
A (Legal) Challenge to Privacy: On the Implementation of Smart Meters in the EU and the US

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A Abstract

Smart meters offer a way to address challenges created by the growing production and availability of volatile renewable energies, but they also create problems with respect to data protection. The implementation of interoperable smart meters on the grounds of EU law creates concerns in regard to the compatibility with EU Charter of Fundamental Rights, Article 7. The EU should therefore adopt an area-specific protection concept, which contains detailed rules to remove the concerns about the legality of interoperable smart meters. The paper gives a detailed analysis of the smart meter related EU legislation and, to put implementation of smart meters into a more general context, gives an overview on the implementation of smart meters in the United States of America.

B Introduction

The generation and supply of volatile renewable energies from wind and solar power pose a challenge for every country and state that decides to increase its renewable energy's percentage in the energy mix. It jeopardizes the safety of the electricity grid if unexpected energy levels lead to an overload of electricity in the grid.¹

Due to their ability to communicate directly with the meter operator, smart meters enable almost real-time capture of power consumption and power production.² They help network operators to regulate the flow of electricity³ and thus become a significant element for an intelligent power grid.⁴ However, smart meters

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¹ Cp. Sabine Schulte-Beckhausen/Carmen Schneider/Thorsten Kirch, 'Unionsrechtliche Aspekte eines »EEG 2.0«' [2014] *Recht der Energiewirtschaft* (RdE) 101, 104.

² Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229; cp. also Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 14 with reference to Bundesnetzagentur, '»Smart Grid« und »Smart Market«. Eckpunktepapier der Bundesnetzagentur zu den Aspekten des sich verändernden Energieversorgungssystems' <www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/NetzzugangUndMesswesen/SmartGridEckpunktepapier/SmartGridPapierpdf.pdf?__blob=publicationFile> accessed 02 January 2017, 11.

³ Cp. Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229.

⁴ Cp. Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für

also allow suppliers to offer load-dependent or daytime-dependent tariffs,⁵ which favours grid regulation through economic incentives.⁶

One can thus deduce that smart meters are a solution for the problems associated with the increasing generation and supply of volatile renewable energies, but they also create challenges themselves, particularly with regard to data protection.⁷ These challenges are cultivated by different characteristic load profiles of electrical equipment, and an analysis of the usage data permits under certain conditions conclusions about the individual's personal lifestyle.⁸

Two European Union law directives oblige the EU member states to guarantee implementation of smart meters into private households. The present paper aims to show that there are already fundamental concerns regarding the legality of these directives with regard to the right to privacy which derives from EU Charter of Fundamental Rights, Article 7: it is doubtful, whether the obligation to implement almost EU-wide interoperable and intelligent meters is proportional under European Union law, given the networking of millions of households, the

resulting significant potential for misuse by third parties and the danger for the essential fundamental right of respect for private life and housing. Furthermore, it is necessary to give an overview on the implementation of smart meters in the United States of America in order to put the implementation of smart meters into a more general context.

This investigation is limited to the obligation to introduce smart meters in consumer households, as there the monitoring risk will be particularly high. Additionally, as a result of the importance of smart meters as emphasized here, this analysis is also limited to solving the problems deriving from smart meters in the electricity sector.⁹ This essay first presents the technical characteristics and functions of smart meters and describes their introduction through EU law. Afterwards, the compatibility of the duty standardized in EU secondary legislation with the EU Charter of Fundamental Rights will be examined. It then briefly describes legal concerns about smart meters in the United States, gives a conclusion and summary, and ends with describing which further research has to be done.

