Smart/Intelligent Grid Development and Deployment in Thailand (Smart Thai)

Smart Thai Workshop: Global Standardization Efforts

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Orga Systems

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Smart Metering Standards In Europe, EU Mandate M/441

• Goals and roadmap of the EU mandate M/441

• Introduction of additional functionalities for smart metering

• Roadmap and responsibilities for the development of today's existing standards into the future
What is the interoperability statement that chicken come with?
No, the interoperable standardisation result of chicken is mainly given by the fact that—at the end of the day—you can eat all of them.
Mandate Goal

Mandate M/441 goal:
Enable interoperable solutions for smart metering.
Where Are Standards Required?

Turn-Key solution (one contractor)

- Investment protection granted by single contractor
- You need good **contracts**
- Not mandatorily good standards
- Interoperability is being paid

Open solution (multiple vendors)

- Investment protection granted by refreshment of solution
- You need good **standards**
- Not mandatorily good standards
- Interoperability must be stated
Basic Rules Smart Metering Standards

• The M/441 standards apply for functionalities and interfaces of smart metering
• They specify common guidelines and procedures, where individual technical standards apply with
• They do not recommend any specific architecture or technology
• They are open to regulatory market models and individual business cases
• They are able to integrate variations of standards in the upper layer of a configuration area
• The SMCG technical report shall mainly describe these guidelines, not implementations
Responsibilities

Interfaces of electricity meters

Central communication system

Interfaces of non-electricity meters

Technical use cases
(EDM, smart grids, DSM, ...)

Commercial use cases
(Billing, tariffication, prepayment, ...)

Interfaces of display and Home Automation

Other areas impacted

Interfaces of electricity meters

CLC TC13

M2M communications area in local networks

CLC TC205

M2M communications area in public networks

Metering area

CEN TC294

CLC TC13

ETSI TC M2M

M/441 standardisation area
## Divide Solutions In Functional Areas

<table>
<thead>
<tr>
<th>Functional area</th>
<th>Requirements</th>
<th>Standards guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meters</td>
<td>Shall not be limited in technology improvement</td>
<td>MID</td>
</tr>
<tr>
<td></td>
<td>Must fulfil national requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protect consumers</td>
<td></td>
</tr>
<tr>
<td>Smart metering topologies</td>
<td>Shall not be limited in technology improvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can be different in Germany, France, Italy, Netherland, Spain, UK ...</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compete against each other</td>
<td></td>
</tr>
<tr>
<td>Central systems</td>
<td>Need to support multiple architectures and standards</td>
<td>COSEM as central data model for all architectures</td>
</tr>
<tr>
<td></td>
<td>Need to support minimum functionality for individual topologies (services)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interoperability to be required by customers and operators and supported by vendors</td>
<td></td>
</tr>
</tbody>
</table>
Interface Architecture Full View

Non-electricity meters
- G/W/H meter
- M1
- G/W/H meter comms
- meter display
- (M2M) gateway opt. internal

Electricity meters
- ELT meter comms
- E1
- MID ELT meter
- (M2M) gateway opt. internal
- meter display

Displays and Home Automation
- Consumer display
- Home automation

Central communication system
- Security information
- IP address mgmt
- Meter DB

Other areas impacted
- AMI head end
- Central communication system
- Displays and Home Automation

Commercial use cases
- (Billing, tarification, prepayment, ...)

Technical use cases
- (EDM, smart grids, DSM, ...)

M2M standardisation area

M/441 standardisation area

M2M comms area

Metering area
## M/441 Interface Map List

<table>
<thead>
<tr>
<th>Interface</th>
<th>Purpose</th>
<th>Metrology impact</th>
<th>Technology types (examples)</th>
<th>Lower layer protocols</th>
<th>local data model</th>
<th>Global data model</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Link between MID meter part and meter comms interface</td>
<td>yes</td>
<td>integrated, wired, optical</td>
<td>Used by mandate but defined outside</td>
<td>COSEM</td>
<td></td>
</tr>
<tr>
<td>E2</td>
<td>Link between meter comms interface and M2M gateway</td>
<td>no</td>
<td>integrated, wired bus, optical, RF</td>
<td>TC13</td>
<td>DLMS/Cosem SML</td>
<td>COSEM</td>
</tr>
<tr>
<td>M1</td>
<td>Link between MID meter part and meter comms interface</td>
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</tr>
<tr>
<td>M2</td>
<td>Link between meter comms interface and M2M gateway</td>
<td>no</td>
<td>integrated, wired bus, optical, RF</td>
<td>TC294</td>
<td>DIV/WIF</td>
<td>COSEM</td>
</tr>
<tr>
<td>C</td>
<td>Link from M2M gateway towards a Dataconcentrator</td>
<td>no</td>
<td>Wireless, PLC</td>
<td>TC13 (TC294)</td>
<td>several</td>
<td>COSEM</td>
</tr>
<tr>
<td>G</td>
<td>Link from M2M gateways and DC’s towards central system</td>
<td>no</td>
<td>IP - DSL, GPRS, UMTS</td>
<td>ETSI</td>
<td>several</td>
<td>COSEM</td>
</tr>
<tr>
<td>H</td>
<td>Data service from M2M gateways towards HBES Home automation</td>
<td>no</td>
<td>wired bus, optical, RF</td>
<td>TC205/TC13</td>
<td>several</td>
<td>COSEM</td>
</tr>
<tr>
<td>S1</td>
<td>Metering interface for Smart Grids data serving</td>
<td>no</td>
<td>IP</td>
<td>TC13 (#TC57?)</td>
<td>COSEM IEC60870</td>
<td>COSEM</td>
</tr>
<tr>
<td>S2</td>
<td>M2M interface for eMobility measurement communication</td>
<td>yes</td>
<td>IP</td>
<td>TC13 (#TC57?)</td>
<td>COSEM SML</td>
<td>COSEM</td>
</tr>
</tbody>
</table>
Thank you!