Programme Area: Smart Systems and Heat

Project: Data Management and System Architecture

Title: Protocols and Legislative Initiatives Report

Abstract:

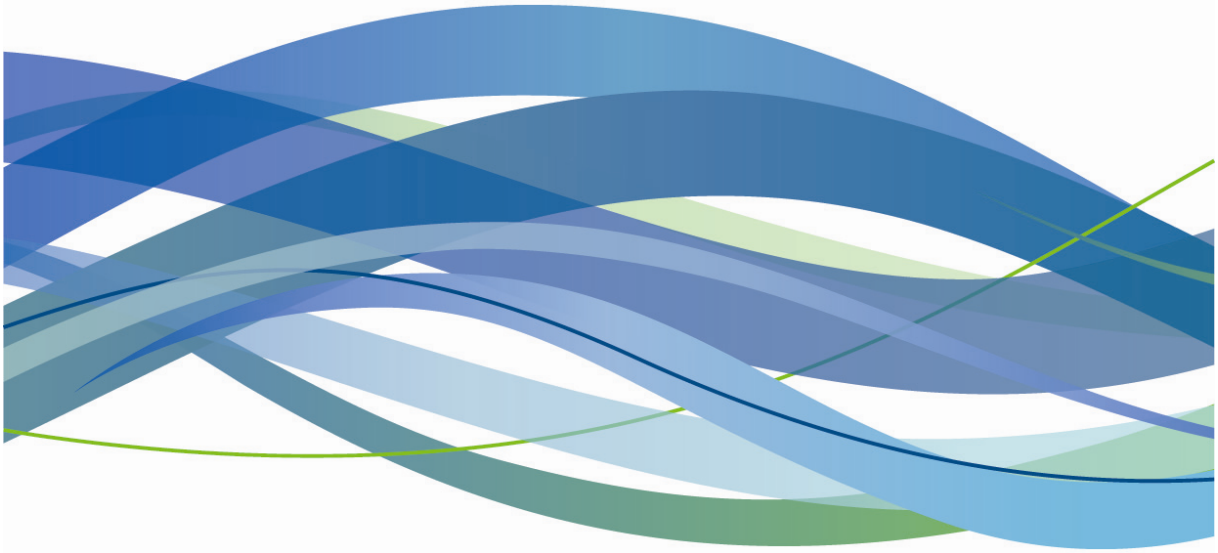
The principal objective achieved within the reports is the identification from other relevant projects of architectural techniques that can be applied to the SSH data architecture design and to identify and assess UK and EU directives, protocols, and legislative initiatives that may impact upon delivery of the SSH Programme.

Context:

This project specified the data system functionality and architecture that would fulfil the information and service requirements of a smart energy system. This included data security and privacy aspects. Hitachi Europe and energy & sustainability consultants DNV Kema worked independently on two £100,000 contracts to identify any data system constraints that need to be incorporated into smart energy systems. The projects were launched in February 2013. The envisaged ETI Smart Systems and Heat system will depend on Information and Communications Technology (ICT) for its efficient design, operation and management. The ICT system will need to provide functionality right along the energy delivery chain: from supply to the end consumer. It will also need to support commercial activities such as billing, and to support academic analysis and review of the system during trials and proving.

Smart Systems and Heat: Data Management and Overall System Architecture (WA3)

WP1a - Directives and Standards Review Report
DELIVERABLE (D.DK3.2)



Energy Technologies Institute

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Ver 0.1	04/02/2013	Draft	AK	GS	MF
Ver 1.0	11/02/2013	Final (with improvements to structure)	AK		MF

Executive Summary

The Energy Technologies Institute recently appointed DNV KEMA to deliver a package of work within work area three (WA3) of its Smart Systems and Heat (SSH) Programme. This is one of two initial reports which set the scene for WA3 (which focuses on Data Management and Overall System Architecture). It provides an overview of existing and emerging UK and EU directives and standards and looks at the relevant implications for the SSH programme.

The main body of the report has been structured around three key themes: policy interdependencies and regulatory stability, harmonisation of standards and data protection policy.

Policy interdependencies and regulatory stability

One of DNV KEMA's main observations is that the level of policy coordination in some key areas has the potential to create uncertainty and hence delay the move to a smart energy system. More specifically, gaps in policy coordination have been identified in smart metering and smart grid policies (both in the UK and the EU), the policies for promoting micro-generation (especially in UK) and the policies for smarter grids. DNV KEMA also highlights the importance of regulatory stability. Moving forwards, the convergence of the energy and telecommunication industries may lead to a need for more coordination, not just on a policy level but also in terms of the parties responsible for enforcing the regulations.

Harmonisation of standards

A lack of coordination has also been uncovered in the standards space – for example separate mandates for smart meters, smart grids and electric vehicle standards which should inevitably be the building blocks for one smart energy system. Indeed, the development of the European electricity and gas network codes in parallel with the ongoing standardisation process at EU level increases the complexity and associated risks that sit around these mandates.

Data protection policy

Last but by no means least, implementation of existing data protection policies in the energy sector may limit the benefits that could arise from a smart energy system and thus further reflection on these is needed within the SSH programme. Continuing debates around EU Data protection policy could bring about changes by around 2016 – these may have an impact on the overarching design of the smart energy system and are likely to bring significant changes to energy industry governance as a whole.

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1 INTRODUCTION

During the first quarter of 2013, DNV KEMA has been commissioned by the ETI to deliver a number of work packages which set the scene for WA3 of the SSH programme. The focus of this work is around Information Communication Technologies (ICT) and a detailed overview of the programme can be found in Appendix I.

This particular report is one of two formal deliverables within work package 1a. Together with two further elements (being developed by the University of Surrey and Delta-ee respectively) the building blocks for an ICT Technology Roadmap will be created. This is further illustrated below:

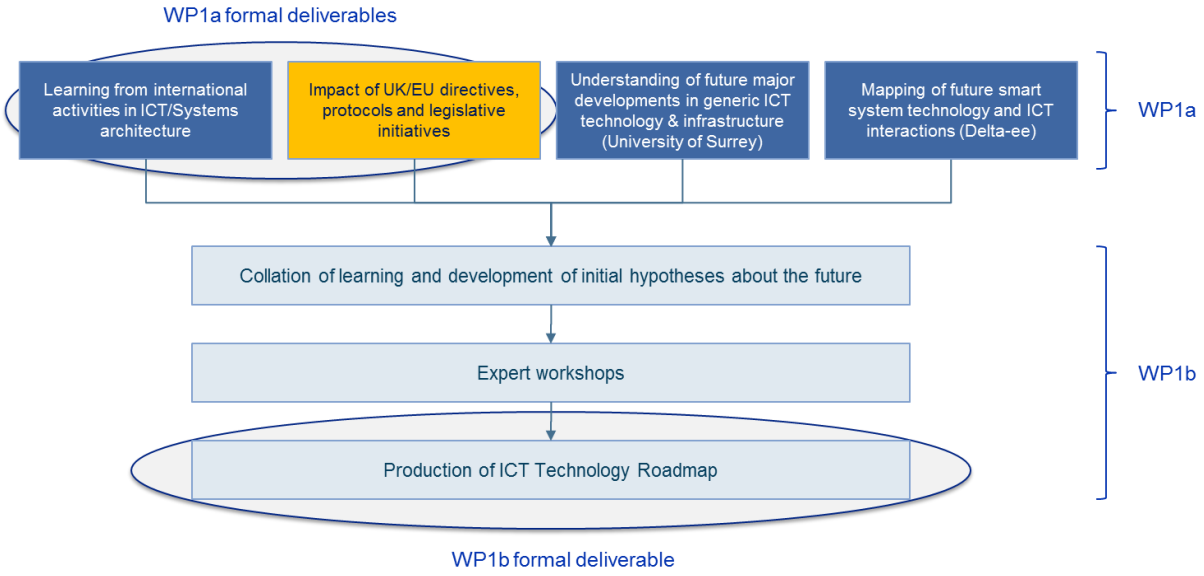

Figure 1: Interactions between work packages 1a and 1b.

2 METHODOLOGY

2.1 Process followed

This report explores the implications arising from existing and emerging regulation in the EU and UK which could have an impact on the development of a smart energy system. The work is based around an extensive literature review and internet research.

The analysis that follows is broadly structured around:

- the interdependencies between policies and regulatory stability, identifying potential gaps or issues that could be encountered going forwards (Section 3).
- the process and potential difficulties associated with harmonising standards for a smart energy system (Section 4).
- the impact of data protection policy; given high availability of data is often deemed a vital prerequisite to the development of a smart energy system (Section 5).

