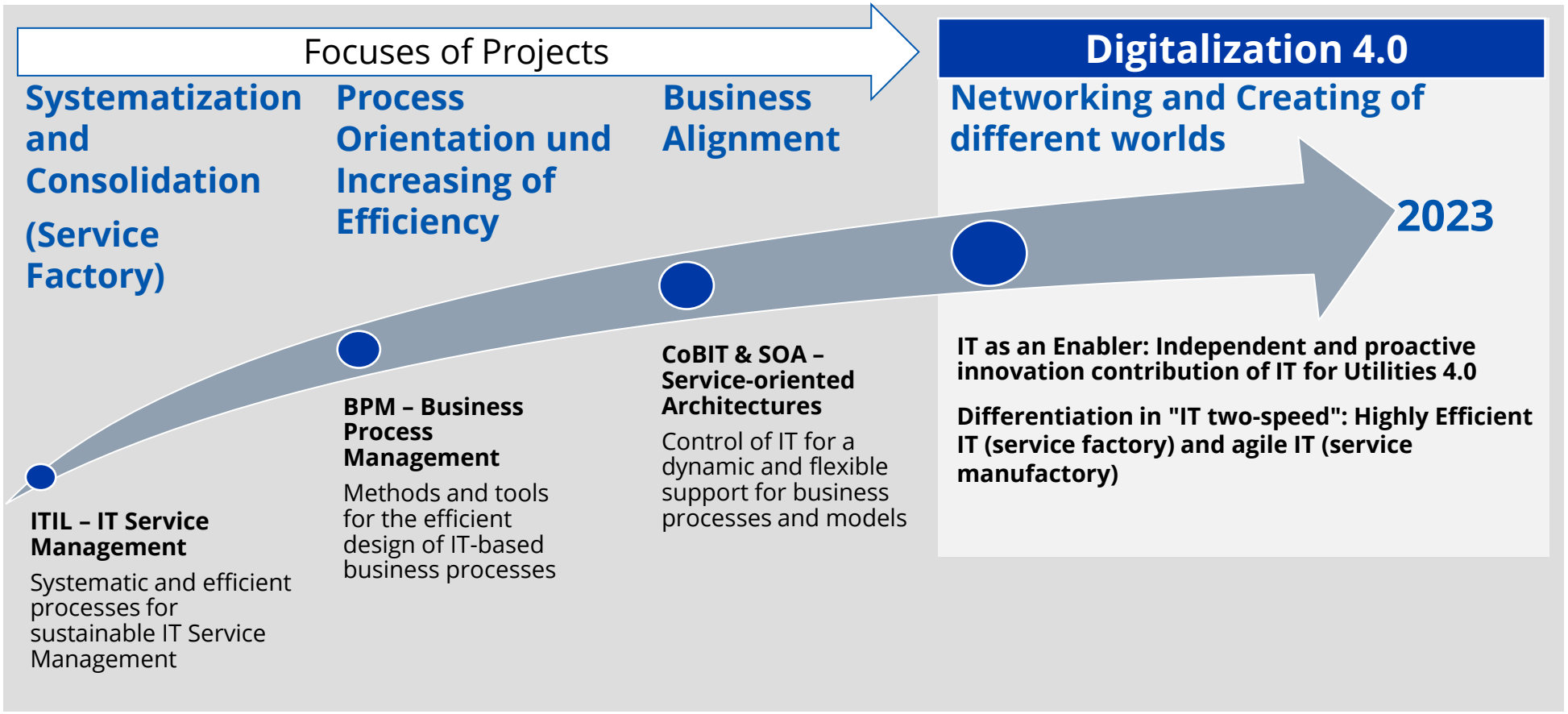
IT Roadmap for Electricity Utilities

Trends and Perspectives of the IT Management (greatly simplified)



IT Roadmap for Electricity Utilities

Overview of IT Backbone

- Digitalization requires a robust IT infrastructure.
- Upgrading systems and networks is essential for seamless operations.
- Cybersecurity measures must be implemented to protect critical data.
- Effective data management strategies are crucial for efficient utility operations.

Planning for IT Infrastructure Upgrades

- Assess current infrastructure and identify areas for improvement.
- Develop a roadmap for upgrading systems, networks, and hardware.
- Consider scalability and future technology advancements.

Cybersecurity Measures

- Implement robust security measures to protect against cyber threats.
- Conduct regular vulnerability assessments and penetration testing.
- Train employees on cybersecurity best practices.

