



Global Business services

Lessons from building the Smart Grid

Malta Case
IUBS
Integrated Utilities Business Systems



Destination: Smart Island



Currency: Euro
 GDP per Capita: € 13,000
 W&E Accounts: 250,000



Location: 95km South of Italy, 290km North African coast
Structure: Archipelago: Malta, Gozo and Comino
Climate: Mild winters and hot dry summer
Area: 316 Km²
Language: Maltese, English
Population: 410,290

IUBS: addressing the Challenge

A complex series of challenges required immediate attention to ensure that Malta is able to deliver affordable secure energy and water while protecting the environment.



Water Service Corporation provides water from underground fresh water and **more than half of its water supply by electrically powered desalination plants**

- Supplies drinking water for all Malta
- Manages waste water for all Malta
- WSC handles the Billing Functions for both itself as well as Enemalta.
- 1,300 employees
- 100% government owned

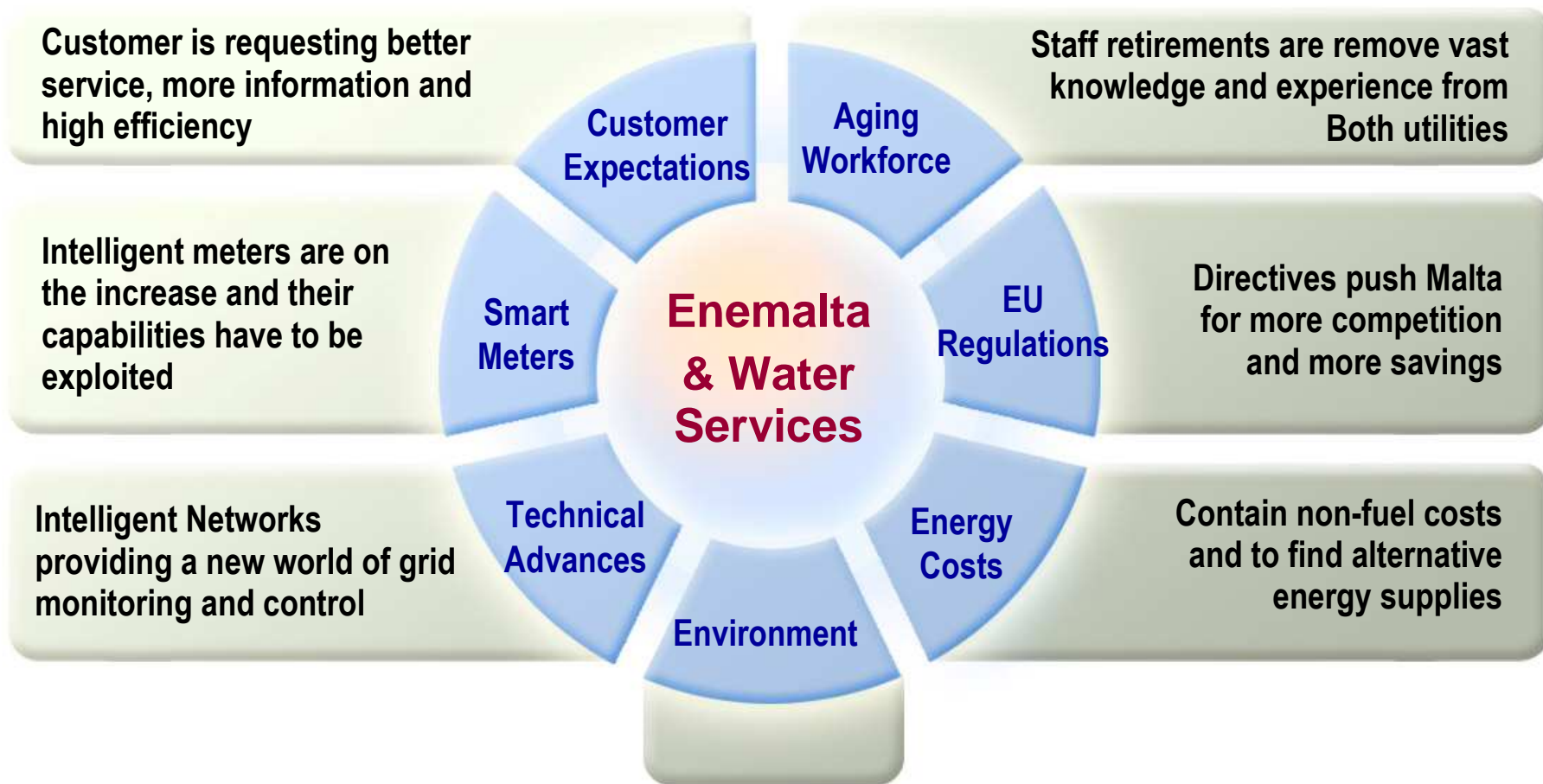


Enemalta Corporation generates electricity entirely by **imported fossil fuel**

- Small isolated system
- Vertically integrated
- 1,400 electricity related employees
- 100% Government owned
- Fuel oil dependency

The Business Case

The need of a Smart Grid



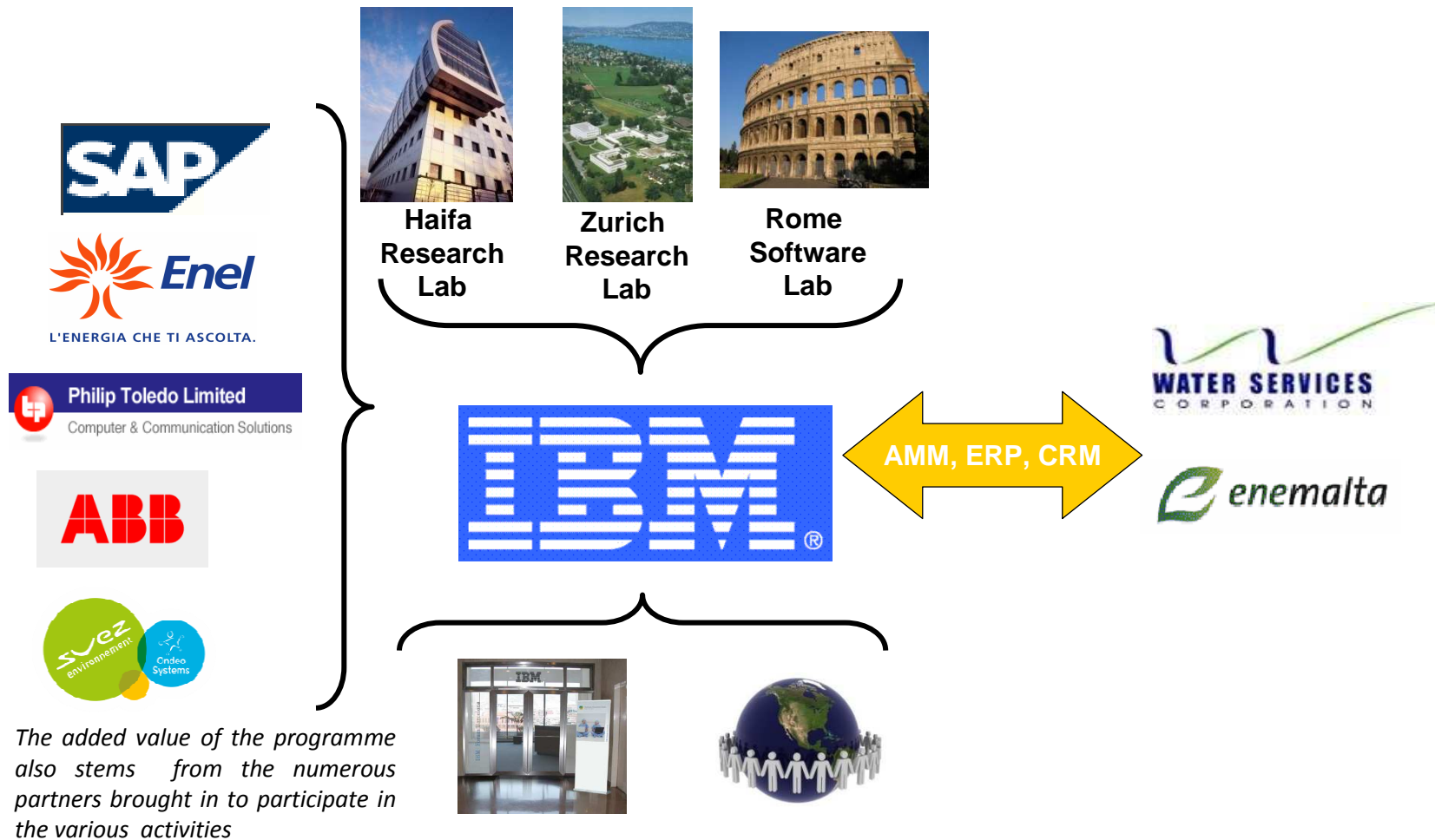
Electricity Generation is one of the largest producer of emissions