This is further illustrated as follows:

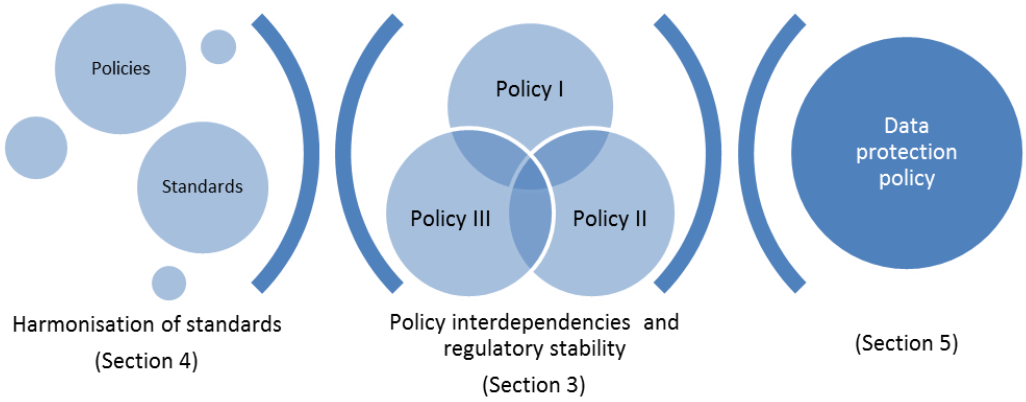

Figure 2: Document structure

2.2 Assumptions

It should also be highlighted that two “game changers” for directives and standards in the UK could be the impacts of Scotland becoming independent, and the UK's revised agreements with, or exit from, the EU. Although the overarching aims of a low carbon future and a smart energy system will remain, such developments will without doubt have a bearing on each of the key findings referred to above. However, these areas are out of scope for this report.

2.3 Further information

All of the directives that have been discussed in the report are listed separately in Appendix II. Appendix III includes the background to regulation for standards and information on the standardisation bodies and their respective roles. Appendix IV presents the Data protection legislation which applies or is under development in the EU and the UK. Lastly, the timescales for the introduction of the European network codes for electricity and gas are provided in Appendix V.

3 POLICY INTERDEPENDENCIES AND REGULATORY STABILITY

Current EU and UK energy policies aim to promote carbon reduction, security of supply and affordability (often referred to as the 'trilemma'). However, there are inherent tensions between these policy goals and interdependencies that could have implications for the development of a smart energy system. This section explores these points by looking at the relevant policies for smart meters, smart grids, micro-generation, demand response and electric vehicles. It also covers the potential convergence of the energy and telecommunication sectors.

3.1 Smart metering and smart grids

Smart metering

Article 9 of the EU Directive 2012/27/EU on energy efficiency requires that 'final customers for electricity, natural gas, district heating, district cooling and domestic hot water are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use'[1]. However, the requirement is subject to technical feasibility, financial viability and ability to deliver potential energy savings.

Furthermore, Directive 2009/72/EC concerning common rules for the internal market in electricity states, in Annex I, that at least 80% of consumers shall be equipped with smart meters by the end of 2020 wherever the economic impact assessment results have been shown to be positive. These assessments should have been finished no later than the 3rd of September 2012[2]. In Directive 2009/73/EC concerning common rules for the internal market in gas there are similar provisions for smart metering. However there is no specific implementation deadline[3]. It should also be noted that there is no equivalent Directive concerning heat meters.

In the UK, the imminent mass roll-out of smart meters (which came into play via the Energy Act 2008), will be led by the suppliers. Indeed, supply businesses will be responsible for replacing over 53 million gas and electricity meters. Modified standard licence conditions in Electricity supply licences and in Gas supply licences now include the requirement to install metering equipment in Great Britain

[1] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

[2] Directive 2009/72/EC 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC

[3] Directive 2009/73/EC of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC

which complies with the Smart Metering Equipment Technical Specifications (SMETS). This is further discussed in Section .4.

The mass roll-out of smart meters is expected to start in 2014 and to be completed in 2019 and will require changes to the regulatory framework governing energy industry participants. The regulatory framework includes the Electricity and Gas (Smart Meters Licensable Activity) Order 2012, which amends the Gas Act 1986 and the Electricity Act 1989 to create the licensable activity of the Data and Communications Company (DCC); the DCC Licence itself; and the Smart Energy Code (SEC).

The DCC will manage the flow of data between smart metering equipment in domestic consumers' homes and small businesses, and those whom are authorised to access smart metering data. The SEC will be a new multiparty agreement which will define the rights and obligations between the DCC and the users of its services and specify other provisions to govern the end-to-end management of smart metering data. In addition, energy suppliers and network operators will be required via new licence conditions to become parties to the SEC. The SEC is expected to be finalised and implemented in second quarter of 2014[4].

Smart meters are seen as an enabling technology for the development of a smart grid and smart energy system. However, this expectation may not be realised due to restrictions around data collection and accessibility (see also Section 5). Limited availability of metering data may, for example, inhibit the development of innovative applications for energy management.

Smart grids

Several EU legislative instruments including the Directive 2009/72/EC and Directive 2009/73/EC on common rules for the internal market in electricity and gas respectively, Directive 2009/28/EC on the promotion of the use of energy from renewable sources[5] and Directive 2012/27/EU, highlight and encourage the development of smart grids. Moreover Communication 2011/658 on the proposal for a Regulation on 'Guidelines for trans-European energy infrastructure' suggests that the adoption of smart grid technologies across the Union is identified as very important to efficiently integrate the behaviour and actions of all users connected to the electricity network[6]. Despite the fact that all the above directives and communications support the development of a smart grid (which is essential component of a smart energy system) they by no means mandate it.

[4] DECC (2012) Smart Metering Programme, Smart Meters Programme Plan

[5] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

[6] Proposal for a regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Decision No1364/2006/EC

In December 2010, the Department of Energy and Climate Change (DECC) published a vision document 'Smarter Grids: the opportunity', setting out what the benefits of smarter grids could be for the UK[7]. The Electricity Networks Strategy Group (ENSG) has also published a vision and a Smart Grid Routemap, setting out a high-level description of the way in which a UK smart grid could be delivered[8].

DECC and the Office of Gas and Electricity Markets (Ofgem) have established a Smart Grids Forum that will consider the network companies' challenges and opportunities relating to distributed generation, the electrification of heating and transport and the implications of smart metering on demand side management and active network management. The Forum aims to address commercial, cultural and technical changes, and the barriers that the network companies may face in making future changes. In particular, one of the work streams focuses on commercial and regulatory aspects and aims to bring together stakeholders to investigate some of the non-technical challenges associated with implementing smart grid solutions[9].

Ofgem has also promoted the development of smart grids by introducing the new performance-based RIIO model that sets out to ensure consumers money is efficiently spent when it comes to investment in Britain's energy networks. RIIO stands for Revenue = Incentives + Innovation + Outputs. RIIO aims to ensure that network costs do not rise any more than they need to by financially penalising inefficient companies that fail to deliver for consumers. Companies will continue to have to meet performance targets and failure to do so brings automatic penalties[10].

In order to attract efficient investment, Ofgem's new RIIO framework rewards companies that innovate and run their networks to better meet the needs of consumers and network users. It does this by setting longer (eight-year) price controls, offering incentives focused on delivering results, and expanding the £500 million Low Carbon Network Fund (which was established for the period from April 2010 to the end of March 2015 to encourage the growth of smart grids). DECC has also provided £2.8m to eight smaller smart grid demonstration projects via its Low Carbon Investment Fund, which also runs until 2015.

Gas DNOs have already submitted business plans for their price control which is due to start in April 2013. Electricity DNOs will submit their draft business plans for the first RIIO price control review in summer 2013[11] but no 'blanket' investments in smart grids are expected to

[7] DECC (2010) Smarter Grids: the opportunity

[8] ENSG (2010) A Smart Grid Routemap

[9] Ofgem (2013) DECC/Ofgem Smart Grid Forum (http://www.ofgem.gov.uk/Networks/SGF/Pages/SGF.aspx)

[10] Ofgem (2010) RIIO - a new way to regulate energy networks

[11] Ofgem (2012) Strategy consultation for the RIIO-ED1 electricity distribution price control

take place in the near future. This position may change during the second price control review, with the submission of draft business plans in 2021.