Data Management Strategies

- Establish data governance policies and procedures.
- Implement data analytics tools for actionable insights.
- Ensure data integrity, quality, and privacy.

Best Practices for IT Governance

- Define clear roles and responsibilities for IT management.
- Establish IT governance frameworks and processes.
- Ensure compliance with industry regulations and standards.

Compliance in the Utility Sector

- Understand and adhere to regulatory requirements.
- Implement controls to mitigate compliance risks.
- Regularly audit and monitor IT systems for compliance.

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Content for Typical Roadmap for the Transformation

1. Current State Assessment

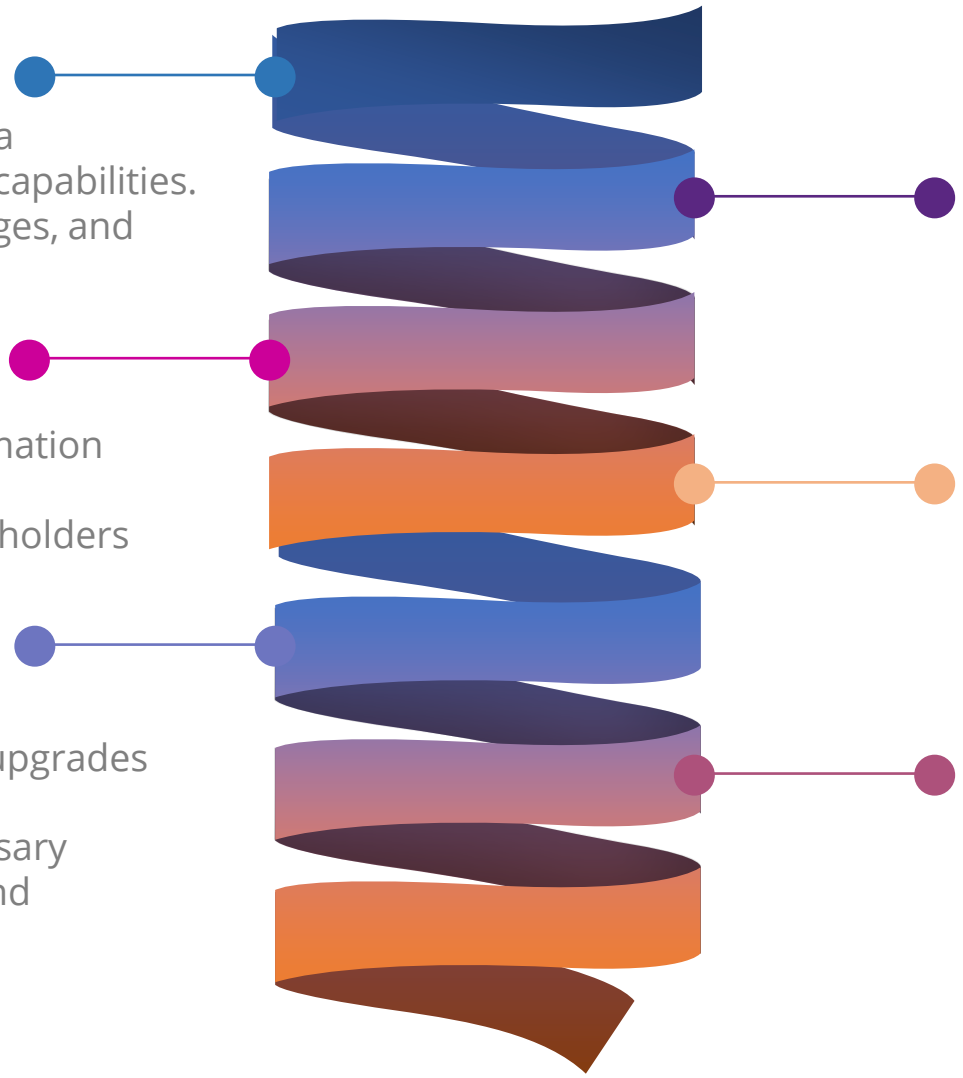
- Analysis of current IT/OT systems, data management practices, and analytics capabilities.
- Identification of existing gaps, challenges, and opportunities in current operations.

3. Governance and Leadership

- Structure for overseeing the transformation process.
- Roles and responsibilities of key stakeholders and leadership teams.