The utilities and IBM ensured that the IUBS programme was geared to contribute towards the achievement of the strategic goals

- Attain self-sustainability
- Efficient Processes
- Customer Focus
- Reduce Commercial & Technical Losses
- Improve Customer Service Quality
- Respectful to the Environment
- Integrated Systems & Information
- Regulation Compliant & Transparency
- Aligned Processes, Organization, Systems and Culture



In December 2008, IBM partnered with Water services and Enemalta and engaged on a €75M implementation of the IUBS programme



News of the world's first smart grid nation soon made headlines...



The Washington Post
The New York Times
ON THE WEB
THE WALL STREET JOURNAL.

Building a smarter planet, one country at a time.

On the Mediterranean island of Malta, power and water are intricately linked. The nation's electricity is generated entirely by imported fossil fuel, while the country depends on electrically powered desalination plants for over half of its water supply. In fact, about 75% of the cost of water from these plants on Malta is directly related to energy production. Meanwhile, rising sea levels threaten Malta's underground freshwater source.

This presents a complex, interconnected series of challenges that require immediate attention to ensure that the country has sustainable resources for the future.

A smarter planet needs smarter energy systems. That's why the Maltese national power and water utilities—Enemalta and Water Services Corporation—are partnering with IBM to help their country become the first in the world to build a nationwide smart grid and a fully integrated electricity and water system.

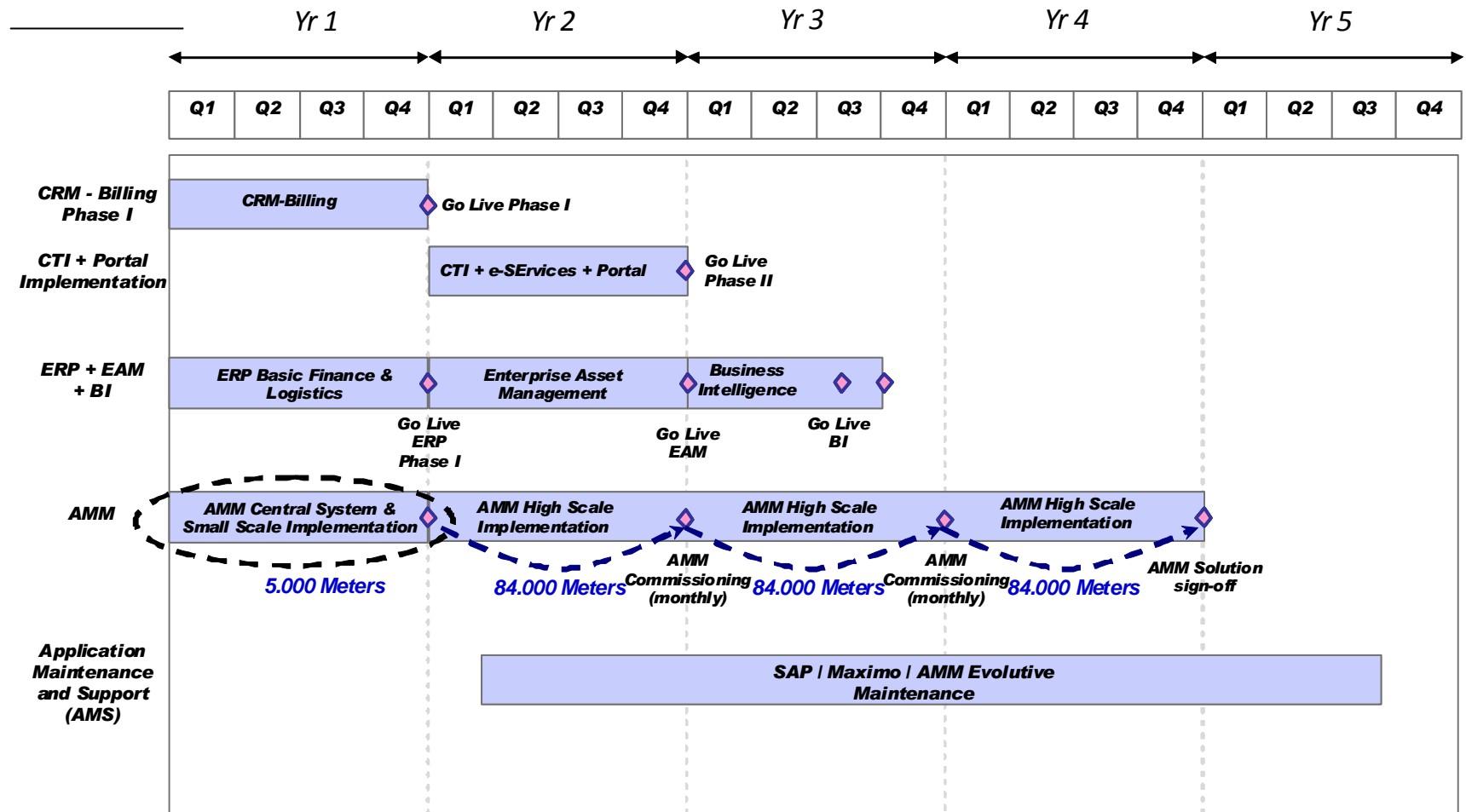
This system will be able to identify water leaks and electricity losses in the grid, allowing the utilities to more intelligently plan

their investments in the network and reduce inefficiency. 250,000 interactive meters will monitor electricity usage in real time, set variable rates, and reward customers who consume less energy and water. Thousands of intelligent sensors will be deployed along transmission lines, substations, and other existing infrastructure to manage electricity distribution more efficiently and to anticipate problems.