Moreover, it is important to highlight that as investments in networks are long-term, the new RIIO framework should provide stability on how investments in smart grids are treated in future. Past experience in the energy sector suggests that regulatory stability is of paramount importance when it comes to attracting and retaining investors.

It is apparent that UK policy promotes the development of smart grids but, like the EU, does not mandate it. However it remains feasible that modifications to the RIIO framework could be made to place binding obligations on the DNOs to adopt particular investment approaches - if they are proven to be more economically efficient in the longer term.

It could also be expected that there should be a very strong interdependency between smart metering and smart grid policies. However, in both the EU and the UK there is little coordination between policies which cost lead to more cost in the long run.

3.2 Micro-generation

Feed-in Tariffs (FiT)

Feed-In Tariffs (FiT) were introduced by the Energy Act 2008 and are the main financial incentive for encouraging the uptake of small-scale renewable electricity generating technologies. Most domestic level technologies qualify for the scheme, including:

- solar electricity (PV) (roof mounted or stand alone)
- wind turbines (building mounted or free standing)
- hydroelectricity
- anaerobic digesters
- micro-combined heat and power (CHP).

Renewable Heat Incentive (RHI)

The Renewable Heat Incentive (RHI) is the Government's principal mechanism for driving forward the transition to deployment of renewable and low carbon heat over the coming decades and was introduced by the Energy Act 2008. It is also the primary tool for achieving practically zero carbon heating in buildings by 2050 and therefore is of particular importance in the context of the SSH programme. There are two phases to the introduction of the RHI:

- Phase 1: the introduction of the RHI for non-domestic installations in the industrial, business and public sectors – already initiated.
- Phase 2: the domestic element, which is expected to be introduced in the summer of 2013 following the UK Government consultation published in September 2012.

Tariff schemes are proposed for:

- biomass boilers, including combined heat and power (CHP) biomass boilers
- ground source heat pumps

- water source heat pumps
- deep geothermal heat pumps
- all solar thermal collectors
- biomethane and biogas

There are also plans to extend support to additional technologies in 2013, including:

- air source heat pumps
- biomass direct air heating
- biomass combustion over 200 kilowatts (kW) [12].

Green deal and ECOs

The Energy Act 2011 includes provision for the Green Deal and the Energy Company Obligations (ECOs).

The Green Deal is a financing mechanism that enables people to pay for energy-efficiency improvements through savings on their energy bills. The Green Deal launched in January 2013 and applies to both the domestic and non-domestic sectors. There are 45 measures or areas of home improvement approved to receive funding under the Green Deal, covering:

- insulation
- heating and hot water
- glazing
- micro-generation

For the non-domestic sector: lighting, mechanical ventilation and heat recovery measures can also be covered. More areas may be added as technology develops. The ECO places an obligation on the “big six” energy suppliers to ensure energy efficiency measures for all classes of customer and was launched in January 2013. ECO is split into three elements:

i. the Affordable Warmth Obligation which aims to provide heating and hot water saving measures, insulation, glazing and micro-generation technologies (except PV) to low-income and vulnerable households,
ii. the Carbon Saving Obligation which aims to provide funding to insulate solid-walled properties (internal and external wall insulation) and those with ‘hard-to-treat’ cavity walls, and,
iii. the Carbon Saving Communities Obligation which aims to provide insulation and glazing measures to people living in the bottom 15% of the UK's most deprived

[12] UK Government (2013) Renewable Heat Incentive (RHI) (https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi)

areas. Of the expected investment by suppliers of £1.3bn per year, there will be a 75:25 split between the carbon and affordable warmth obligations[13].

Zero Carbon Homes

From 2016, developers will be required to deal with all emissions from-new build homes that fall under the scope of building regulations. A specified portion of this will have to be dealt with on-site through energy efficiency measures such as insulation and on-site renewables such as solar panels. The remaining emissions can be dealt with using off-site measures, the mechanism for which is yet to be decided. Similar plans for Zero Carbon non-domestic buildings may be applicable from 2019.

DNV KEMA's analysis of the FiT, RHI, Green Deal, ECOs and Zero Carbon Homes policies reveals that there is an overlap when it comes to the promotion of micro-generation. Fragmentation of the relevant policies may create confusion in the market as parallel price signals are provided to potential investors. There may therefore be a need for one consistent policy with regards to micro-generation. Moreover, past experience of the FiT, and the transition to the Green Deal from predecessor schemes, has shown that regulatory stability in financial incentives is needed to allow the development of new markets/start-ups. A change in these financial incentives could lead the smaller companies out of the market and thus could be an obstacle for successful innovation and basic service provision.

3.3 Capacity market and Demand response

The Energy Bill includes provisions on the forthcoming Electricity Market Reform. The key element of the reform package is a Capacity Mechanism in the form of a Capacity Market. The aim is to ensure future security of electricity supply by looking at both generation and demand elements. Thus, it is expected that the introduction of the Capacity mechanism is likely to lead to a growing market for demand response services. The first auction of the capacity market is expected to take place in 2014[14].

3.4 EVs and smart grid

A further policy related to the Climate Change Act 2008 is the Ultra-low emission vehicles initiative. UK Government provides £400 million to encourage people to buy and drive new ultra-low emission vehicles. It also provides funding to the Plugged-in Places scheme, which offers match-funding to consortia of businesses and public sector partners to install electric vehicle charging points[15]. The government has also set out a framework for the development

[13] UK Government (2013) The Green Deal and Energy Company Obligation (https://www.gov.uk/government/consultations/the-green-deal-and-energy-company-obligation)

[14] DECC (2012) Capacity Market: Design and Implementation Update (Annex C)

[15] UK Government (2013) Ultra-low emission vehicles (https://www.gov.uk/government/policies/reducing-greenhouse-gases-and-other-emissions-from-transport/supporting-pages/ultra-low-emission-vehicles)

of recharging infrastructure to support electric and plug-in hybrid vehicles and in 2011 published a strategy on plug-in vehicle infrastructure[16].

The impacts of EVs on the distribution network are expected to be major - as without a level of control over the charging profiles, the peak demand on the network could increase significantly which in turn could trigger large investments which need to be financed. Furthermore, the rate of uptake is a potential concern as vehicles can be purchased a lot faster than networks can be reinforced or upgraded.

3.5 Converging energy and telecommunications sectors

A change is taking place in terms of the quality of engagement between utilities and ICT firms. ICT firms require a more detailed understanding of operational processes in order to provide value-added services to a smart energy system, but they are learning fast.

Moreover, ICT companies will help to create the necessary interaction between the electricity, gas, heat and transportation sectors needed for a smart energy system. However, integration could be expanded into other industry sectors, such as healthcare and wellbeing (e.g. applications tracking time spent driving vs. time spent walking).

The energy and telecommunications sector are increasingly working together, which raises the possibility of mergers or combined propositions. Indeed, Australian utility ActewAGL offers “sextuple-play” services (electricity, gas, voice, data, TV and mobile); in the United States, the merger of Hancock Telecom and Central Indiana Power offers customers energy and communications services, complemented by value-added services for home automation and security[17].

Lastly, as cyber security for a smart energy is relevant for the telecommunications and energy regulators there is a need to clearly define roles and responsibilities in this regard[18].

Taking into account all of the changes and interactions between the energy and telecommunication sectors there might be a need for a more holistic approach when it comes to policy in order to enhance the level of benefits for consumers. Furthermore, stronger coordination between regulatory authorities for energy and telecommunication is likely to be needed anyhow in order to safeguard consumer interests.

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[16] Office for Low Emission Vehicles (2011) Making the Connection, The Plug-In Vehicle Infrastructure Strategy

[17] OECD (2012) ICT Applications for the Smart Grid, Opportunities and Policy Implications

[18] Monizza (2012) Action plan to accommodate ICT/telecoms in the energy sector to maximise synergies in building Smart grids (http://ec.europa.eu/information_society/events/smartenergy/programme/action_plan/index_en.htm)

4 HARMONISATION OF STANDARDS

Standards play a crucial role in the development of a smart energy system. This section covers the policies surrounding the development of standards for smart energy system elements, in particular, European network codes, EU mandates and smart meter specifications.

4.1 Recognising the need

Directive 2009/72/EC (Article 5) and Directive 2009/73/EC (Article 8) refer specifically to the need for technical rules to allow the development of a common electricity and gas market. Such rules ensure the interoperability of systems and will be objective and non-discriminatory. The Agency for the Cooperation of Energy Regulators (ACER) may also make appropriate recommendations towards achieving compatibility of those rules, where appropriate to ensure technology neutrality.

