PRIVACY AND SECURITY BY DESIGN:
THE SMART METER GATEWAY IN GERMANY

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THE SHIFT TOWARDS DISTRIBUTION GRIDS COMES WITH NEW VULNERABILITIES

Yesterday

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Percentage of Generation (gross)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Grid</td>
<td></td>
</tr>
<tr>
<td>Ultra-high Voltage</td>
<td>~80%</td>
</tr>
<tr>
<td>(380/220 kV)</td>
<td></td>
</tr>
<tr>
<td>High Voltage</td>
<td>~20%</td>
</tr>
<tr>
<td>72.5 kV - 125 kV (usual 110 kV)</td>
<td></td>
</tr>
<tr>
<td>Distribution Grid</td>
<td></td>
</tr>
<tr>
<td>Medium Voltage</td>
<td>~10%</td>
</tr>
<tr>
<td>1 kV - 72.5 kV (usual 20 kV)</td>
<td></td>
</tr>
<tr>
<td>Low Voltage</td>
<td>~90%</td>
</tr>
<tr>
<td>&lt; 1 kV (usual 0.4 kV)</td>
<td></td>
</tr>
</tbody>
</table>

Tomorrow

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Percentage of Generation (gross)</th>
</tr>
</thead>
</table>

Past

<table>
<thead>
<tr>
<th>Capacity [gw]</th>
<th>Conventional</th>
<th>DERs</th>
<th>Conventional</th>
<th>New</th>
<th>Conventional</th>
<th>DERs</th>
<th>Conventional</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td>Black start capable</td>
<td></td>
<td>Partially black start capable</td>
<td></td>
<td>Not black start capable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td>Increases</td>
<td></td>
<td></td>
<td></td>
<td>Increases</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DfT, 2020

Future

<table>
<thead>
<tr>
<th>Capacity [gw]</th>
<th>Conventional</th>
<th>DERs</th>
<th>Conventional</th>
<th>New</th>
<th>Conventional</th>
<th>DERs</th>
<th>Conventional</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
<td></td>
<td></td>
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</tr>
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</table>

2 POWER SYSTEM FLEXIBILITY CAMPAIGN & 3DEN JOINT EXPERT WEBINAR
25 FEBRUARY 2021
GUIDING PRINCIPLES FOR PRIVACY AND SECURITY BY DESIGN

1. **Collection and use of data** without the consumer's consent only permitted for system relevant purposes.

2. **Meter reading intervals as sparingly as possible** (no conclusions can be drawn about user behavior).

3. **Data** is only transmitted **anonymously, pseudonymized or aggregated**.

4. Data is **processed locally**.

5. Data are **transmitted to as few places** as possible.

6. **Strict data deletion periods** are specified.

7. Communication and processing steps are **visible and verifiable for the consumer** at all times.

8. Rights of **deletion, rectification and objection** are easily enforceable.

9. **Free choice of tariff**.

10. Smart meters are not **freely accessible** from the outside. **Clear profiles for authorized access** are defined.
SETTING ARCHITECTURE AND REQUIREMENTS WITHOUT SETTING TECHNOLOGICAL PATH DEPENDENCIES

**Local Metrological Network - LMN**
- Connection between Gateway meters

**Wide Area Network - WAN**
- Interface for communicate with external market participants

**Home Area Network - HAN**
- The HAN interface is assigned to the end consumer to connect controllable assets
TECHNICAL PROTECTION REQUIREMENTS

Protection Profile (BSI-CC-PP-0073)
• Describes possible threats to an SMGW and defines the minimum requirements for corresponding security measures according to Common Criteria (CC).

Threat Scenarios
• The protection profile identifies possible direct threats or indirect threats via WAN to the SMGW.

Protection Goals
• To counter threats, the protection profile identifies a set of security objectives.

Certification Process
• Common Criteria (CC) certification proofs the security properties of the Protection Profile (PP).
• Proofs safe production and development environment at the manufacturer and safe delivery of the product to the end user.
Overall goals of TR-03109

• Ensuring interoperability of various components.
• Specification of protection profile and protection goals.

TR-03109-1 Requirements for the interoperability of the communication unit of a smart metering system

TR-03109-2 Requirements for the functionality and interoperability of the security module Certification Process

TR-03109-3 Cryptographic specifications

TR-03109-4 Public key infrastructure for the SMGW

TR-03109-5 Communication adapter

TR-03109-6 Smart Meter Gateway administration
DIGITAL IDENTITIES ARE THE NEXT STEP: THE BLOCKCHAIN MACHINE IDENTITY LEDGER (BMIL)
THANK YOU FOR YOUR ATTENTION!

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