All of this data can then be collected and analyzed to help lower costs, reduce consumption and cut greenhouse gas emissions. By addressing the issues of water and power as a system, the Maltese government can provide citizens with better information to make smarter decisions about how and when they use power—and the country can begin the task of replacing carbon-intensive fuel oil with renewable energy for the future.

Let's build a smarter planet. Join an ongoing conversation about the most critical issues facing our planet today at ibm.com/think

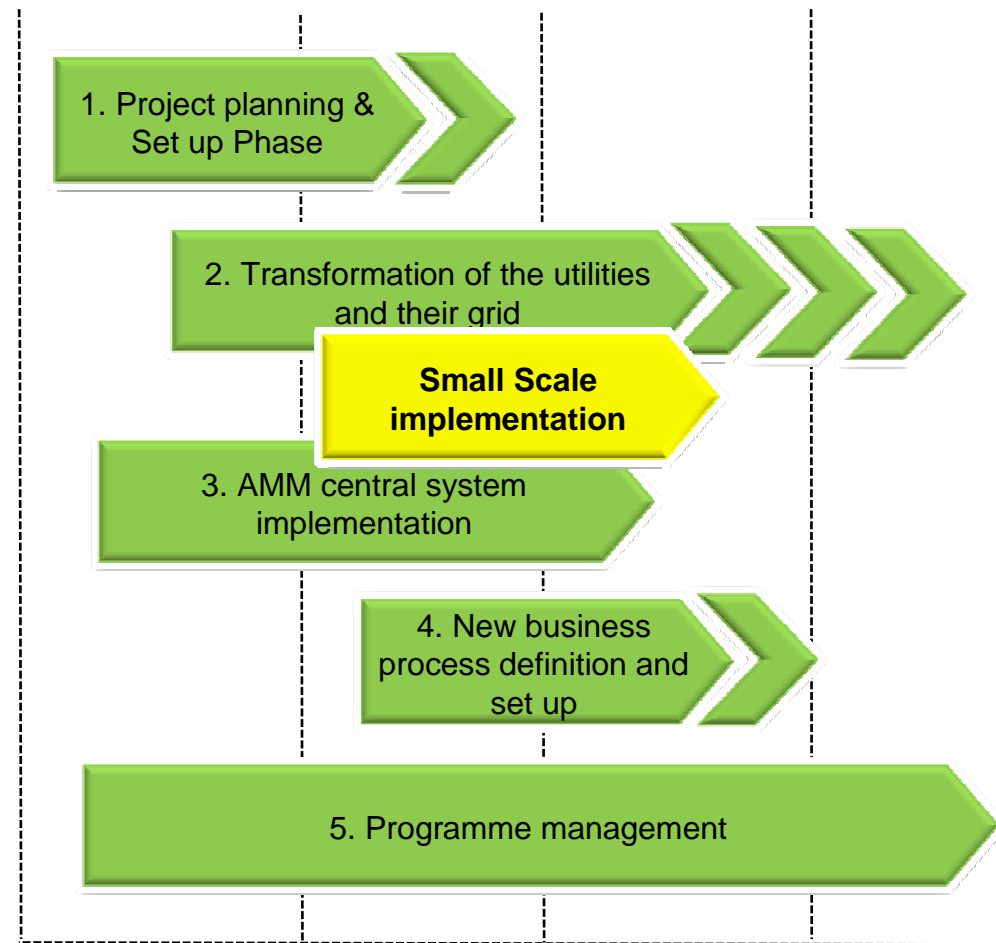
The IUBS programme is a 5 year programme



The timetable and structure of the plan was built in such a way as to ensure business continuity and alignment with the overarching strategy. Moreover, the programme was planned out so as to maximise benefits as early as possible within the programme and facilitate the change AMM introduced.

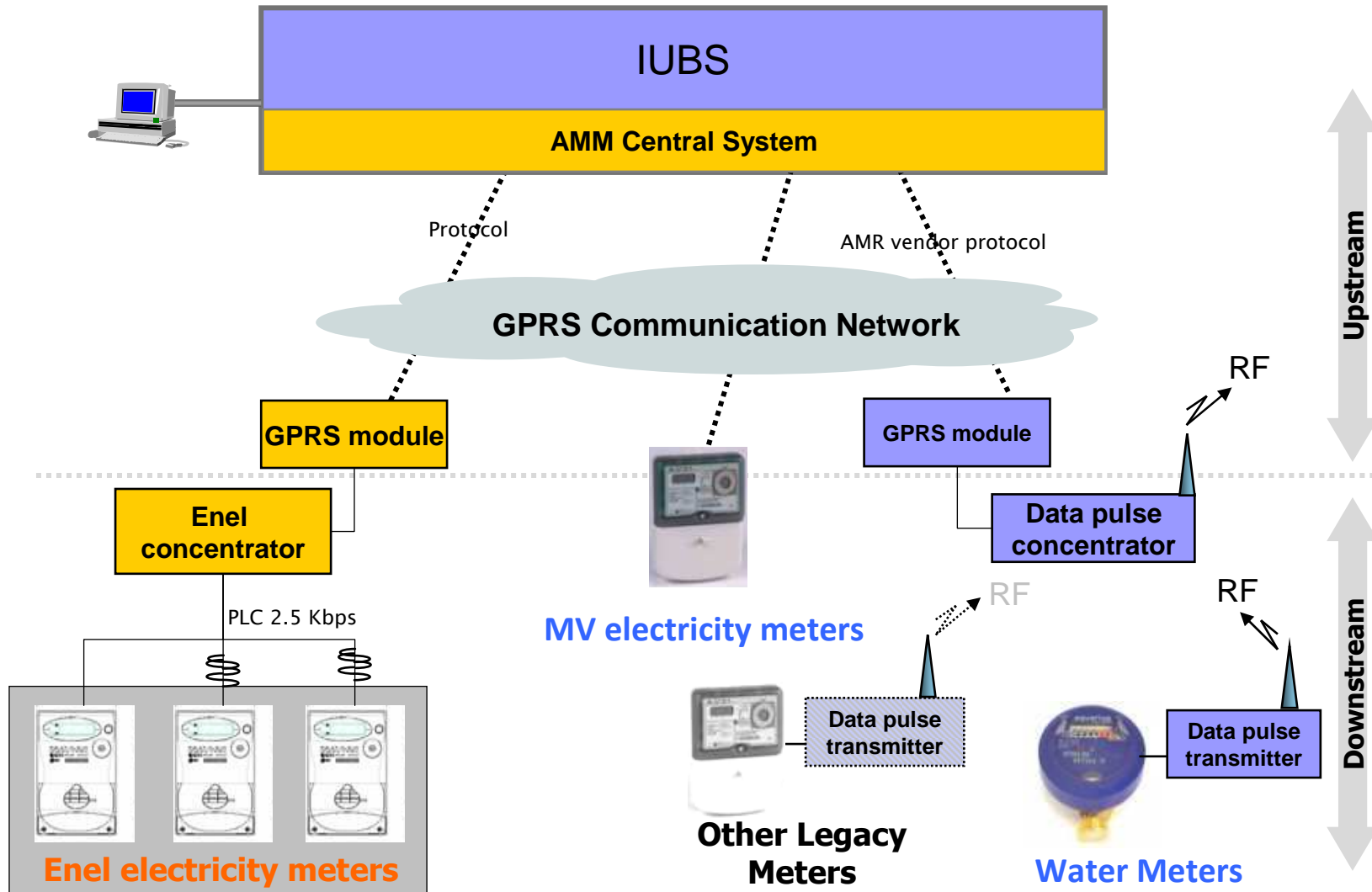
Strong project phasing together with the execution of a Small Scale Implementation (SSI) heavily facilitated the massive roll-out of the AMM implementation