4.2 Developing Network Codes

Regulation (EC) 714/2009[19] and Regulation (EC) 715/2009[20] lay down rules providing a framework for cross-border exchanges in electricity and natural gas in order to alleviate the inherent difficulties. They also establish the European Network of Transmission System Operators for Electricity (ENTSOE) and Gas (ENTSOG) respectively that are responsible for developing network codes relating in particular to:

- network security and reliability;
- data interexchange;
- technical and operational exchanges;
- transparency rules;
- harmonised transmission tariff structures;
- energy efficiency.

These codes will include specific technical rules and procedures for all the above areas that will become legally binding in the forthcoming years. Network codes are expected to be submitted by ENTSOE and ENTSOG to ACER and subsequently to the European Commission (EC) by 2014[21]. Detailed timescales for each of the codes developed can be found in Appendix IV. After submission to the EC, final modifications and adjustments take apply before they can come into force (a process known as Comitology). During this process,

[19] Regulation (EC) No 714/2009 of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity

[20] Regulation (EC) No 715/2009 of 13 July 2009 on conditions for access to the natural gas transmission networks

[21] DG Energy (2013) Network Codes & Guidelines (http://ec.europa.eu/energy/gas_electricity/codes/codes_en.htm)

the network codes will be continuously evolving. The final network codes could potentially determine the level of sophistication regarding the control of future networks and hence what ICT might be required. The latest timescales for the European network codes are provided in Appendix V.

4.3 Developing standards

In order to provide a consistent framework for identifying and developing the standards that are required for the development of a smart energy system, the EC has issued a series of Mandates referring to Smart Meters (M/441), Smart Grids (M/490) and Electric Vehicles (M/468). The organisations involved in delivering these standards are CEN, CENELEC and ETSI[22]. More information about these organisations as well as the background regulation for standards is provided in Appendix III.

M/441 for Smart Meters

Mandate M/441 for Smart Meters issued in 2009 intends to enforce standardisation of measuring instruments among European Standardisation Organisations (ESOs) for the development of an open architecture for utility meters that involves communication protocols to enable interoperability[23]. The interoperability of utility meters (water, gas, electricity, heat) can then improve customers' awareness of actual consumption to allow timely adaptation to their demands. The Commission has also prepared Recommendation 2012/148/EU which deals with preparations for the roll-out of smart metering systems and provides common minimum functional requirements. The minimum key functionalities include:

- frequent updates of the readings provided directly to the consumer.
- storage of past consumption data
- remote reading of meters by the operator that are frequent enough to help network planning.
- enabling advanced tariff structures and remote tariff control.

M/468 for Electric Vehicles

Mandate M/468 for Electric Vehicles was issued in 2010. It is envisaged that interoperable chargers will allow consumers to easily charge their vehicles throughout Europe, and to use the same charger for electric vehicles produced by different manufacturers[24]. The standard

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[22] DG Energy (2013) Smart Grids (http://ec.europa.eu/energy/gas_electricity/smartgrids/smartgrids_en.htm)

[23] European Commission (2009) Standardisation Mandate to CEN, CENELEC and ETSI in the field of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability

[24] European Commission (2010) Standardisation Mandate to CEN, CENELEC and ETSI concerning the charging of electricity vehicles

will ensure interoperability and connectivity between the electricity supply point and electric vehicle chargers, as well as guarantee the safety of the batteries and their electromagnetic compatibility. However, despite the efforts so far, no alignment with respect to chargers has been achieved, although seven major companies namely - Audi, BMW, Daimler, Ford, GM, Porsche and Volkswagen have agreed to a single rapid charging system and the use of a specific communication protocol[25].

M/490 for Smart Grids

The EC has understood the importance of the development of smart grid and thus set up the Smart Grids Task Force (SGTF) at the end of 2009[26]. SGTF is entitled to provide policy and regulatory directions for the deployment of smart grids and issue key recommendations for standardisation, consumer data privacy and security. It also proposed the issue of the Mandate M/490 for Smart Grids in 2011[27]. This particular mandate is intended to build upon the previous two mandates and enforce a technical reference architecture that accomplishes three primary objectives:

i. represent the functional data flows between the main domains and facilitate the integration of many systems and subsystem architectures;
ii. address a set of consistent standards that support information exchange (communication protocols and data models) and the integration of all users into the electric system operation; and
iii. establish sustainable standardisation processes and collaborative tools that enable stakeholder interactions to improve the first two objectives and adapt them to new requirements based on gap analysis, while ensuring the fit to high-level system constraints such as interoperability, security, and privacy.

Overall, so far, M/490 reinforces International Electrotechnical Committee (IEC) good working practices. The first set of standards for this mandate has already been submitted to the Commission. A proposal to update M/490 during the period 2013-14 was agreed recently[28]. Two main topics to be addressed on standardisation during 2013-14 are:

- the implementation of the methodologies developed and the second set of standards and

[25] Ford (2013) Seven Auto Manufacturers Collaborate on Harmonized Electric Vehicle Fast Charging Solution (http://media.ford.com/article_display.cfm?article_id=35430)

[26] DG Energy (2013) Smart Grids Task force (http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm)

[27] European Commission (2011) Standardization Mandate to European Standardisation Organisations (ESOs) to support European Smart Grid deployment

[28] European Commission (2012) Meeting minutes from the 14th meeting of the Steering Committee of the Task Force for Smart Grids

- the system interoperability testing methods and a conformance testing map.

Based on the timescales previously described, the production of standards for a smart energy system is inevitably a time consuming process given the sheer number of interests involved. This will always create a risk that the development of a smart energy system could be delayed, coupled with the potential for higher trial costs and interoperability issues.

As network codes and standards are developed at the same time by different organisations, it is of fundamental importance that there is rigorous coordination to ensure the consistency of the outcomes. Similarly, standards developed via the three different mandates need to be consistent. For example: depending on the smart meter specifications adopted, the functionality of smart grids could be constrained in comparison to what had been expected. The SGTF group is tasked with coordinating the work and deliverables of M/490 with other mandates - i.e. M/441 for smart meters and M/468 for electric vehicles and the development of network codes by ENTOSE and ENTSOG (in cooperation with ACER). However, both network codes and standards are continuously evolving, making this task exceedingly difficult. A common or more joined up framework for delivering standards and network codes may create more certainty going forwards.

4.4 The UK experience

The UK has developed its Smart Metering Equipment Technical Specifications (SMETS) following the provisions of Directive 98/34/EC29, the Measuring Instruments (Active Electrical Energy Meters) Regulations 2006 and the Measuring Instruments (Gas Meters) Regulations 2006 (which implement the Directive 2004/22/EC30).

The first version of SMETS[31], which has already been approved at an EU level, aimed to reduce the risk of smart meters having to be replaced when a customer changes supplier whilst providing sufficient confidence to suppliers to allow them to begin their “Foundation” roll-out programmes. However, in recent weeks it has come to light that only 300 SMETS meters are currently deployed (as of Jan 2013) which highlights the risk and uncertainty which still remains in the specification. The latest iteration of SMETS was published in late

[29] Directive 98/34/EC of the European Parliament and of the council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services

[30] Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

[31] DECC (2012) Smart Metering Implementation Programme Smart Metering Equipment Technical Specifications

January 2013[32] and has been submitted to European Commission (EC) (approval expected in Q3 2013) - yet there remain a number of gaps which need to be addressed.

Moreover, it is acknowledged that these specifications were primarily developed from a supplier's point of view. As a result, some of the functions that may be useful to the Distribution Network Operators to facilitate smarter grids were added into the specification quite late and many others are yet to be justified in terms of their likely benefit. According to the provisions of Directive 98/34/EC, any further updates to SMETS will continue to be subject to EU approval.

5 DATA PROTECTION POLICY

It is widely recognised that data privacy is one of the most important areas for the development of a smart energy system. This section covers relevant legislation and its implications. It also discusses the potential impact of any future reform of EU data protection rules. Legislation surrounding data protection is provided in Appendix IV.

5.1 Applicable legislation

Given the fact that privacy is one of the fundamental human rights, there is already a regulatory framework in place both in the EU and UK that ensures that private data is protected. Yet this gives rise to questions such as:

- what data gathered by smart meters in a smart energy system is private, and,
- to what extent the current legislative framework applies (i.e. interpretation).

