Smarter Utilities

Transforming the Industry

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Global market forces require a new approach for the energy and utilities industry…

*Market forces, impacting the landscape of utilities around the world, requiring the transformation of industry business models.*

- New entrants and disruptive technologies
- Climate change and environmental concerns
- Growth in renewable generation and distributed resources
- Aging asset performance with increased expectations on reliability
- Increased pressure on operational efficiency and workforce productivity
- Increasing desire by consumers for a role in energy management and conservation
... enabled by a new Utility infrastructure that is instrumented, interconnected, and intelligent...

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<tr>
<th>Instrumented</th>
<th>1. Smart, Connected Devices</th>
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<tr>
<td></td>
<td>• Distributed Resources</td>
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<td>• Smart Meters</td>
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<td>• Mobile Devices</td>
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<td>• Substation and Grid Devices</td>
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<tr>
<th>Interconnected</th>
<th>2. Integrated Communication Networks</th>
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<td>• Extranet, Office Network</td>
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<td>• Backhaul</td>
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<td>• Access Network</td>
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<td>• Neighborhood Network</td>
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<td>• Home Area Network</td>
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<th>Intelligent</th>
<th>3. System Integration Platform</th>
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<td>• Application &amp; Data Integration</td>
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<td>• Systems Management</td>
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<tr>
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<td>• Distribution Management Systems</td>
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<td>• Geographic Information Systems</td>
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<th>5. Presentation</th>
<th>Web, Mobile Devices and In-Premise Devices</th>
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<td>• Customer Information Systems</td>
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<td>• Work Management Systems</td>
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There are new ‘participants’ in the Value Chain that the Utility has to take into account.

There are more applications and technologies to consider.

The information that an Operating Domain requires to increase performance is also in the other Domains and outside of the Utility itself.

OT and IT technologies are converging.

There is no one company which can cover all facets of a Smart Grid.

The ability to develop and maintain a Partner Ecosystem is key.

... and supporting the convergence of Engineering and Business processes...
... creating the conditions to reduce the CO2 footprint and enabling citizens to take control of their consumption...

Hi Level Architecture of CCC
... as they will be served by a end user-centric system.

- **Connected elements**
  - Utilities information is held in silos. A true system would connect generation, transmission and consumption data securely among multiple parties, most crucially customers.

- **Intelligence**
  - Because many components are not instrumented or are differently instrumented from region to region, one can’t know their current status, especially at the consumer level. Knowing status and anticipated conditions would let us improve reliability and efficiency.

- **Adaptability**
  - Our current top-down, one-directional and self-contained approach can’t accommodate ever-increasing demand, nor can it integrate renewable energy, electric cars and distributed storage. We need a system that is multi-directional, multi-stakeholder and managed in real time.

- **Clarity of design:**
  - Consumers have yet to embrace their role in the system. Yet the crucial change with transformative impact is activating the human component. We need to come to see the end user as the system’s design point.
Malta - The Business Case

*The need of a Smart Grid*

Customer Expectations
- Staff retirements are removing vast knowledge and experience from both utilities

Aging Workforce
- Directives push Malta for more competition and more savings

Enemalta & Water Services
- Intelligent meters are on the increase and their capabilities have to be exploited
- Smart Meters
- EU Regulations

Environment
- Intelligent Networks providing a new world of grid monitoring and control

Technical Advances
- Customer is requesting better service, more information and high efficiency

Energy Costs
- Electricity Generation is one of the largest producers of emissions

Environment
- Contain non-fuel costs and to find alternative energy supplies

Malta - The Business Case

*The need of a Smart Grid*
The to-be network

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

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**Diagram Description:**

- **IUBS (Intelligent Utility Billing System)**
  - **AMM Central System**
  - **GPRS Communication Network**

**Network Components:**

- **Enel concentrator** connected to **Enel electricity meters** via **PLC 2.5 Kbps**
- **Data pulse transmitter** connected to **MV electricity meters**
- **Data pulse transmitter** connected to **Other Legacy Meters**
- **Data pulse transmitter** connected to **Water Meters**
- **GPRS module** connecting to **AMR vendor protocol**
- **RF Communication** for **Upstream** and **Downstream** connections
We know the importance of understanding the clients’ motivations behind the AMM Project engagement....

1. High level of Electricity commercial losses
2. Network Water Leakages
3. Water Apparent Losses
4. Need for on time Information to make operational and strategic decisions.
5. Strong link between Water & Electricity Corporations (75% of Desalination process is Electricity, 4% of National Electricity Consumption)
6. Environmental Commitments (WSC & EMC committed with the reduction of CO2)
7. Improve Internal Efficiencies (Internal processes could be improve between 30-50%)
8. Empower Customer as well as providing better service
9. Better Interaction between Utilities & Customer (Time of Use, Incentives, Prepayment, more information,...)

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

- **Standards**
  - finish the job of establishing open data standards for Utilities systems

- **Smart systems by design**
  - interconnectivity, intelligence, adaptability and security cannot be bolted on after the fact.

- **More collaboration**
  - a diverse, multi-stakeholder world requires all parties working closely together on a daily basis.

- **Policy and ethics**
  - come together to forge a new policy framework that protects the individual’s privacy and the community’s and nation’s security.