- Deploy 5000 accounts with AMI field devices as part of a small scale implementation (SSI)
- Define processes to make use of the AMI solution
- **Exploit the results of the SSI** to build knowledge, learn, optimize and reengineer almost all facets of the project, **in an effort to smoothen the Massive roll out (MRO)**
- Replace 245.000 electricity meters and install AMR modules for 245.000 water meters as part of the massive roll-out
- Install field communication devices to communicate with e-meters and AMR modules
- Deploy a central IT system for remote meter management



The to-be network

The utility independent metering infrastructure to be deployed would be managed by a single central system



Built on experience and best practice, project teams are structured to streamline work and maximize efficiencies

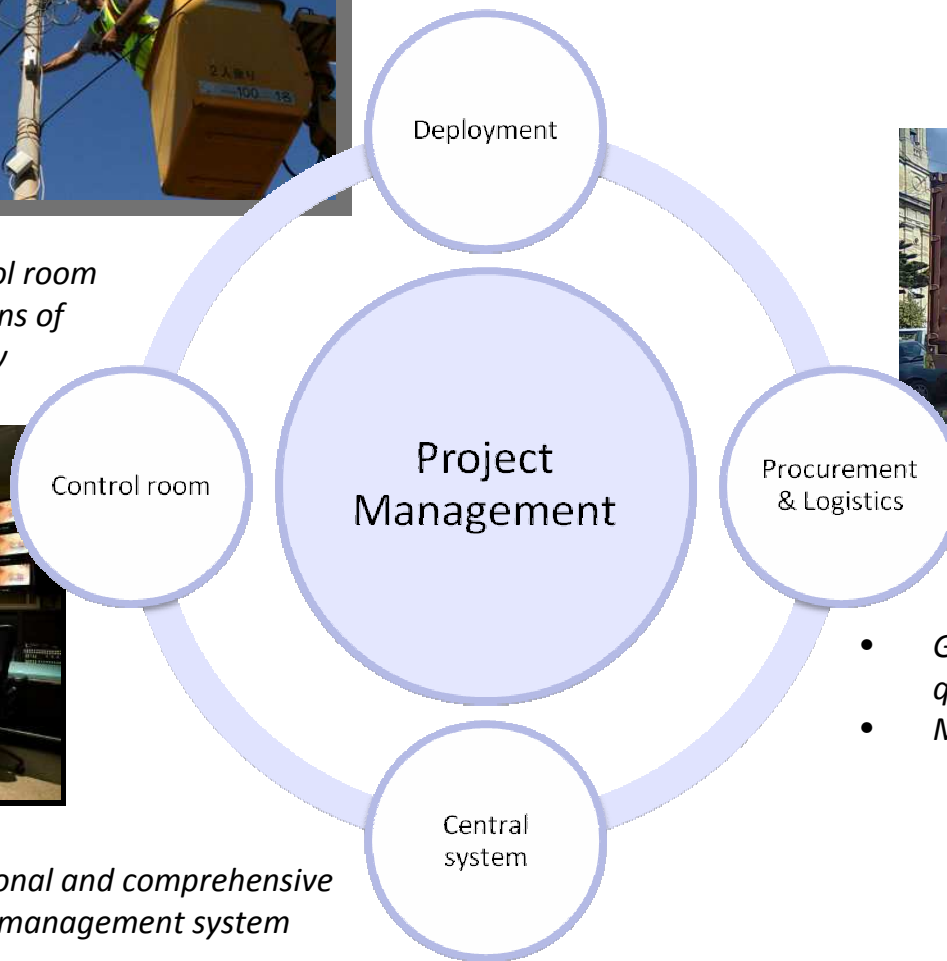


- *Ensure efficiency and quality of installations*

- *Set-up and organize control room*
- *Ensure successful operations of communication technology*

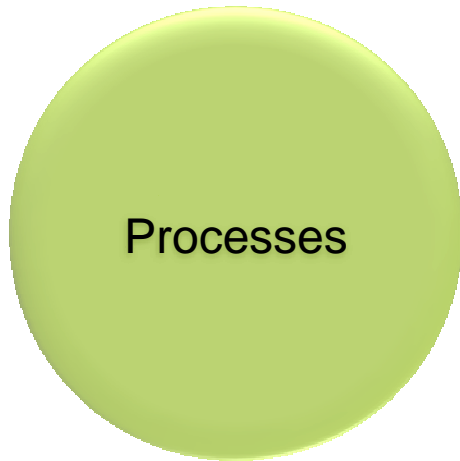


- *Deliver fully functional and comprehensive Automated meter management system*



- *Guarantee availability and quality of devices*
- *Manage Vendor relationships*

The massive deployment needs to be coupled with changes in the SCM processes



- Inventory management processes
- Warehousing processes
- Materials delivery and receipt processes
- Quality assurance processes
- Logistic processes
- Etc.....

The application of industry experience as well as best practice is necessary when implementing new processes that are part and parcel of an AMM solution.

More so when one thinks that the level of operations can increase ten fold during the massive deployment.

It is estimated that for every metering point as much as 5 accessories and materials are needed!



*Therefore
250.000 metering points can result in
1.500.000 devices
going through the warehouse!*

AMM redefines the coordination of delivery and logistic activities

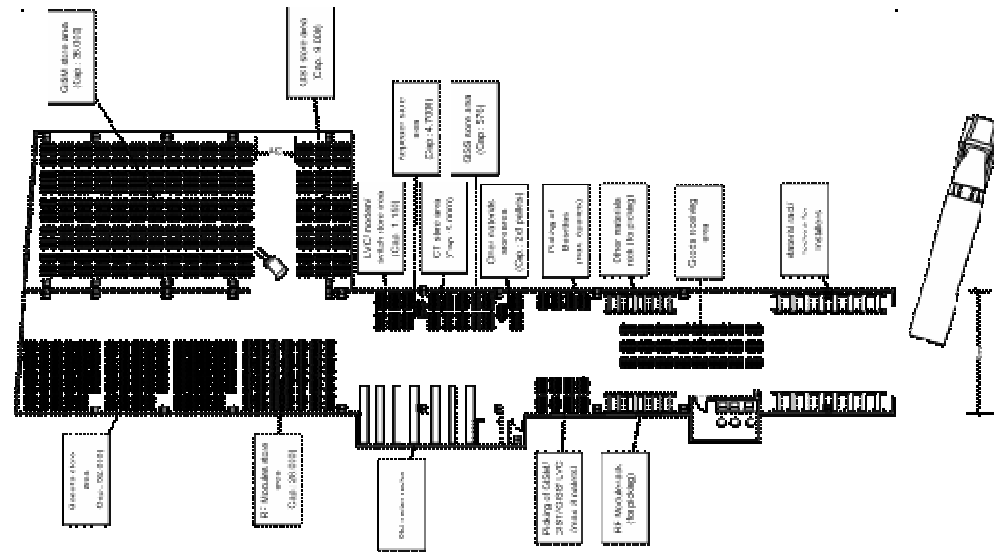


The specialist integrated supply chain (ISC) team was brought in to aid in the increased operational logistics. They also supported in the coordination of complex activities that arise when sourcing devices from several suppliers across the globe