Determining the data that could be cross-related to an individual and thus should have some appropriate controls around it would seem to be essential. Recommendation 2012/148/EU suggests that Directive 95/46/EC (Data protection Directive)[33] and Directive 2002/58/EC (e-privacy directive)[34] set very clear requirements on who has access to different categories of such information and how it should be processed[35]. Indeed, in the UK it is quite clear that the Data Protection Act 1998 (DPA) and Privacy and Electronic Communications Regulations 2003 (the implementation of Data protection Directive and the e-privacy Directive in UK) are also applicable.

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[32] DECC (2012) Smart Metering Implementation Programme Smart Metering Equipment Technical Specifications Version 2

[33] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data

[34] Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector

[35] Commission Recommendation of 9 March 2012 on preparations for the roll-out of smart metering systems

There is however another directive that could be applicable to a smart energy system but this is by no means clear at the moment. Directive 2006/24/EC regarding data retention states that the traffic data that is being collected by providers of public communications has to be stored for a minimum of 6 months and a maximum for 2 years[36]. Given the fact that the Opinion of Art 29 Data Protection Working Party (WP)[37] on smart metering states that 'retention policies and practices will need to be established for new purposes and reviewed for existing purposes[38], and as the Directive focuses mainly on the telecommunication sector, its applicability to smart metering may be limited[39]. Nonetheless, if this directive is deemed applicable there might, for example, be an increased need to retain private data, which in the UK is contrary to the proposed rules governing the DCC.

5.2 Dealing with data protection

In Recommendation 2012/148/EU, the EC suggests a 'privacy by design' approach whereby data protection and security features are built into smart metering systems before they are rolled out[40]. The Recommendation also suggests that data collection should be limited to the minimum amount necessary and data should be rendered anonymous such that its origin cannot be determined. Finally, it has been stated that the Commission plans to develop a data protection impact assessment template.

The 'privacy by design' approach could give rise to further change in the coming years, due either to a change in data protection legislation or the general discovery that consumers are more willing to share private data in order to receive better services than was perhaps thought.

The UK Government continues to be minded to take the 'privacy by design' approach to deal with data privacy as the EC recommends. Moreover, it will follow the principle that consumers should have a choice as to how their smart metering data is used and by whom, except where it is required to fulfil regulated duties[41]. In order to safeguard private data, the

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[36] Directive 2006/24/EC of the European Parliament and of the Council of 15 March 2006 on the retention of data generated or processed in connection with the provision of publicly available electronic communications services or of public communications networks and amending Directive 2002/58/EC

[37] The Directive 95/46/EC (Data Protection Directive) sets up the Article 29 Data Protection Working Party (WP) which provides opinions on issues regarding data protection.

[38] Opinion 12/2011 on smart metering, 4 April 2011, WP 183

[39] Havlíková (2011) Smart Grids in the European data protection legal framework, University of Oslo, Faculty of Law

[40] Commission Recommendation of 9 March 2012 on preparations for the roll-out of smart metering systems

[41] DECC (2011) Smart Metering Implementation Programme Response to Prospectus Consultation

DCC will be established. It will be the conduit for most domestic (and some non-domestic) consumers' data as it travels from their respective smart meters to parties that are authorised to have access to it. The DCC Licence Conditions and the SEC will include specific provisions for protecting data. Again, the DCC will not be permitted to store any data at all.

It may be that customers are not willing to share their private data with third parties if explicit consent is required. There is therefore the risk that some of the anticipated benefits (from smart energy systems) may not be realised if existing data policy frameworks are retained.

5.3 Reform of EU Data Protection Directive

In January 2012 the EC proposed a comprehensive reform of the EU's Data Protection rules to strengthen online privacy rights and boost Europe's digital economy. This is primarily down to the fact that technological progress and globalisation have profoundly changed the way private data is collected, accessed and used. A further reason for this reform is that Member states have all implemented the Data protection Directive slightly differently, a common problem when it comes to any directive or indeed standard.

The key changes proposed are:

- 'A 'right to be forgotten' will help people better manage data-protection risks online. When they no longer want their data to be processed and there are no legitimate grounds for retaining it, the data will be deleted.
- Whenever consent is required for data processing, it will have to be given explicitly, rather than be assumed.
- Customers to be able to easily access their own data and rights of data portability, i.e. easier transfer of personal data from one service provider to another.
- Companies and organisations will have to notify serious data breaches without undue delay, where feasible within 24 hours.
- A single set of rules on data protection, valid across the EU.
- Companies will only have to deal with a single national data protection authority – in the EU country where they reside.
- Individuals will have the right to refer all cases to their national data protection authority, even when their personal data is processed outside of their home country. This is a massive issue at the moment due to globalisation.
- EU rules will apply to companies not established in the EU, if they offer goods or services in the EU or monitor the online behaviour of its citizens.
- Increased responsibility and accountability for those processing personal data.
- Unnecessary administrative burdens such as notification requirements for companies processing personal data will be removed.

- National data protection authorities will be strengthened so they can better interpret and enforce the EU rules.[42]

The proposal is also suggesting the introduction of a general regulation with a directive specifically for the criminal justice sector. The process of reform is ongoing and is at the top of the agenda of the Irish presidency (first half of 2013). Analysts however expect that the new rules could be put into force by 2014. Currently, the proposed regulation and directive allow two years for implementation following their enactment, meaning that it will be 2016[43] before any changes are seen.

The introduction of these new rules is likely to require changes to UK energy industry governance (e.g. the DCC Licence Conditions, the SEC, and Supplier/DNO Licences etc.). Moreover, as mentioned in the previous section - such a change could also affect the technical specifications for the smart metering infrastructure. There could therefore be some confusion and delay in terms of a move towards a smart energy system.

[42] European Commission (2012) Why do we need an EU data protection reform?

[43] Smith (2013) EU data protection reforms: how the process works, and what the ICO is doing, ICO blog (http://www.ico.gov.uk/news/blog/2013/eu-data-protection-reforms-how-the-process-works-and-what-the-ICO-is-doing.aspx)

6 SUMMARY OF FINDINGS

This section captures some of the key findings that have been identified during the review which are subsequently intended as potential areas of focus for the SSH programme. One of the key conclusions that can be drawn is that existing policies, if taken on "face value", are intended to support the development of a smart energy system. Despite this, data protection rules and interdependencies between policy drivers could become significant blockers.

Indeed, Sections 3, 4 and 5 of the report discussed a series of potential enablers and blockers for the SSH programme. These are summarised in Figure 3:

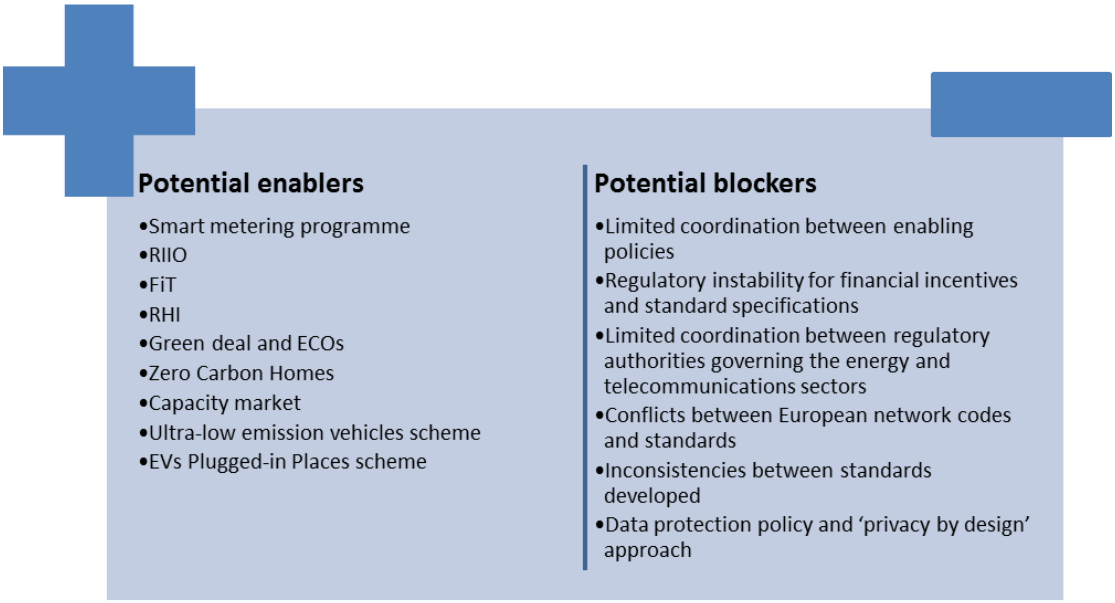


Figure 3: Potential enablers and blockers for the SSH programme

Figure 4 summarises some of the key forthcoming directives and standards which have been referenced throughout the report. Note also that the relevant sections of the report have been included in the diagram.