C Technical Characteristics and Functions of Smart Meters

Smart meters link two sets of information: the amount of power consumption and the elapsed time of consumption.¹⁰ The term "smart meter" can refer to both such meters with the ability for and without bidirectional communication.¹¹ Smart meters fulfil a variety of functions. Consumers can utilize smart meters to track their energy consumption in detail and thus identify potential savings.¹² Moreover, the electrical

den Datenschutz – Tatsächliche und rechtliche Betrachtung (Heymanns 2015) 1; cp. on the role of smart meters in a so-called smart grid also Claudia Eckert/Christoph Krauß, 'Sicherheit im Smart Grid. Herausforderungen und Handlungsempfehlungen' [2011] Datenschutz und Datensicherheit (DuD) 535, 535ff; about the purpose of a smart grid Nicole Angenendt/Katharina Vera Boesche/Oliver Helge Franz, 'Der energierechtliche Rahmen einer Implementierung von Smart Grids' [2011] Recht der Energiewirtschaft (RdE) 117, 118.

5 Eoghan McKenna/Ian Richardson/Murray Thomson, 'Smart meter data: Balancing consumer privacy concerns with legitimate applications' [2012] Vol. 41, Energy Policy, 807, 811, Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] EnergieRecht Zeitschrift für die gesamte Energierechtspraxis (ER) 229, 230; Referentenentwurf des Bundesministeriums für Wirtschaft und Energie, 'Entwurf eines Gesetzes zur Digitalisierung der Energiewende' <www.bmwi.de/BMWi/Redaktion/PDF/P-R/referentenentwurf-gesetz-digitalisierung-energie-wende,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf> accessed 02 January 2017, 1; Joel B. Eisen and others, Energy, Economics and the Environment (4th edn, Foundation Press 2015) 904 and 907 with further reference.

6 Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 106 ff, with reference to Ecofys/EnCT/Becker Büttner Held, Einführung von lastvariablen und zeitvariablen Tarifen, <www.ecofys.com/files/files/ecofys_2009_einfuehrung_last_u_zeitvariabler%20tarife.pdf> accessed 02 January 2017, 41; Joel B. Eisen and others, Energy, Economics and the Environment (4th edn, Foundation Press 2015) p. 903.

7 Cp. Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 1ff; cp. also Beckel/Sadamori/Staake/Santini, 'Revealing household characteristics from smart meter data' [2014] Vol. 78, Energy, 397, 409; and Eoghan McKenna/Ian Richardson/Murray Thomson, 'Smart meter data: Balancing consumer privacy concerns with legitimate applications' [2012] Vol. 41, Energy Policy, 807, 807ff.

8 Cp. Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 299 with reference to Ulrich Greveler/Benjamin Justus/Dennis Löhr, 'Hintergrund und experimentelle Ergebnisse zum Thema „Smart Meter und Datenschutz“' <http://1lab.de/pub/smartmeter_sep11_v06.pdf> accessed 02 January 2017. Cp also Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] Computer Law & Security Review, 530, 532 with further reference.

9 Smart meters would also be conceivable in other energy fields, e.g. as a gas or water meter, cp. Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 7 with reference to Steffen Benz, 'Energieeffizienz durch intelligente Stromzähler – Rechtliche Rahmenbedingungen' [2008] Zeitschrift für Umweltrecht (ZUR), 457, Footnote 8.

10 Cp. Katrina Fischer Kuh, 'Personal Environmental Information: The Promise and Perils of the Emerging Capacity to Identify Individual Environmental Harms' [2012] Vanderbilt Law Review, 1565, 1566 with further reference.

11 Cp. Luisa Albrecht, 'Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung' (Heymanns 2015) 5ff.

12 Ulrich Greveler/Peter Glösekötter/Benjamin Justus/Dennis Löhr, 'Multimedia Content Identification Through Smart Meter Power Usage Profiles', <https://www.nds.rub.de/media/nds/veroeffentlichungen/2012/07/24/ike2012.pdf> accessed 02 January 2017, 1; Eoghan McKenna/Ian Richardson/Murray Thomson, 'Smart meter data: Balancing consumer privacy concerns with legitimate applications' [2012] Vol. 41, Energy Policy, 807, 810; cp. also Nancy J. King/Pernille W. Jessen, 'For

current can be read more easily, since it is not necessary for the meter operator to send a person to read the meter and the consumer does not have to pass the meter reading when the possibility of remote reading is used.¹³ For network operators, smart meters enable better and safer network management, as the supply and withdrawal of electricity can be regulated more precisely by almost real-time recording of consumption and generation.¹⁴ In practice, this is particularly valuable for recording power generation in smaller electricity plants, since the power generation of large plants can already be precisely determined.¹⁵ While smart meters allow suppliers to offer tariffs that are dependent on the load or the day-to-day time, electrical devices can switch themselves on and off by means of smart meters, depending on the price level of the electricity.¹⁶ If an intelligent meter is also equipped with a remote control function, it offers the advantage that power generation and consumption can be directly reduced or increased for the purpose of network control.¹⁷

