

Protection profiles: effects of the new German Energy Industry Act

Data privacy & data security in German smart grids and smart meters

Germany has started the process of ensuring data privacy and data security in the smart grid and in smart meters by means of acts, regulations and technical directives. The work currently being carried out is being watched with interest by our European neighbours. For example, it was one of the topics discussed at the Metering Europe fair in Amsterdam in October.



The new Energy Industry Act and the protection profiles and technical directives anchored within it have a massive effect on the existing technical solutions and specifications in Germany. However, the challenges which are approaching us will also provide an opportunity to introduce smart grids and smart meters in Germany and beyond in a controlled manner. The requirements of the protection profiles are very high but are ultimately designed to secure and protect consumer data.

The Act amending Energy Industry Regulations in Germany dated 26 July 2011, the so-called Amended Energy Industry Act 2011, came into force on 4 August 2011. One of the main changes in the Energy Industry Act is the amended Article 21 which for the first time makes a clear distinction between a metering system ("the metering equipment integrated in a communications network for recording electrical energy", in other words electricity meters) and metering equipment for gas (gas meters). Metering systems should be installed in the following:

- new buildings or after major renovation work,
- for end consumers with an annual consumption of over 6000 kWh,
- for system operators under the German Renewable Energy Act and the Heat and Power Cogeneration Act, for new systems with an installed power of over 7 kW,
- in all other buildings where technically feasible and financially viable.

According to the Energy Industry Act, the technical feasibility will arise as soon as appropriate products are available on the market. Whether their installation is financially viable will be assessed by the

German Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie, BMWi).

As far as gas metering equipment is concerned, only metering equipment that can be safely connected to a metering system may be installed as from 1 January 2013. This means that no separate smart metering infrastructure for gas is to be created. In fact, the gas meter will be read, for example, through an electricity meter.

Both gas metering equipment and metering systems must comply with the requirements for guaranteeing data privacy, data security and interoperability. And this is where the protection profile comes into play. The German Federal Office for Information Security (Bundesamt für Sicherheit in der Informationstechnik, BSI) was commissioned in September 2010 by the BMWi with the development of a "protection profile for smart metering systems (smart meters)". Protection profiles have already been established in information technology to ensure data privacy and have proven that they are capable of doing so. Their use is now to be extended to smart grids and smart meters. The BSI has already developed protection profiles for smartcards, USB data media and electronic health cards, for instance.

Protection profiles are based on the so-called "Common Criteria (CC) for Information Technology Security Evaluation" (ISO/IEC 15408) and are widely recognized in many regions around the world. Protection profiles describe and evaluate risks, define security targets and establish requirements for functions of and the scope of testing for products.

As far as our sector is concerned, this means that smart grids and smart meters have been identified in Germany as critical infrastructure and critical components. The security of the energy supply and the private sphere of customers must be protected. The communications unit of a metering system or a smart meter (also known as a gateway) has been identified as the component which must be protected from wide area network (WAN) attacks. These gateways (in other words devices with an interface to the WAN) include multi utility controllers (MUC) and electricity meters. The relevant associations (DVGW, FIGAWA) are currently discussing whether industrial and commercial gas meters, data loggers and volume correctors are also to be considered as gateways as defined by the BSI protection profile.

In cooperation with the Federal Network Agency, the PTB and TÜV-IT as well as various other organizations, the BSI has already established the protection profile for the gateway. The final draft was published at the end of August 2011 (see https://www.bsi.bund.de/DE/Themen/SmartMeter/smartmeter_node.html).

The protection profile for the gateway's security module and the Technical Directive which defines the minimum requirements relating to data security (e.g. encryption) and interoperability (e.g. communications protocols) for the interfaces to the WAN and to the local metrological network (LMN) are still in the drafting and coordination phase.

No further protection profiles or technical directives are being planned by the BSI for meters which are in the LMN (e.g. residen-

tial gas meters) or the head end. However, meters and head ends must comply with the requirements of the technical directive for the gateway as regards the LMN or WAN interface so that they can communicate with the gateway in the first place.

According to the protection profile, the gateway is defined as follows: "The gateway...

... is the only device which is directly connected to the WAN; it is not accessible from the WAN and shall provide a wake-up service.

- In addition to a national metrological approval, gateways will also require certification or licensing under the BSI protection profile (even the MUC will require a metrological approval).
- Gateways must include a security module.
- The development process of the gateway must be certified according to CC.
- Battery-powered residential gas meters in the LMN must at least support wireless M-Bus communication according to the Open Metering System (OMS) with extended encryption and authentication mechanisms.

to be installed in Germany until 31 December 2012 and may continue to be used until the next expiry date of their current calibration.

The BSI project plan as it currently stands is to complete the outstanding protection profile for the gateway's security module and the Technical Directive by February 2012. The certification criteria for the products and the development processes must then be completed by August 2012. The BSI's objective is to meet the requirements of the Energy Industry Act promptly so that



... constitutes a firewall between the WAN and LMN and the home area network (HAN); the meters are in the LMN, the HAN may include photovoltaic systems, an electric car, smart white goods or a private PC for example.

... records, processes (e.g. cumulates, pseudonymizes and assigns tariffs) and stores the data from the connected meters.

... only gives access to authorized entities.

... checks the recorded data in terms of their integrity and authenticity; signs/verifies and encrypts/decrypts information.

... uses the services of a security module (hardware security module) which contains the main security mechanisms such as the encryption/decryption of messages, verification/generation of signatures and the generation and storing of keys.

... provides a user interface (e.g. for display purposes)."

The new Energy Industry Act will therefore have an enormous effect on existing technical solutions and German specifications, some of which are listed below:

- The M-Bus specification of the OMS must be adjusted accordingly.
- The Energy Services Specification (the so-called "EDL-Lastenheft") is no longer relevant for gas meters.
- The head end must be capable of processing encrypted and signed meter data.

As far as the effects of the new Energy Industry Act on smart gas metering are concerned, we must wait for the completion of the Technical Directive and statutory regulations. This Directive defines the minimum encryption algorithms and communications protocols which must be supported by the gateway and therefore also by the meters in the LMN (e.g. residential gas meters) and the head end. The statutory regulations are likely to define whether industrial and commercial gas meters, data loggers and volume correctors with a WAN interface must comply with the BSI protection profile or not.

According to the Energy Industry Act, metering systems and metering equipment for gas which do not satisfy the requirements of the protection profiles and the Technical Directive may continue

manufacturers can launch certified products which comply with Article 21 of the Energy Industry Act as from January 2013.

Over the last few months, Elster has played an active role in the process to develop the protection profile through various organizations and the company plans to continue this work until the protection profiles and the Technical Directive have been officially adopted. Elster will also work through these organizations to address the unanswered points which must be controlled by the forthcoming statutory regulations, e.g. for smart gas metering, such as the form in which the protection profile can be used in industrial gas metering and what the implementation concepts are for pure gas suppliers. In addition, we will be available for any questions you may have on the subject of protection profiles. And we will, of course, inform you as soon as possible when we have products or retrofit solutions available for modular systems such as diaphragm gas meters which comply with the requirements of the protection profile.