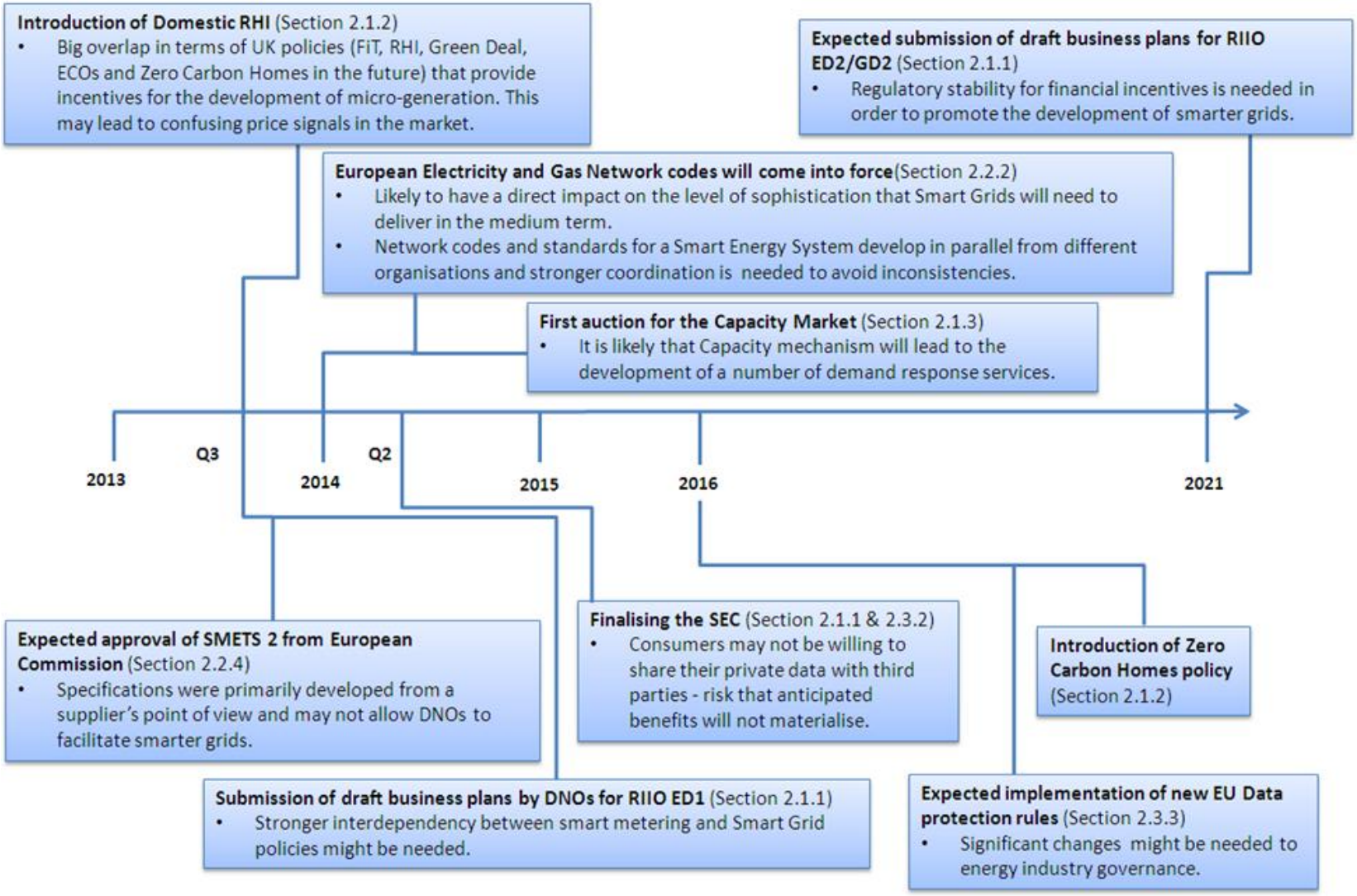
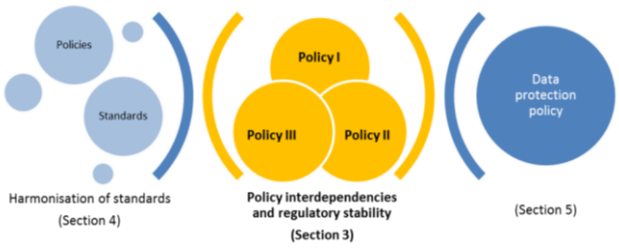


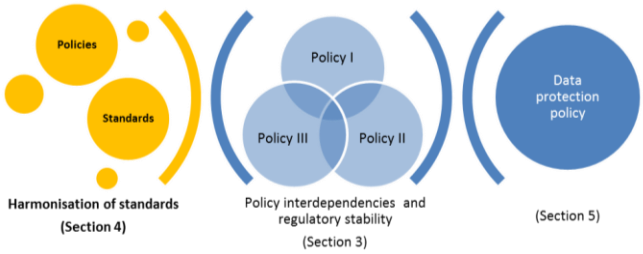
Figure 4: Forthcoming directives and standards and their implications for the SSH programme.

Finally, the following tables list the key takeaways in each of the areas discussed. The area covered off in the respective tables is highlighted in yellow:



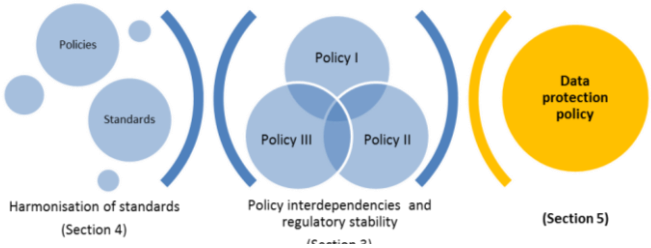
- The EU and UK envisage the development of a smart energy system as derived from the current legislation but there is no holistic "physical"/technology or commercial approach outlined in the policies developed so far.
- There is a lack of coordination between smart metering, smart grid, and smart energy system policies between the EU and UK.
- The new regulatory framework for networks (RIIO) sets out to provide sufficient stability to ensure appropriate levels of investment in smart grids can be made. However, there is a distinct separation between smart metering and smart grid policy in the UK which may create difficulties down the line.
- There is a big overlap in terms of UK policies (FiT, RHI, Green Deal and ECOs) that provide incentives for the development of micro-generation – these may lead to confusing price signals in the market.
- Past experience with FiT and the transition to the Green Deal from predecessor schemes, has shown that regulatory stability for financial incentives is needed in order to promote the development of small innovative companies and associated innovation and basic service delivery.
- The introduction of the Capacity market in UK could contribute significantly to the development of demand response and may radically change the mindset for a smart energy system design.
- Policies on EVs charging and smart grids do not seem to be well coordinated.
- The convergence of i) ICT and operational technologies ii) 'vertical' industries and sectors and iii) energy and telecommunications services might create a need for a holistic approach to regulations and standards and/or enhanced coordination among regulatory authorities.

Table 1: Key findings on Policy interdependencies and regulatory stability



- The EU standardisation process pertaining to smart energy systems is ongoing and quite slow.
- The specification that has been proposed for the mass roll-out of smart meters in the UK has been most heavily influenced by suppliers' and it remains possible that some of the potential smart energy system benefits may not come to fruition if the industry design is not future-proof.
- As standards for smart meters, smart grids and EVs are developed via separate mandates, there is a risk that there could be compatibility issues.
- New European electricity and gas network codes are under development and will become binding in the coming years. It is expected that they will have a direct impact on the level of sophistication that smart grids will need to deliver in the medium term.
- Standards are likely to complement European network codes in several areas and strong coordination is needed as they develop in parallel from different organisations to avoid any inconsistencies.
- Developing UK standards for a smart energy system in areas that are not currently covered by the EU will still be subject to an approvals procedure at the EU level so naturally there is a timing issue to consider.