D Smart Meters in EU Law

According to different understandings of the concept of smart meters, EU law also offers two sources for their introduction by the Member States:¹⁸

privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 531 with further reference; and Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) p. 900 ff.

13 Cp. Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229f.

14 Eoghan McKenna/Ian Richardson/Murray Thomson, 'Smart meter data: Balancing consumer privacy concerns with legitimate applications' [2012] *Vol. 41, Energy Policy*, 807 [810], Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229, Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) 903; cp. also Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 531 with further reference.

15 Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229f.; Ulrich Greveler/Peter Glösekötter/Benjamin Justus/Dennis Löhr, 'Multimedia Content Identification Through Smart Meter Power Usage Profiles' <<https://www.nds.rub.de/media/nds/veroeffentlichungen/2012/07/24/ike2012.pdf>> accessed 02 January 2017, 1.

16 Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 230.

17 Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229 ff. Cp. Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) 921.

18 Cp. regarding the predecessor provisions and Directive 2004/22/EC

On the one hand, under Energy Efficiency Directive, Article 9, Paragraph 1¹⁹, Member States shall ensure that, under certain conditions, 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.²⁰ The provision does not state that these meters must be integrated into a communications network.

Secondly, Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1,²¹ requires the Member States to ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity supply market.²² Per Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 5, Member States, or any competent authority that they designate, shall ensure the interoperability of those metering systems. Smart meters that are built based on the Internal Market in Electricity Directive must therefore be equipped with bidirectional communication capability.

If meters are introduced not only based on Energy Efficiency Directive, Article 9, Paragraph 1, but also in accordance with the Internal Market in Electricity Directive, pursuant to the Energy Efficiency Directive, Article 9, Paragraph 2, Character (b), Member States shall ensure the security of the smart meters and data communication, and the privacy of final customers, in compliance with relevant Union data protection and privacy legislation. Therefore, they must comply in particular with the general

which generally requires a visual display for measuring instruments Luisa Albrecht, *Intelligente Stromzähler als Herausforderung für den Datenschutz – Tatsächliche und rechtliche Betrachtung* (Heymanns 2015) 19ff.

19 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 (Text with EEA relevance), OJ L 315, November 14th 2012, pp. 1–56.

20 Cp. also Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 230f.

21 Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC (Text with EEA relevance), OJ L 211, August 14th 2009, pp. 55–93.

22 See also in regard to the directive Jan Dinter, 'Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf' [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 230; cp. also Oliver Helge Franz/Katharina Vera Boesche, in Franz Jürgen Säcker (ed), *Berliner Kommentar zum Energierecht*, Band 1 Halbband 1 (3rd edn, CH Beck 2013) § 21i EnWG marginal reference number 1.

data protection directive²³ and the directive on privacy and electronic communications²⁴.

E An Assessment of the Compatibility of the Introduction of Smart Meters with EU Charter of Fundamental Rights, Article 7

I Applicability and Scope of Application of EU Charter of Fundamental Rights, Article 7, in Contrast to EU Charter of Fundamental Rights, Article 8

EU Charter of Fundamental Rights, Article 7,²⁵ protects (at least) all natural persons against impairments to private life and to their homes.²⁶ Private life is the area that concerns only oneself.²⁷ So the term private life shall include the protection of privacy, which also includes the protection of home, although the protection of home is listed separately in EU Charter of Fundamental Rights, Article 7.²⁸ Home means the geographic area that therefore affects only oneself because it is removed from the general access.²⁹ This includes basements.³⁰