The ISC team also ensured that all devices supplied to IBM customers are compliant with strict IBM resale policies as well as EU regulations

A strategy and handbook relating to all activities was drafted to ensure successful implementation of all activities

- Coordination of deliveries and drafting of delivery plans
- Warehouse assessment and evaluation
- Warehouse design and adaptations
- Support at delivery reception
- Materials guarantee and return
- Quality audits, assurance and assessment



AMM solutions are not always plug and play..... strong partnerships with vendors allow solutions to be customized to meet needs



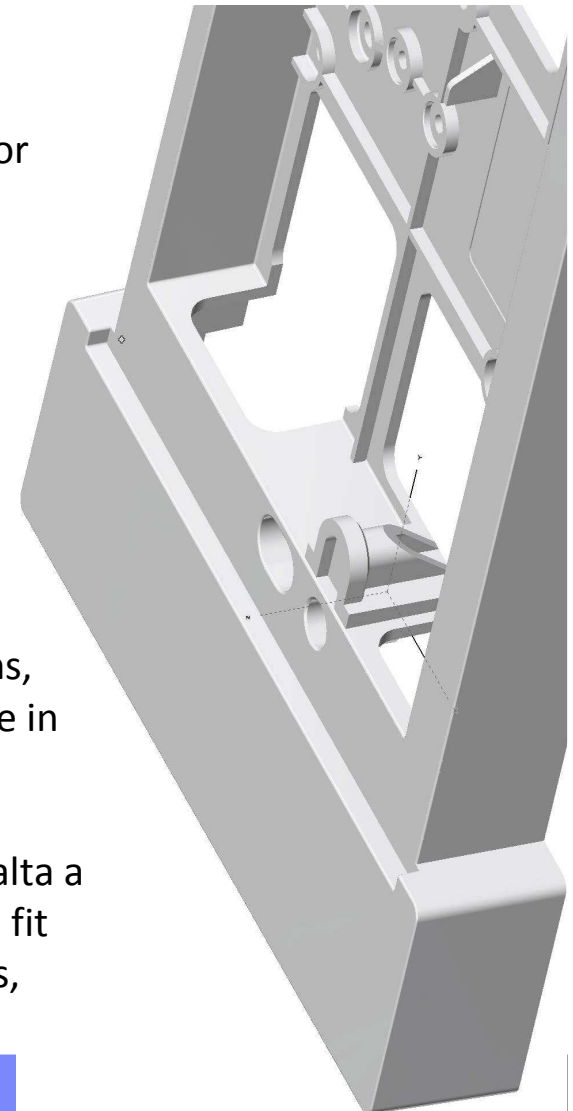
Supplier Relationships

- Multi input model for AMR module
- Base plate design and rollout for smart meter installation
- Field testing equipment and applications
- Firmware adaptations
- Etc.....

IBM worked with suppliers to ensure thoroughness of the solution, commitments across the board and adequate knowledge transfer

Tangible added value in the form of solutions, work-arounds, optimizations, efficiencies etc can be brought about by ensuring that vendors partake in the project as partners

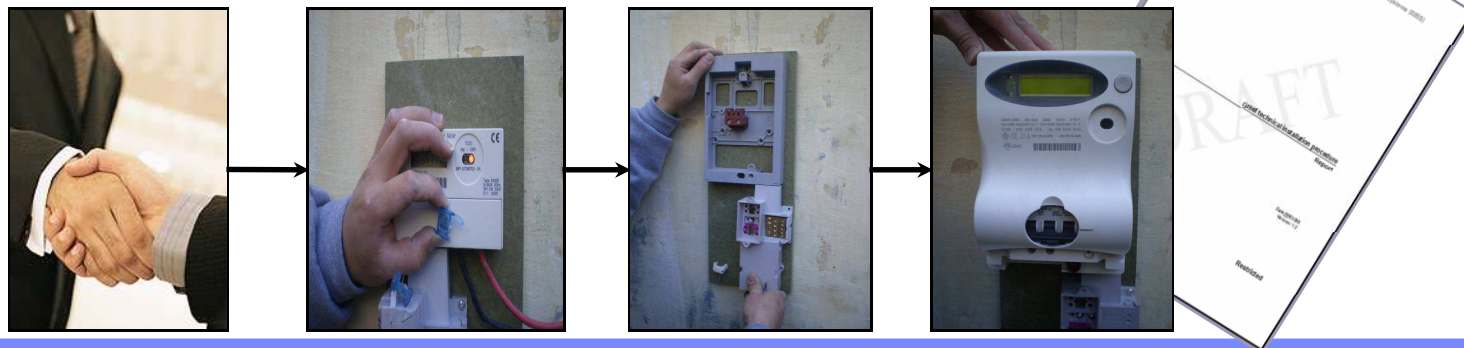
Implementing an AMM system is not always a plug and play activity. In Malta a series of tasks had to be carried out to ensure that the solution would fit the environment. IBM worked with suppliers to deliver enhancements, modifications and customizations to the solutions



The less time it takes to get the solution deployed the sooner the utilities can start reaping the benefits

- Fact: Duration of implementation is inversely related to ROI. Therefore, reducing the time of deployment was a clear objective of the project. One of the biggest contributors is the actual installation of all of the field devices.
- Knowledgeable of this fact, the project team:
 1. Drafted procedures built on the installation experience of over 30 million meters
 2. Championed a communication plan and call centre to facilitate hit rate
 3. Designed an appointment and exception handling system to streamline activities
 4. Assessed various deployment scenarios and selected the one that contributed most to reduction in deployment time
 5. Developed a PDA application centered around this Mantra
 6. Drafted a thorough deployment strategy taking into account elements related to stakeholders, capacity planning, helpdesk and support to installers etc...

*Installation procedure
extract:*



Installing faster requires customer buy-in: an awareness campaign was implemented to support just this

The team led a tailored communications campaign to smoothen the implementation of the AMM system and maximize the hit rate.



• Notification letter and note
 • Use of local networks
 • Personality
 • Printed material

Email: info@arms.com.mt
 FREEPHONE 8007 2222
 More info including FAQs:
www.enemalta.com.mt/smartmetering

External Comm. - SSI

Notification

enemalta **smartMETER**
 Indirizz (Address): _____
 Nru tal-Kont (Account No): _____
 Data li fha ghejna inzuruk (Date we visited): _____
 Min li fih ghejna inzuruk (Time we visited): _____
 Din hija [l-ewwel / it-tieni / l-ahhar] zjara minn impjegati ta' l-Enemalta f'dan l-oġġ biex ikun installat l-Smart Meter.
 This is the [1st / 2nd / last] visit carried out by Enemalta employees at these premises to install a new Smart Meter.
 Afina se [nerggu / mhux se nerggu] nigu f'dan il-post, fid-data u l-fin indikat heven taft.
 We [will / will not] be visiting your premises again on the date and time indicated below.
 [___ / ___ / 20___] bejn (between) [___ : ___] u (and) [___ : ___].
 Jekk tixtieq tagħmel appointment għal gurnata konvenjenti għalik cempel bla blaq fuq 8007 2222. Dan għandu jkun minn ta' l-anoor 48 siegħa qabel l-appuntament li qed jidher.
 Should you wish to set an appointment for a more convenient date you are kindly requested to call Freephone 8007 2222 at least 48 hours in advance of the above scheduled appointment.

