Automatic Electronic Gas Metering Management in Italy

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AGENDA

- Introduction Automatic Electronic Gas Metering Management in Italy
- Gas Standards - UNI/TS 11291 and Authority Defined Gas Metering Schedule
- Project Status with GPRS and multi-point-to-point 169MHz in DLMS
- Points of Discussion & Lesson learnt
- Ecosystem and Customer involvement
Introduction Automatic Electronic Gas Metering Management in Italy

- Italian Authority mandated in late in 2008 the deployment of smart gas only meters in Italy,
- Gas mandate objectives: favor energy saving and enable billing in line with actual consumption
- Gas only standard as smart electrical metering deployment complete and gas concessions are managed independently
- Commitato Italiano Gas was delegated by AEEG to define national technical standards
- Italian AMM system supports point to point (P2P) and/or multi-point (P2M) communications for all types of gas meters G4 to above G65
- Residential meters G4 & G6
  - Italy has 20M+ traditional meters
  - Two way communication protocol: DLMS with Telco SIM for Point to Point (P2P) or DLMS using a variation of 169 MHz Wireless M Bus for multi-point communication (P2M)
  - Concentrators for point to multipoint are more repeaters than intelligent gateways
  - Advanced key management using experience from 35M+ electrical electronic meters deployed for 10+ years
  - Electronic closure valve, temperature compensation but no pressure compensation, electronic display, and firmware upgradable
  - Interchangeability requirement not just Interoperability
Gas Standards - UNI/TS 11291: Gas measurement systems

- No international “gas only” standards were available
- UNI standard has evolved with time requiring a long, very significant effort to ensure success and limit risk without limiting stakeholders or future innovation
- New inter-changeability standard with details of conformity evaluation
- External bodies IMQ and NMi are supporting market with standard UNI/TS 11291 certification services
- The standards process is now considered “almost complete” 1 part in final approval after modification

Part 1: General requirements for remote reading or remote management system

Part 2: CTE protocol

Part 3: CTR protocol

Part 4: Requirements for meters with capacity more than 65m3/h (Group >G40)

Part 5: Requirements for meters with capacity from 16 m3/h up to 65 m3/h (Group from G10 up to G40)

Part 6: Requirements for meters with less than 10 m3/h (less than group G10)

Part 7: Gas meter remote management system

Part 8: Gas distribution network - Gas meter – Remote management protocols

Part 9: Functional test and interoperability test

Part 10: Safety

Part 11-1: Interchangeability - General
Part 11-2: Interchangeability - Data model
Part 11-3: Interchangeability - Communication profile of local interface
Part 11-4: Interchangeability - Communication profile PM1 (P2M)
Part 11-5: Interchangeability - Communication profile PP3 (P2P)
Part 11-6: Interchangeability - Test specifications for the evaluation of conformity
## Authority Defined Gas Metering Schedule & C&I Status

<table>
<thead>
<tr>
<th>C&amp;I Group</th>
<th>% Installed</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; G40</td>
<td>100%</td>
<td>Feb 2012</td>
</tr>
<tr>
<td>G40</td>
<td>100%</td>
<td>Dec 2014</td>
</tr>
<tr>
<td>G16-G25</td>
<td>60%</td>
<td>Dec 2014</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>Dec 2015</td>
</tr>
<tr>
<td>G10</td>
<td>15%</td>
<td>Dec 2014</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>Dec 2015</td>
</tr>
</tbody>
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- C&I meters – are being installed or retrofitted with integrated PTZ with P2P SIM based now in a “competitive manner” without serious technical issues, now mainly fully integrated meters.

- Very significant drop in basic component and installation prices from initial installation 3 years ago.

- As volume of devices and time in the field increases, some of the issues of long term support, especially of early installed devices are beginning to surface e.g. intermittent faults caused by firmware bugs, needing skills and support not easily found in a DSO.

