

Smart Meter Implementation Guidelines

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Overview

- Smart Grid and in particular Smart Metering are being installed by utilities internationally.
- Very large investments are made in upgrading the “smartness” of the utility distribution networks as well as metering installations.
- Manufacturers are releasing new smart equipment on the market every day and every offer seems to be the solution to all challenges facing utility managers.
- Financial managers may perceive these technologies to be a quick fix for their revenue losses and financial viability.
- The big challenge however is the substantial investment required to install and operate the new devices.

Big Question

The obvious question arises: “What should my utility do to ride this new wave of technology and how should we go about doing it, if at all?”

You will need Wisdom



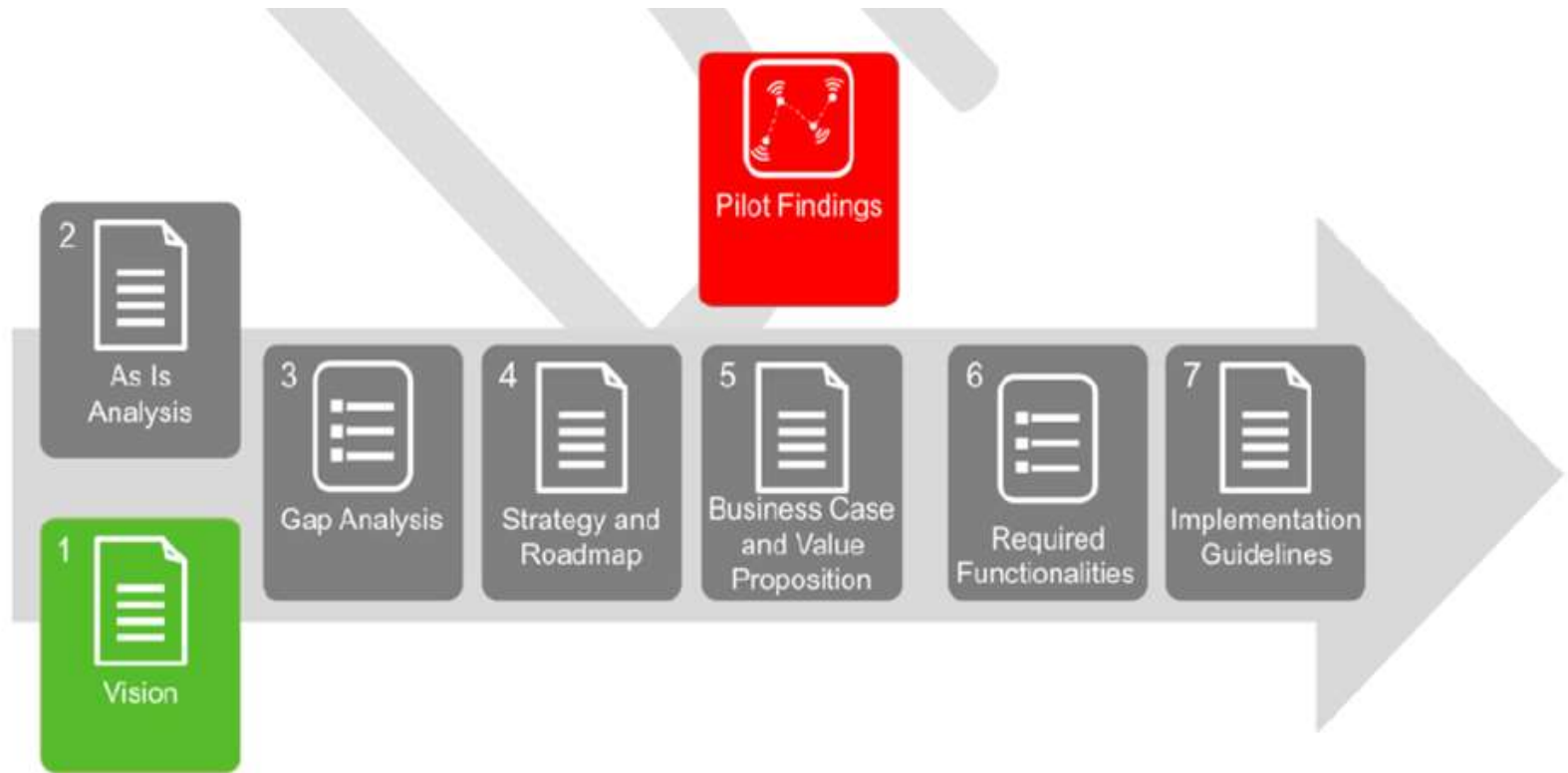
Smart Grids

- Advanced Metering Infrastructure (AMI)
- Customer Side Systems (CS)
- Demand Response (DR)
- Distribution Management System/Distribution Automation (DMS)
- Transmission Enhancement Applications (TA)
- Asset/System Optimization (AO)
- Distributed Energy Resources (DER)
- Information and Communications Integration (ICT)
- Source SANEDI

Smart Metering

- AMI (Advance Metering Infrastructure) or SM (Smart Metering) is a component of the SG and includes remote metering, load control, remote connect/ disconnect as well as establishing a bidirectional link from the utility to each customer service point.
- This is more than often the first and a very important component rolled out in the SG implementation strategy. SM enables direct communication with the customer consumption metering via various communication media

Process to implement SG



Source: Sanedi

SG maturity assessment

- Standardised methodology to compare utilities
- Evaluates the current status vs the future aspirations
- Identifies the required functionalities
- Establishes the progress at the various levels of the assessment
- Enables the utility officials to establish their stake in a SG