Table 2: Key findings on Harmonisation of standards



- It is not clear whether, and to what extent, the EU directives related to data retention is applicable to the data collected from a smart energy system.
- The 'privacy by design' approach adopted by both the EU and the UK in dealing with data protection issues might lead to the development of technical specifications for the smart metering infrastructure that could become restrictive in later years due to changes in data protection legislation.
- As an explicit consent will be required from consumers before sharing private data with third parties, there is a risk that the expected benefits from smart metering and smart energy system 'enabling technologies' might not be realised due to the potential restriction of data and information provided to third parties.
- EU rules regarding data protection are under reform and it is likely that new rules will be implemented in 2016 triggering changes to energy industry governance.

Table 3: Key findings on Data protection policy

Glossary

ACER	Agency for the Cooperation of Energy Regulators
BSI	British Standards Institution
CEN	European Committee for Standardization
CENELEC	European Standardization Organisation for Electrotechnical standards
DCC	Data and Communications Company
DECC	Department of Energy and Climate Change
EC	European Commission
ECI	European critical infrastructures
ECOs	Energy Companies Obligations
ENSG	Electricity Networks Strategy Group
ENTSOE	European Network of Transmission System Operators for Electricity
ESOs	European standardization organizations
ETI	Energy Technologies Institute
ETSI	European Telecommunications Standards Institute
EU	European Union
EVs	Electric Vehicles
ICT	Information and Communication Technologies
IEC	International Electrotechnical Committee
ISO	International Organisation for Standarisation
Ofgem	Office of the Gas and Electricity Markets
RHI	Renewable Heat Incentive
RIIO	Revenue = Incentives + Innovation + Outputs
SEC	Smart Energy Code
SES	Smart energy system
SGTF	Smart Grids Task Force
SSH	Smart Systems and Heat
UK	United Kingdom

Appendix I – Overview of the programme

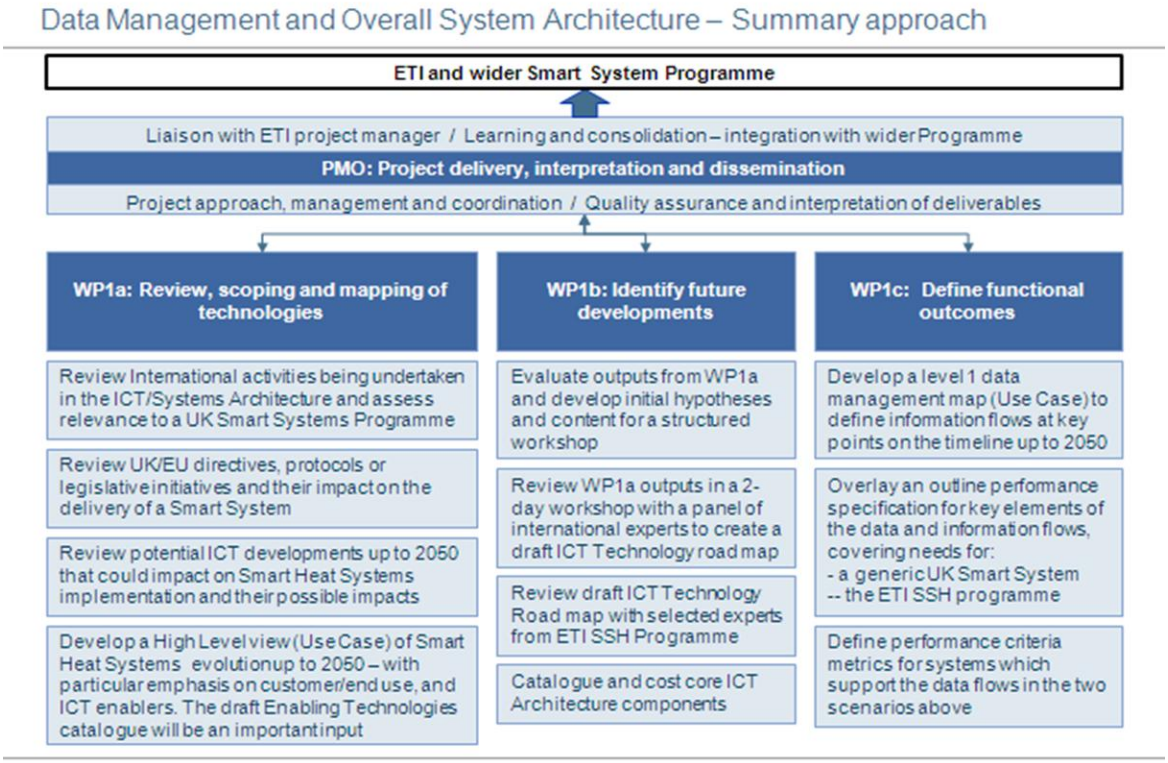


Figure 5: DNV KEMA's scope of the work

Appendix II – List of regulations

Primary EU Law	
Charter of Fundamental Rights of the European Union	
Treaty on the European Union	
Treaty on the Functioning of the European Union	
EU Directives	
Directive 95/46/EC	on the protection of individuals with regard to the processing of personal data and on the free movement of such data
Directive 98/34/EC	laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services
Directive 2002/58/EC	concerning the processing of personal data and the protection of privacy in the electronic communications sector
Directive 2004/108/EC	on the approximation of the laws of the Member States relating to electromagnetic compatibility
Directive 2004/22/EC	on measuring instruments
Directive 2006/24/EC	on the retention of data generated or processed in connection with the provision of publicly available electronic communications services or of public communications networks
Directive 2006/95/EC	on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits
Directive 2008/114/EC	on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection
Directive 2009/28/EC	on the promotion of the use of energy from renewable sources
Directive 2009/72/EC	concerning common rules for the internal market in electricity
Directive 2009/73/EC	concerning common rules for the internal market in gas
Directive 2012/27/EU	on energy efficiency
EU Regulations	
Regulation (EC) 765/2008	setting out the requirements for accreditation and market surveillance relating to the marketing of products
Regulation (EC) 714/2009	on conditions for access to the network for cross-border exchanges in electricity
EU Recommendations	
Recommendation 2012/148/EU	on preparations for the roll-out of smart metering systems

EU Communications	
Communication 2009/111	on mobilising Information and Communication Technologies to facilitate the transition to an energy-efficient, low-carbon economy
Communication 2011/658	on guidelines for trans-European energy infrastructure
EU Mandates	
Mandate M/441	for Smart Meters
Mandate M/468	for Electric Vehicles
Mandate M/490	for Smart Grids
UK ACTS	
Gas Act 1986	
Electricity Act 1989	
Human Rights Act 1998	
Data Protection Act 1998	
Climate change Act 2008	
Energy Act 2008	
Energy Act 2011	
UK Regulations	
Privacy and Electronic Communications Regulations 2003	
Measuring Instruments (Active Electrical Energy Meters) Regulations 2006	
Measuring Instruments (Gas Meters) Regulations 2006	

Table 4: List of EU and UK regulations

Appendix III- Background regulation for standards and Standardisation bodies

Background regulation for standards

Within the EU Directive 98/34/EC, Regulation (EC) No 765/2008, Directive 2004/22/EC, Directive 2006/95/EC and Directive 2004/108/EC set the basis on which technical standards relevant to a smart energy system are produced. The first two pieces of legislation are quite general and apply to all type of standards across all industries.

Directive 98/34/EC aims to eliminate or reduce the barriers to the free movement of goods which can arise from the adoption of different national technical regulations, by encouraging transparency of national initiatives vis-à-vis the European Commission, European standardisation bodies and other Member States. In order to achieve those goals it establishes information procedures for the adoption of voluntary technical specifications and for obligatory technical specifications.

Regulation (EC) No 765/2008 was set to provide a common framework for the accreditation infrastructures within the EU and, as a consequence, to facilitate movement of goods between the Member States. Correct operation of the accreditation infrastructures is essential in guaranteeing control of product conformity assessment bodies and surveillance of the products and economic operators on the European market. This regulation is known as the New Legislative Framework (NLF) that has been the legislative definition of essential requirements for goods. Related to the legislative document (e.g. directive or regulation), harmonized standards from the European Standards Organizations (ESOs) describe further technical details[44].

Moving to the analysis of directives more directly related to standards for a smart energy system, Directive 2004/22/EC on measuring instruments focuses on electricity, gas, water and heat meters and the requirements these instruments need to satisfy. As this legislation was enacted prior to the development of smart energy system concept, there is no direct reference to smart meters. However, provisions of this directive are also applicable for smart metering purposes. The Directive states that Member States should not impede placing of the meters on the market and should carry out conformity assessment before doing so. Moreover, specific rules for data retention of the meters in case of loss of electricity in the circuit are provisioned[45].