Internal Comm.



Int'l Communication

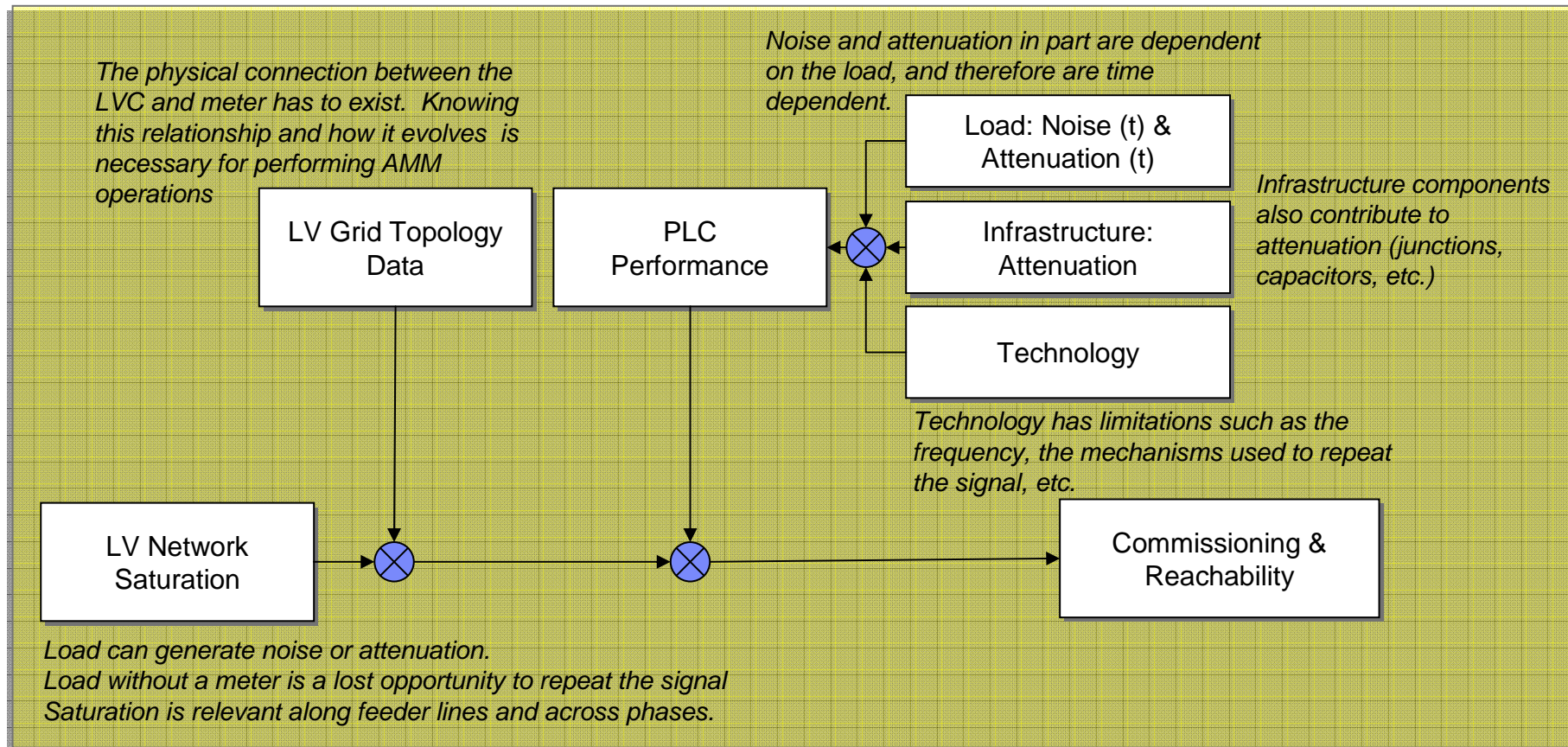
- Videos
- Printed media
- IBM's W3
- Visits by interested parties
- Key note speakers in seminars and conferences

Info / Edu Campaign



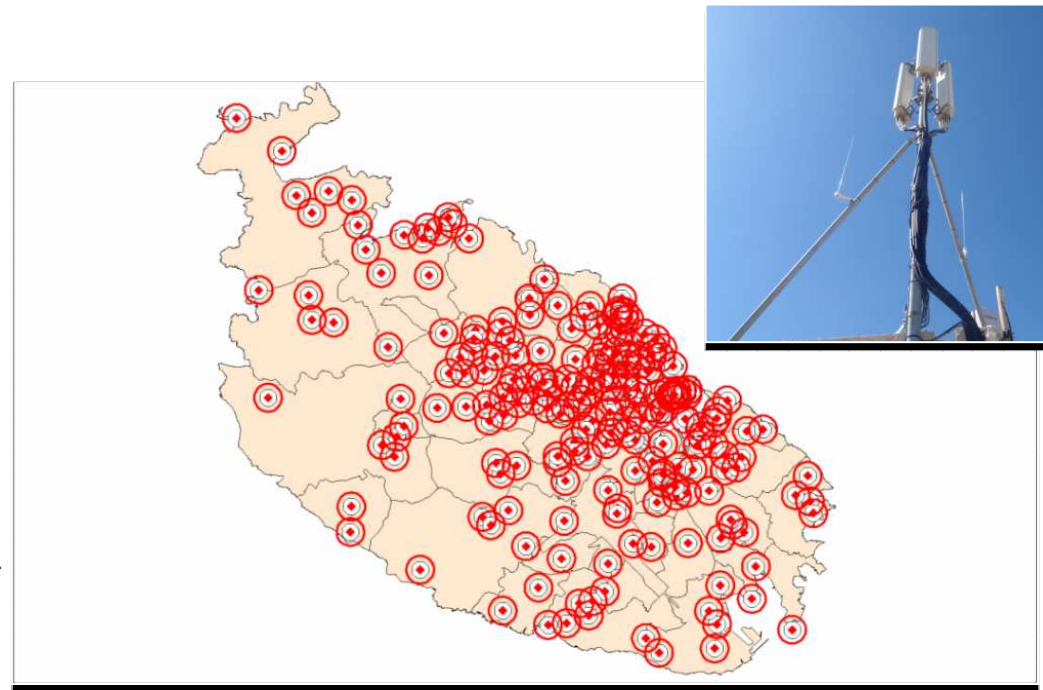
Deploying the field devices is only the first step.....