5. Technology and Infrastructure Plan

- Assessment of required technology upgrades or new implementations.
- Plan for building or enhancing necessary infrastructure, including hardware and software needs



2. Vision and Strategic Objectives

- Clear articulation of the vision for the data-driven transformation.
- Definition of strategic objectives and how they align with overall business goals.

4. Key Transformation Areas

- Specific areas for transformation such as IT/OT convergence, customer data management, grid analytics, etc.
- Prioritization of initiatives based on impact, feasibility, and alignment with strategic objectives.

6. Data Management Strategy

- Policies for data collection, storage, processing, and security.
- Approach to data governance and quality control.

Content for Typical Roadmap for the Transformation

7. Analytics and Intelligence Development

- Detailed use case planning
- Strategy for developing advanced analytics capabilities.

9. Change Management Strategy

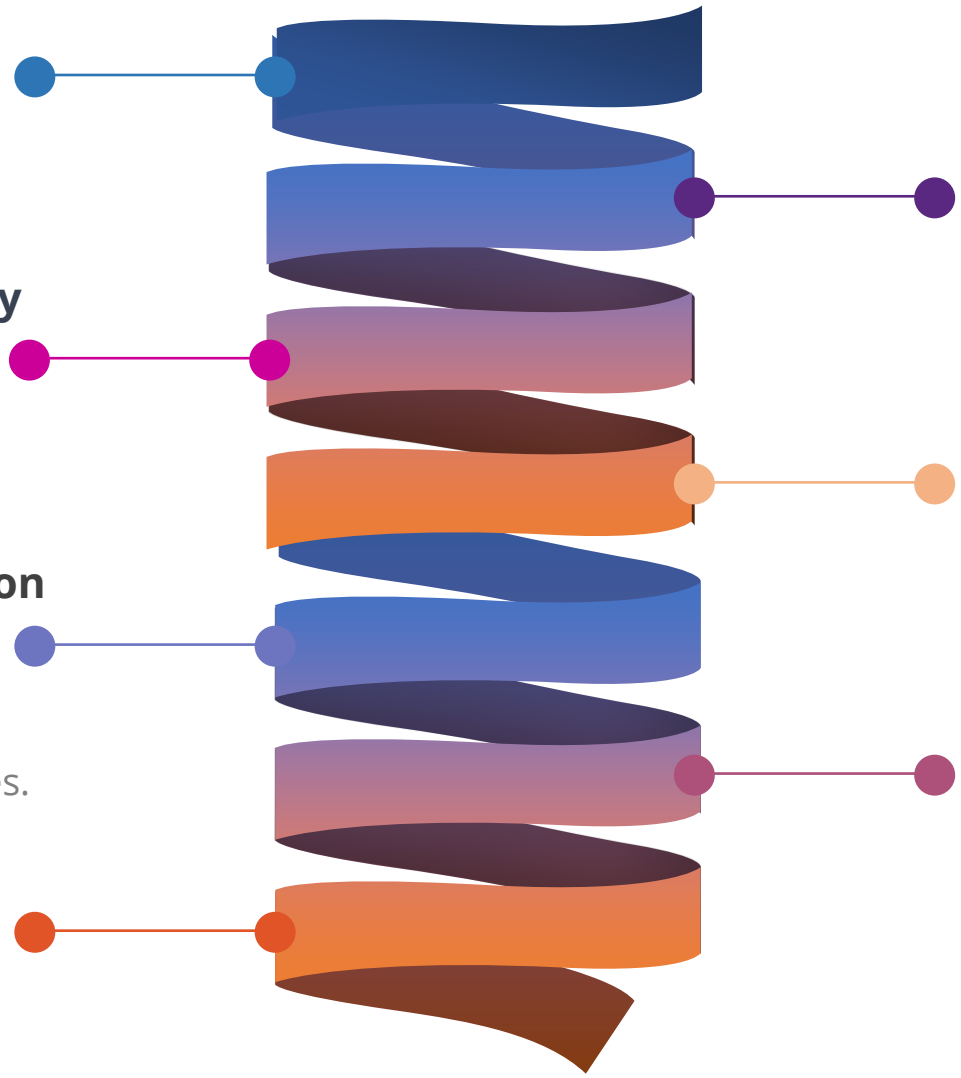
- Approach for managing organizational change, including communication plans, training programs, and stakeholder engagement.

11. Budget and Resource Allocation

- Detailed budget outlining the financial investment required.
- Plan for resource allocation, including human capital and technology resources.