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[44] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93

[45] Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments

Directive 2006/95/EC (Low Voltage Directive (LVD)) requires both a conformity assessment procedure applied to equipment before placing on the market and an evaluation of the Essential Health and Safety Requirements (EHSRs) which electrical equipment must meet either directly or by means of harmonised standards[46]. This directive ensures that electrical equipment within certain voltage limits both provides a high level of protection for European citizens and enjoys a Single Market in the European Union.

Lastly, the main objective of the Directive 2004/108/EC is to regulate the electromagnetic compatibility of equipment as it needs to comply with the requirements set when it is placed on the market and/or taken into service. The Directive first limits electromagnetic emissions of equipment in order to ensure that, when used as intended, such equipment does not disturb radio and telecommunication as well as other equipment. It also governs the immunity of such equipment to interference and seeks to ensure that this equipment is not disturbed by radio emissions when used as intended. Furthermore the application of good engineering practice is required for fixed installations, with the possibility for the competent authorities of Member States to impose measures if non-compliance is established[47].

All the above directives determine specific requirements for the development of equipment used in the EU that should be followed in order to protect consumers and ensure a common market for all products. It goes without saying that the equipment needed for the creation of a smart energy system has to comply with all those. However, given the fact that vendors are familiar with all those directives, conformance doesn't appear to be an issue. Delays may though occur if the UK would like to adopt a standard before the EU does as certain procedure needs to be followed.

Standardisation bodies

CENELEC is the European Standardization Organisation for Electrotechnical standards within Europe. Many CENELEC committees monitor, feed into and parallel vote on International Standards produced in their corresponding committees in the International Electrotechnical Committee (IEC). CENELEC are tasked under Mandate 441 to identify, produce and maintain standards for electricity meters, communication protocols, home automation equipment, Electric Vehicles and other electrotechnical applications[48].

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[46] Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

[47] Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

[48] CENELEC (2013) About CENELEC (http://www.cenelec.eu/)

CEN the European Committee for Standardization on the other hand is responsible for standards that are not Electrotechnical. The International equivalent of CEN is the International Organisation for Standarisation (ISO). CEN is also entitled to identify, produce and maintain standards in the area of gas, water and heat meters, communications protocols for battery powered meters, and other non-electrotechnical applications[49].

Lastly, ETSI is the European Telecommunications Standards Institute and covers standards associated with telecommunications media, protocols and physical layers. ETSI are recognized by the Smart Metering Coordination Group for the delivery of standards in the area of telecommunications, as part of the ongoing work to fulfill the requirements of Mandate M/441[50].

The UK has its own standard organisations which also undertake work in producing standards. The British Standards Institution (BSI) is the UK's National Standards Body and represents UK economic and social interests across all European and International standards organizations. BSI has issued standards with regard to the Energy management and efficiency, the Specification for domestic gas meter boxes and meter bracket, Greenhouse gas emissions, Renewable energy and Data protection[51].

Interestingly, in 2012 BSI has been commissioned by the UK Department of Business, Innovation and Skills to formulate a Smart Cities Standards Strategy. This strategy will identify the needs and concerns of stakeholders and explore where standards might facilitate the wider uptake of the Smart Cities concept including a smart energy system[52].

[49] CEN (2013) FAQs (http://www.cen.eu/cen/pages/faq.aspx)

[50] ETSI (2013) Standards (http://www.etsi.org/standards)

[51] BSI (2013) Standards (www.bsigroup.co.uk/en-GB/standards/)

[52] BSI (2013) Smart Cities (http://shop.bsigroup.com/en/Browse-By-Subject/Smart-Cities/?t=r)

Appendix IV - Data protection legislation

EU Data protection legislation

The EU Charter of Fundamental Rights which is legally binding for all Members (Article 8), the Treaty on the Functioning of the European Union (Article 16) and the Treaty on European Union (Article 39) comprise the primary legislation and provide the basic principles for data protection in the EU. However, the core EU legislation regarding privacy and data protection is the Directive 95/46/EC (Data protection Directive) on the protection of personal data. It sets up a regulatory framework which seeks to strike a balance between a high level of protection for the privacy of individuals and the free movement of personal data within the EU. To do so, the Directive sets strict limits on the collection and use of personal data and demands that each Member State set up an independent national body responsible for the protection of these data. The Data protection Directive also sets up the Article 29 Data Protection Working Party (WP) which provides opinions on issues regarding data protection[53]. It has issued two opinions relevant to smart energy systems so far; the Opinion 183 (12/2011) on smart metering and the Opinion 15/2011 on the definition of consent.

The Opinion 183 (12/2011) on smart metering focuses on what is the "relationship between the legal requirements set out in the Data Protection Directive and the context of the smart metering". The main outcome of this opinion is the fact that data protection laws will apply to the smart metering as personal data are being processed[54].

Consent is one of several legal grounds for processing data and thus an important part of the Data Protection Directive. This was the main focus of the Opinion 15/2011 on the definition of consent. Relevancy for smart metering lies in the explanation of the valid and invalid consent. The opinion presents examples of a situation where consent is/is not freely given. Interesting parallels with smart meters can be seen with the example of electronic health records. If there is no other option for the service to be provided, refusal means a clear disadvantage for people who will not consent[55].

The Art.29 WP thus came to the conclusion that consent is not sufficiently free in the case of electronic health records. If we think of smart meters, the option not to install smart meters might mean that the household will not be provided with electricity, gas, water etc. As this is not considered an option for those not consenting, one can conclude that consent is not

[53] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data

[54] Opinion 12/2011 on smart metering, 4 April 2011, WP 183

[55] Opinion 15/2011 Consent, 13 July 2011, WP 187

sufficiently free (in the case of smart meters), if there is no option[56]. Hence, issues may arise if the implementation of smart meters and subsequently the collection of personal data are subject to consumer's consent

The Directive 2002/58/EC (e-privacy directive) refers to the processing of personal data and the protection of privacy in the electronic communications sector. Amongst others, the directive lays down provisions regarding confidential communications, the processing of traffic data and location data. Initially it was not clear if this directive will also apply to smart grids[57].

UK Data protection legislation

The UK's legislative framework for data protection includes the Human Rights Act 1998 and in particular, the right to respect for private and family life, where any interference needs to be justified. The key legislation though is the Data Protection Act 1998 (DPA) that establishes a framework of rights and duties which are designed to safeguard personal data. Further on, Privacy and Electronic Communications Regulations 2003 (the implementation of the e-privacy Directive 2002/58/EC in UK) is also relevant to data protection.

The Information Commissioners' Office (ICO) oversees and enforces the DPA and the Privacy and Electronic Communications Regulations 2003 and makes sure that industry participants comply with the requirements under those Acts[58]. It is also important to mention that consumers retain their rights under the DPA such as to access information held about them, to object to processing that is causing them distress, and to prevent processing for direct marketing.

[56] Havlíková (2011) Smart Grids in the European data protection legal framework, University of Oslo, Faculty of Law

[57] Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector

[58] ICO (2013) About the ICO(http://www.ico.gov.uk/about_us.aspx)

Appendix V –European Network codes' timescales

Timescales for electricity network codes (Last updated in 28 August 2012)[59]

Network Code (NC)	Comitology to start
NC on capacity allocation and congestion management	Q1/13
NC on forward markets	Q1/14
NC on grid connection	Q4/12
NC on DSO and industrial load connection	Q2/13
NC on HVDC connection	Q2/14
NC on operational security	Q3/13
NC on operational planning and scheduling	Q3/13
NC on load-frequency control and reserves	Q4/13
NC on operational training	-
NC on requirements and operational procedures in emergency	-
NC on balancing	Q1/14
NC on third party access	-
NC on data exchange and settlement	-

Table 5: Timescales for electricity network codes

Timescales for gas network codes (Last updated in 25 January 2013)[60]

Network Code (NC)	Comitology to start
NC on capacity allocation methodologies	Q1/13
NC on balancing	Q3/13
NC on tariffs	Q4/14
NC on interoperability rules	Q1/14

Table 6: Timescales for gas network codes

[59] DG Energy (2013) EC / ACER / ENTSOE 3-year work plan Electricity 28 August 2012 (http://ec.europa.eu/energy/gas_electricity/codes/doc/20120828_3years_electricity.pdf)

[60] DG Energy (2013) EC / ACER / ENTSOG 3-year work plan Gas 25 January 2013 (http://ec.europa.eu/energy/gas_electricity/codes/doc/20130125_3years_gas.pdf)