- Area’s unlikely to be covered by P2M network are being installed today - leaving option to connect to residential concentrators when technology is deployed / stable.
Authority Defined Gas Metering Schedule  Residential G4 & G6

• DSO with more than 200,000 meters
  • G4-G6 3% installed Dec 2014
  • G4-G6 3% remote managed Dec 2015
  • G4-G6 10% installed Dec 2015
  • G4-G6 60% remote managed Dec 2018

• DSO with 100,000 to 200,000 meters
  • G4-G6 3% installed Dec 2015

• DSO with less than 100,000 meters
  • G4-G6 No obligation today

• Significant penalties for non compliance, no longer 4€ per meter
• Gas concession renegotiation ongoing today has hindered Authority schedule and DSO smart metering adoption
• Authority will define intermediate deadlines between Dec 2015 to Dec 2018 for large DSO’s
• Update expected soon also for G4-G6 deployments for DSO’s under 200,000
• Low % targets today - the creation of a stable deployable solution takes 18 - 24 months of optimization
Italian Gas Market Status – Residential Meters G4 & G6

- Larger utilities are leading as they have capability to manage and have the most to gain with an efficient deployment
- Some utilities to support Authority deadlines for residential G4 & G6 installations are adopting the lower risk Point to Point P2P meters each with a SIM. This gives more time to get ready for Point to multipoint P2M solutions. Telco’s are aggressively pricing connectivity to support.
- For radio based P2M most utilities are still in piloting or technological evaluation phase today
- P2M Meter, availability, stability, compatibility with UNI standard is improving but it is still an issue.
- Battery worries and radio performance are lower on utilities priority list than in the past
- Mechanical, ultrasonic and thermal mass electronic meter are all under test
  - Ultrasonic seems to be winning - lower cost, smaller than existing meters - Mechanical with electronic modules have size problems and are less competitive, thermal mass are gaining market share
- Aggressive purchasing activity has reduced prices, less profit margin may result in less post sales support, especially for medium and small utilities
- Very many conventional meters will need to be replaced long before their useful life is reached.
Italian Gas Market Status – Point to Multipoint Radio Components

- Radio P2M 169 Mhz Wmbus (Meters & Concentrators)
  - Very limited experience at world wide level in 2 way gas only radio deployments
  - Radio technologies has been the key worry of all utilities due to lack of experience, skill, difficulty to guarantee radio coverage to ensuring meter connectivity without excessive battery power use.
  - The lack of at least one significant public independent pilot during specification preparation phase has impacted all stakeholders and increased overall risk
  - Where to locate concentrators varies from Utility to Utility – lamp posts, utility assets, partner or city council assets and telco infrastructures are all still in discussion but the priorities are emerging.
  - Concentrator location, radio performance, asset management, concentrator radio redundancy are key factors which impacts both financial and technical performance and the overall success of the project.
  - Concentrators: interchangeability of meters from different suppliers is similarly an issue.
  - Effectiveness of network planning software still in early stages of validation, now seen as expensive but useful tool, today mainly spin off’s from Telco network planning tools
Italian Gas Market – Points of discussion & Lesson learnt

- Smart gas metering is a small tsunami for most of the 100+ utilities in Italy: financially, required skills, workload and risk
- Authority has sponsored multi service pilots with focus on radio technologies including Gas, this gives some funding to improve skill, helps optimize gas investment to ensure other fluids can be managed more efficiently
- Gas concession renegotiation, will impact the Authority the deployment schedule update
- Generic lack of financial budget to prepare for the deployment means development and rollout teams are still understaffed
- Implications not a simple mechanical device but a small computer with firmware in a complex multiplayer ecosystem is becoming visible to DSO technical departments, this complexity affects both CAPEX and OPEX.
  - Long term purchasing agreements for supply, interchangeability, support including firmware, MTBF, etc
  - With difficulty utilities are moving to more systematic, scientific, results based approach – less “go no go”
- Italian specific metering software is available to manage meters, field install and maintenance using mobile devices is gaining momentum software to support failure analysis is still in its infancy
- It takes 12 to 24 months to move with all stakeholders from Pilots to Rollout even for large utilities
Italian Gas Market : Customer involvement

• No real public debate, limited communication in popular Press and TV regarding gas meter deployment

• The unbundling of energy market means smart metering is a distribution utility project, limited focus today on energy savings, in home display’s or smart home as these are mandated to be in the retailer arena

• Everyone has a smart electrical meter for number of years, so the idea is not new.

• Discussion in conferences, how to use radio network for other services like Water metering or Smart City

• Customer feedback is very limited - usability of the meter display, customer refusals, customer concrete benefits and savings are still unknown

• What happens to 40% of the customer not covered ? Today the utility defines who will get the new meter. This however may change as the rollout progresses.