13. Long-Term Sustainability Plan

- Strategy for ensuring long-term viability and adaptability of the transformation initiatives.
- Plans for future scalability and continuous improvement.



8. Implementation Plan and Timeline

- Detailed action plan with specific initiatives, tasks, and milestones.
- Realistic timeline for implementation phases.

10. Performance Metrics and KPIs, CBA

- Definition of KPIs to measure progress and success.
- Framework for regular monitoring and reporting.

12. Pilot Projects and Prototyping

- Description of pilot projects to test and refine transformation initiatives.
- Feedback mechanisms and iterative improvement processes.

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Guide for Utilities, Key Takeaways (1/4)

Developing a Practical Roadmap

- Establishing a comprehensive and realistic roadmap is crucial for utilities, particularly in developing countries, embarking on data-driven transformation. This roadmap should encompass all key components including IT/OT technology implementation, data governance, and the development of analytics capabilities.

Strategic Prioritization

- Emphasizing strategic prioritization of initiatives, utilities are advised to target projects that offer significant and quick benefits, known as 'low-hanging fruits', to build momentum and demonstrate the value of data-driven practices

Learning from Others' Experiences

- Utilities should learn from the experiences of others in similar transformations, adapting strategies and avoiding pitfalls based on these insights. Conducting thorough cost-benefit analyses is also crucial to ensure sustainable investments.

Guide for Utilities, Key Takeaways (2/4)

Addressing Technological Underutilization and Silos

- Common issues such as underutilization of technology and siloed IT and OT implementations need to be addressed. Strategies include aligning technology with business processes, providing adequate training, and fostering interdepartmental collaboration.

Project Management and Tracking

- Establishing a Project Management Office (PMO) structure is recommended for strategic oversight and coordination of transformation initiatives. A systematic approach to tracking progress and realization of KPIs is essential for monitoring the impact of these projects.

Data Collection and Governance

- Effective data collection mechanisms and robust governance practices are paramount. Emphasis is placed on the quality of data, recognizing the importance of network and customer data managed through systems like GIS and Customer Information Systems.

Guide for Utilities, Key Takeaways (2/4)

Data Models and Pilot Implementations

- Adequate data models are essential for facilitating transformation, and pilot implementations or field trials are encouraged to validate new technologies and identify challenges.

Bridging IT-OT Convergence Gap

- Bridging the cultural and operational gap between IT and OT teams is crucial for enhanced efficiency and innovation. Harmonizing skill sets across power systems, ICT technologies, and data science is vital.

Guide for Utilities, Key Takeaways (4/4)

Ensuring Interoperability and Handling Legacy Systems

- Compliance with interoperability standards is emphasized, and a careful approach to managing legacy systems is advised, balancing the cost and benefits of upgrades.

Building a Data-Driven Culture

- Fostering a data-driven culture across the enterprise is essential, requiring leadership commitment, clear communication strategies, and building data literacy and analytics capabilities.

Engaging with Policymakers and Regulators

- Proactive engagement with policymakers and regulators is necessary to showcase the benefits of data-driven transformation and shape a supportive regulatory environment.

Key Takeaways for Adoption of Data-driven Practices

The exploration of electricity utilities in developing countries highlights the critical role of data-driven practices in achieving operational excellence and long-term sustainability. Key points include:

Integrating Physical and Digital Assets

- Integrating physical grid assets with business systems, underpinned by data utilization.
- This integration aligns strategies with core objectives and operational needs.

Addressing Challenges and Seizing Opportunities

- Developing countries face challenges like low electrification, grid constraints, and distribution inefficiencies.
- Overcoming these requires innovative financial planning, adaptive business and revenue models, as well as skilled workforce development.

Building a Roadmap for Transformation

- A practical and realistic roadmap is vital for successful transformation.
- It should include strategic prioritization of initiatives, thorough cost-benefit analyses.
- Targeting 'low-hanging fruits' can demonstrate the benefits of data-driven practices and build momentum.

Envisioning a Future-Ready Utility Landscape while Addressing the Challenges of Today

- Data-driven practices are crucial for creating a future-ready utility landscape, ensuring operational excellence, cost-efficiency, and sustainable growth.
- This transformation not only modernizes utilities but also fosters a more efficient and equitable energy future.

Thank You

Gökhan Tosun, gokhan.tosun@mrc-tr.com

https://www.linkedin.com/in/gokhantosun/