Draft

Standardization Roadmap for E-Energy / Smart Grid Germany

– Executive Summary

Energy supplies to customers and the use of energy in general are undergoing radical change. Triggered by political objectives such as limiting climate change and securing energy supplies in the light of dwindling resources which are, moreover, in part procured from politically unstable regions, increasing energy efficiency, extending decentralised power generation using energy-efficient combined heat and power systems, and a significant increase in the share of renewables are regarded as fundamental ways towards a solution. In addition, deregulation is creating new market roles and a new understanding of systems in energy supply.

The implementation of these general objectives leads to new demands: The fluctuating supply of electrical power from renewable energy sources and the incorporation of a large number of decentralised generation facilities requires a new kind of management of power supplies, in which the consumer side in particular must be more intensively involved in balancing control. Meaningful involvement of the large number of players and market roles, from power generators through suppliers and the various market players and service providers down to the industrial, commercial or private final customers, will only be possible and successful if it goes hand in hand with an expansion of information and communication technology. The linking of new technologies in power engineering and ICT[1] to solve the coming challenges in the energy sector is, in the broadest possible sense, referred to as the Smart Grid.

There are already standards in place which form an important basis of and point the way towards a future Smart Grid.

The detailed version of the standardisation roadmap makes 50 recommendations for the further procedure on the various issues, especially for standardisation, and these are summarised here.

1. Importance of standardisation
   Standards are of essential importance to the Smart Grid, because data have to be exchanged between an extremely wide range of market roles and processes. Industries previously separated commence interaction on the basis of standards. The E-Energy Expertise Centre at the DKE[2] is to take on a coordinating function in this respect.
2. International standards as the basis
   International standards issued by IEC and CENELEC and further established standardisation organisations such as CEN, ISO and ETSI are the basis for upcoming standardisation programs. The work on international standardisation, which is now intensifying – and in this context the work of IEC/TC 57 is worthy of special mention – must be further supported and monitored from Germany.

[1] ICT Information and Communication Technologies

[2] DKE German Commission for Electrical, Electronic & Information Technologies of DIN und VDE

Provision for special national circumstances or further development of international, generic standards into standard profiles to ensure interoperability will in part also be conducted nationally.

On account of the breadth of the subject matter, concentration on focal topics is proposed:

3. Cross-cutting issue: Information security, data protection and product/system safety
   This horizontal issue is of great importance, not only with regard to the functionality of a power supply system, but also to acceptance by the users.
4. Cross-cutting issue: Data models and semantics
   Data, services and functions must be described in uniform semantics if the flow of information across various interfaces, communication models and market roles is to be ensured. Descriptions of functions (Use Cases) and reference architectures will form the basis. Firm interface requirements on the basis of standards can be developed from these.

The following vertical focal topics address the implementation of power generation and load management as the basis for integration of decentralised and fluctuating energy supply into the grid. With the current focus of research in Germany and Europe, a core competency is discerned in this field in relation to other countries and regions.

5. Focal topic: Smart Meters
   Work on digital energy consumption meters with standardised communication interfaces for local and remote communications has already progressed far. Standard profiles – as a rule on the basis of international standards – have been extensively defined at VDE/FNN[3] and are to be reviewed and further developed against the background of further European and international developments and studies on IT security and data protection.
6. Focal topic: Decentralised generation and load management – Interfaces and grid connection of decentralised generators and loads
   The work on IEC 61850-7-420 on the connection of distributed systems, for example, is regarded as groundbreaking in this context. In future, against the background of network integration, electromobility and storage facilities are also to be incorporated in a smart load and generation management.
7. Focal topic: Distribution system automation
   This focal topic examines the development of standards for automation in distribution networks, especially when network management is extended to the low voltage range by distributed and decentralised network management technologies.
8. Focal topic: In-house automation
   Against the background of new market processes such as flexible tariffs, energy management in-house will take on an important function in the implementation of a Smart Grid. Only with as broad application as possible, also covering existing equipment and homes, will it be possible to achieve corresponding effects, and therefore communication systems for simple, retroactive integration will have to be used in these cases in particular. This also means that existing in-house communication and automation systems will have to be taken into account and developed with appropriate energy management functions.
9. Further types of energy
   Further types of energy such as gas and thermal energy are to be taken into account, especially in the fields of smart meters and energy management systems.

[3] VDE Association for Electrical, Electronic &Information Technologies, FNN Forum network technology / network operation in the VDE

10. Coordination committee

    Together with the standardisation committees on Smart Grids, it is recommended that a national coordination committee be established to deal with further topics such as market strategies, roles and responsibilities, business models, regulatory or legal frameworks, business processes which are lacking or questions of certification in cooperation with the standardisation bodies. This committee could also mirror European or international activities on the political level.

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