- Installing electronic meters or AMR modules can be considered to be run of the mill activities for utilities. However, an AMM implementation requires system knowledge, work and collective effort.
- That being said ensuring successful operation of the solution entails understanding the process and the factors that need to be managed in order to yield positive results:



Communication topology is the critical link of any AMM solution.... and sometimes it needs to be designed and built

- In the case of electricity the topology is dictated by the electricity grid. In the case of water, the RF network, that is built during the deployment, is also the topology.
- Given the novelty of the activity, IBM, with support from the vendor and water services, led the construction of the RF network
- For this reason **IBM staffed and trained an AMR engineer**. He was trained by vendor experts to build the network and was the principle interface as regards RF communication between the utilities, IBM and the vendor
- In constructing the network IBM:
 - Partnered with the vendor to perform complete **knowledge transfer** re network construction
 - Acquired authorizations from site owners and other 3rd parties
 - **Liaised with regulatory authorities** re the frequencies and transmission power
 - Contracted a **3rd party to perform the installation** of the network
 - Mapped and Planned the deployment of the communication network

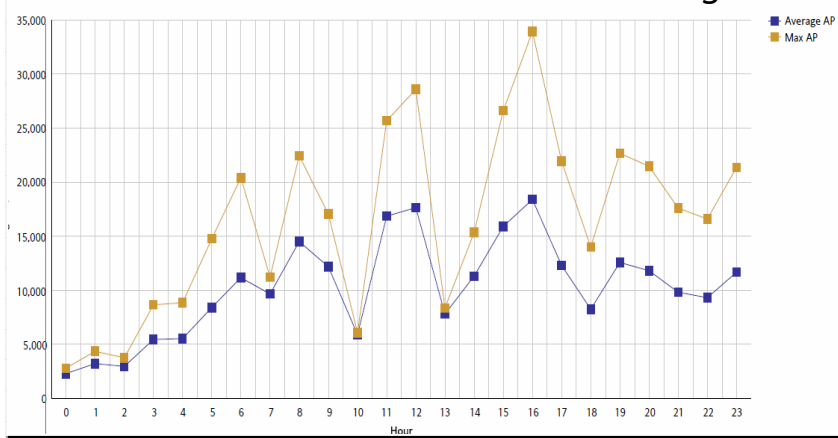


Projected RF network of Malta

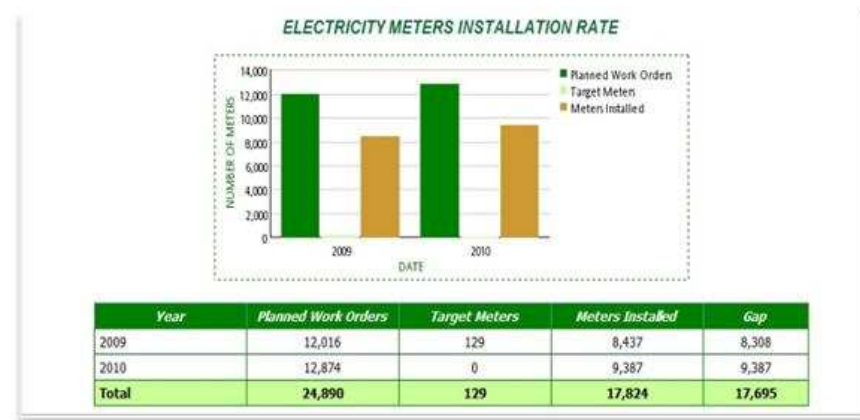
AMM is there to support business decision making – the meter data management tool set does just this

- The remote collection of substantially increased volumes of data and remote meter management provides enhanced functionality as well as inherent value, savings and revenue
- Targeted business decisions towards operational and strategic agendas of both Enemalta and water service will be made intelligent using the reports that are produced via MDM:
 - WO and installation tracking during deployment
 - Consumption profiling and aggregation as well as consumption analytics
 - Energy balancing and water balancing
 - Validations and estimations
 - Quality of service
 - AMM performance trend monitoring