Compass results: dashboard

City of Ekurhuleni (Energy) Current																
Level	Strategy, Management & Regulatory		Organization & Structure		Grid Operations		Work & Asset Management		Technology		Customer		Value Chain Integration		Societal & Environmental	
5	Grey	0.00	Red	0.13	Grey	0.00	Grey	0.00	Red	0.15	Red	0.20	Grey	0.00	Yellow	0.47
4	Grey	0.00	Grey	0.00	Grey	0.00	Red	0.15	Red	0.17	Red	0.23	Red	0.08	Red	0.34
3	Red	0.18	Red	0.07	Red	0.10	Red	0.14	Red	0.28	Red	0.39	Grey	0.00	Red	0.25
2	Yellow	0.52	Grey	0.00	Red	0.18	Red	0.23	Yellow	0.46	Red	0.33	Red	0.18	Green	0.76
1	Yellow	0.67	Yellow	0.47	Yellow	0.50	Red	0.20	Green	0.72	Red	0.25	Red	0.30	Red	0.15
0	Green	1.00	Green	1.00	Green	1.00	Green	1.00	Green	1.00	Green	1.00	Green	1.00	Green	1.00

Point Range

Meaning



≥ 0.70

Green reflects level compliance within the domain



≥ 0.40 and < 0.70

Yellow reflects significant progress



< 0.40

Red reflects initial progress



= 0

Grey reflects has not started

Start small with the right genes



Why and how do utilities implement SM systems

- **System Objectives**
 - Meeting Legislative requirements
 - Solve revenue/ unit losses
 - Improve operational efficiency
 - Improve customer service

Policy objectives

- Target customer groups
- Target geographical areas
- Electricity tariffs for smart metering
- Enhance the bylaws to support the policies

Business drivers

- Legislative
- Operational efficiency
- Customer services
- Revenue improvement
- Loss reduction
- Cost reduction
- Energy efficiency

Regulatory requirements in RSA

- The drivers for the legislation can be different in the various countries but in South Africa the main driver for the promulgation of regulation 773 of July 2008 was the shortage of generation capacity.
- The regulation basically requires all residential customers with an average consumption of more than 1000kWh per month to be served via a smart metering system on a time of use tariff.
- The SM should also be able to control non-essential loads like water heaters, air conditioners and pool pumps
- The main objectives were thus to reduce electricity use by implementing more efficient technologies.

Cost factors

- Metering installation and maintenance
- Meter enclosures
- Communication installation and operation
- Back office systems and software
- ICT systems
- Skilled staff and operational cost
- Customer communication
- RFP/ Project consultancy

Possible benefits

- **Operational efficiency**
 - Improved processes
 - Network visibility and upgrading
 - Outage management
 - Maintenance management
- **Customer satisfaction**
 - Personal energy management,
 - Cost and consumption feedback
 - TOU tariffs
- **Energy efficiency**
 - Peak demand and network management
 - CO2 emission management
 - Reduction in energy consumption per customer
- **Demand response**
 - Optimizing network load
 - Energy sourcing optimized

Possible benefits continued

- **Revenue protection**
 - Tamper and fraud detection
 - Improved billing and revenue collection
 - Non-technical loss reduction
- **Revenue collection**
 - Improved meter reading processes
 - Improved billing accuracy
 - Better Revenue management
 - Improved cash flow
- **Systems integration**
 - Improved management of information
 - Improved management decision making
 - Information availability to all stakeholders including the customer

How do I plan the roll out of a system

- Get professional assistance
- Know what you would like to accomplish
- Clearly define the objectives
- Define a strategy to address the objectives
- Take all cost factors into consideration
- Ensure that you acquire proven technology
- Stick to the correct standards
- Ensure that the new system is integrated into your existing system
- Ensure that your staff is effectively skilled
- Acquire the services of reliable system support staff or outsource to expert companies.

Implement required functional tools



Implementation team

- Utility steering committee to take ownership of the SM system and functionalities
- Experienced project management
- Experienced installation teams
- QA processes teams
- Installation data management
- Customer liaison team

Risk factors

- Vendor lock in due to proprietary equipment
- Unreliable communication systems
- Unreliable SM equipment
- Under skilled personnel
- Technology aging and incompatibility
- Customer acceptance
- Financial viability

Communication options

- GPRS (concentrator or meter to head end)
- PLC (last mile)
- Radio Mesh (last mile)
- Fibre optics (back haul)
- Spread Spectrum Radio (meter or concentrator to Head end)

Security

- Consider Cyber Security and Privacy as a vital part of your system implementation
- Security efforts should not only include smart meters
- Security training of operations staff and consumers
- A set of standards and guidelines that include (amongst others):
 - reference risk assessment methodology
 - methodology for assessing interdependencies
 - incident handling strategy
 - establish security governance
- Consider Cyber Security in all domains and phases of the system lifecycle

Conclusion

- The **planning and implementation** of SM systems **requires experience** and knowledge of the systems and standards in the industry
- It is also essential to select **appropriate technology** to ensure compatibility with future as well as existing and legacy systems
- Compile a **cost benefit analysis** and ensure that the utility implement functionality where the maximum benefit can be derived for the supplier and the customer

Conclusion (continued)

- Ensure that your staff, customers and all the **utility stakeholder** form part of your **implementation team**
- The **success** of a SM system roll out depends on **co-operation** between technical, financial, ICT and management
- **Manage the risks, quality and functionality** of the new system effectively to operationalise information to the advantage of the utility.

Do you want genetic hybrid like this ?



Or grow it into a powerful thorough-bred?



Smart Grid roll out?