MDM is the intelligence and business enabler behind the AMM

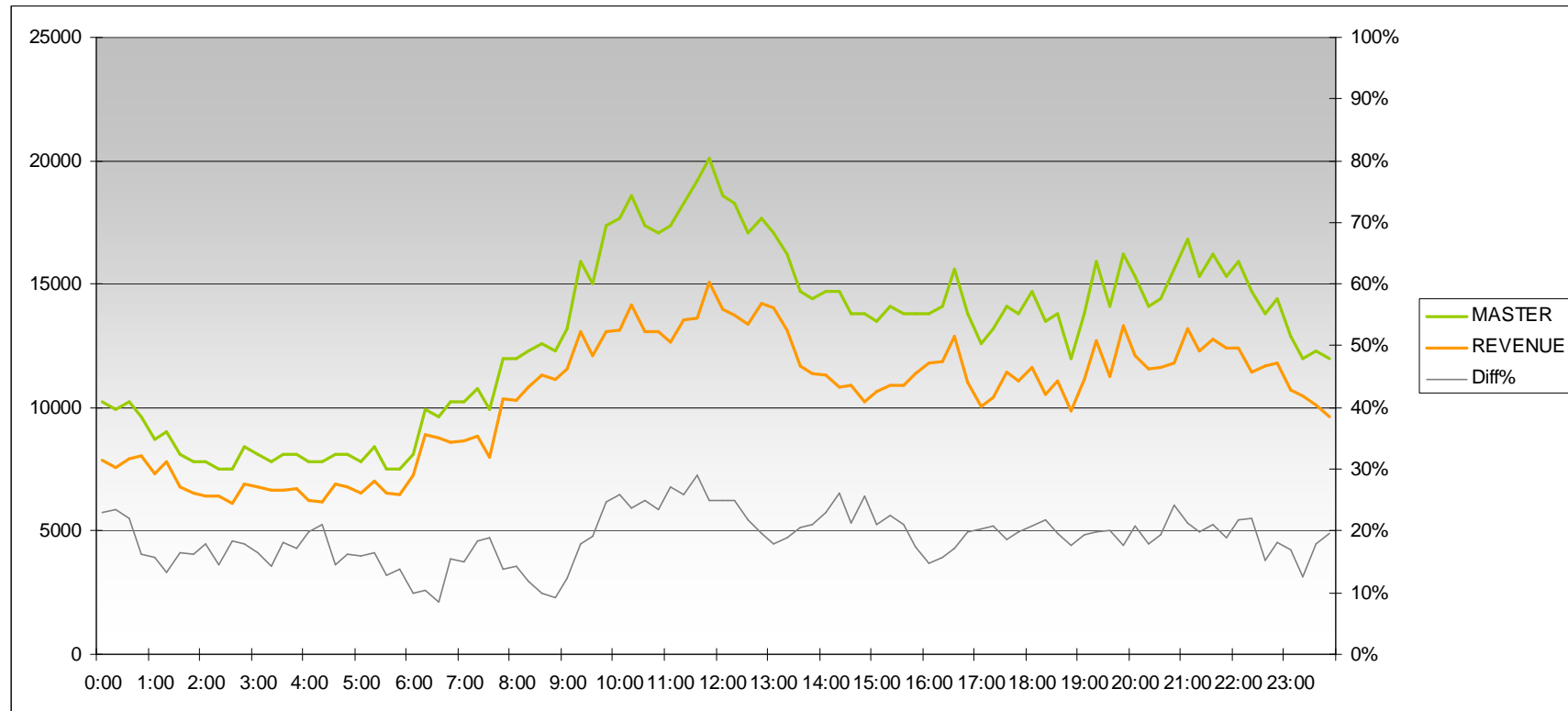


MDM – peak load



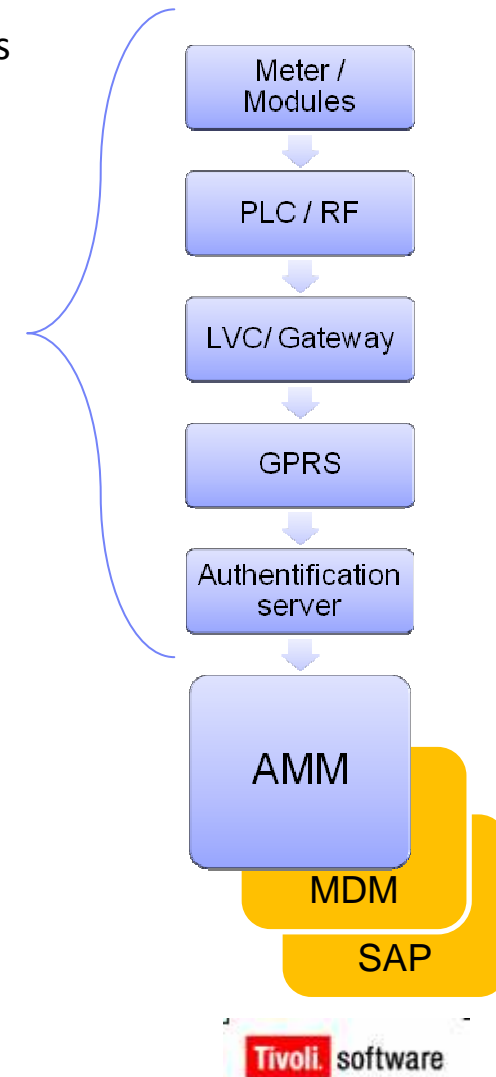
MDM - Installation tracking

First exercises on energy balance provide a 20% of unidentified consumption

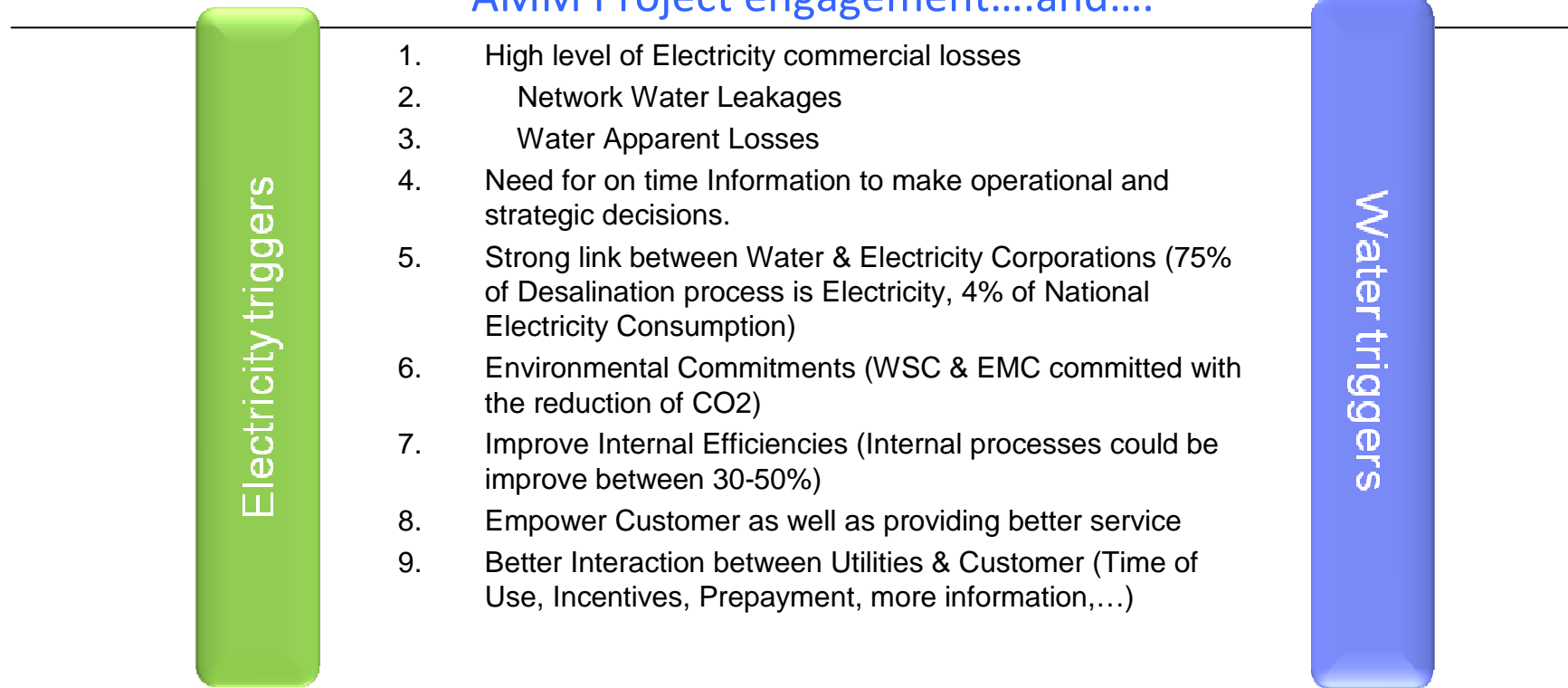


Deploying a nationwide network means that there are interactive devices that need monitoring

- The installation and validation of the communication network is not the end of the AMM implementation.
- The interactive devices deployed in the network need to be monitored and operated
- That's why IBM and the utilities will deploy a control room to monitor the network:
 - Alarms, events and trends observed
 - Meter commissioning/association
 - Meter firmware uploading
 - Creating customer work orders
- The control room will then relay the events and results of activities to the responsible parties for further action



We know the importance of understanding the clients' motivations behind the AMM Project engagement...and....



Understanding the major triggers and principle utility pain points ensured that the IUBS team was able gear solutions and services to address such issues

A value realization team was deployed to:

- Interact with implementation teams to map technology functionality with tangible monetary savings, gains etc
- Identify independent value streams indirectly related to the technology implementation, structure reorganization, streamlining of processes and application of industry best practices, tried and tested formulas etc
- Drive the actualization and communication of such value to fruition

... knowing customers means being able to drive value and benefits that matter

To the Utilities

- Decreased cost of managing the meters
- Precise bills with rich history of consumption
- Reduce outages by one order of magnitude...
- Eradicate thefts and frauds...
- Manage bad payers with both social responsibility and business integrity
- Evidence of service rendered to customers.
- Evidence of energy saved through the elimination of frauds and thefts
- Improved time to cash

To the Client

- Less customer disturbance – through remote operations
- Change details of contract by phone call
- Billing aligned with the real consumption
- Energy plan to fit consumption pattern
- Decrease in customer dissatisfaction and disputes
- Flexible tariff structures
- Virtual transactions vs physical transactions
- Flexibility of billing periods
- Overall improved service

To the Community

- Energy is delivered where it is most needed
- Less pollution for the same economic benefit
- Plan network investment according to the real consumption patterns
- Strong monitoring of Network availability and efficiency
- Reduction in outages and black-outs reduces the risk of disruptions to the economy