In contrast to this, EU Charter of Fundamental Rights, Article 8, rules on the protection of personal data. It protects any information

relating to a natural person.³¹ However, the protection referred to by EU Charter of Fundamental Rights, Article 8, only applies on data processing operations.³² Due to the fact that both articles shall reflect ECHR, Article 8,³³ it has to be admitted while making this legal argument that a clear distinction between EU Charter of Fundamental Rights, Article 7 and 8, is difficult;³⁴ it could also be noted that the considerations at stake should be based on a right which is drawn from both EU Charter of Fundamental Rights, Article 7 and 8.³⁵ The EU Charter of Fundamental Rights, Article 7 and 8, are strongly connected.³⁶

As long as legal norms of the Union therefore do not expressly include data processing, in particular permission of data collection, only the application of EU Charter of Fundamental Rights, Article 7, comes into consideration related to these norms.³⁷ The provisions at stake only concern implementation of the meters.

One could argue that it is not EU Charter of Fundamental Rights, Article 7, but EU Charter of Fundamental Rights, Article 8, which applies here, because of the fact that Energy Efficiency

23 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, OJ L 281, November 23rd 1995, pp. 31–50. This Directive will be replaced May 25th 2018 through regulation [EU] 2016/679 of the European parliament and of the council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance), OJ L 119, May 4th 2016, pp. 1–88.

24 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 (Directive on privacy and electronic communications), OJ L 201, July 31st 2002, pp. 37–47.

25 EU Charter of Fundamental Rights Article 7 states: "Respect for private and family life. Everyone has the right to respect for his or her private and family life, home and communications.", Charta of Fundamental Rights of the European Union, OJ C 364 of 12/18/2000, p. 1 [10].

26 Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht*, (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 10.

27 See Norbert Bernsdorff, in: Jürgen Meyer (ed), *Charta der Grundrechte der Europäischen Union* (4th edn, Nomos 2014) Art. 7 marginal reference number 19; Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht*, (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 5.

28 Albrecht Weber, in Klaus Stern/Michael Sachs (eds), *Europäische Grundrechte-Charta. Kommentar*, [CH Beck 2016] Art. 7 marginal reference number 10.

29 Thorsten Kingreen, in Christian Calliess/Matthias Ruffert (eds), *EUV/AEUV. Das Verfassungsrecht der Europäischen Union mit Europäischer Grundrechtecharta. Kommentar*, (4th edn, CH Beck 2014) Art. 7 GRCh marginal reference number 9.

30 Hans D. Jarass, *Charta der Grundrechte der Europäischen Union. Kommentar*, [2nd edn, CH Beck 2010] Art. 7 marginal reference number 35.

31 Norbert Bernsdorff, in Jürgen Meyer (ed), *Charta der Grundrechte der Europäischen Union*, (4th edn, Nomos 2014) Art. 8 marginal reference number 15; Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 8 GRC marginal reference number 7.

32 Kirsten Bock/Malte Engeler, 'Die verfassungsrechtliche Wesengehaltsgarantie als absolute Schranke im Datenschutzrecht' [2016] *Deutsches Verwaltungsblatt* [DVBl], 593, 595; Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 8 GRC marginal reference number 11 with further reference; Norbert Bernsdorff, in Jürgen Meyer (ed), *Charta der Grundrechte der Europäischen Union* (4th edn, Nomos 2014) Art. 8 marginal reference number 16.

33 See Jeanne P. M. Bonnici, 'Exploring the non-absolute nature of the right to data protection' [2014] Vol. 28, *International Review of Law, Computers & Technology*, 131, 137, and Gloria González Fuster/Raphaël Gellert, 'The fundamental right of data protection in the European Union: in search of an uncharted right' [2012] *International Review of Law, Computers & Technology*, 73, 74.

34 In detail to the difference and the relationship of the two provisions Orla Lynskey, 'Deconstructing Data Protection: The 'Added-Value' of a Right to Data Protection in the EU Legal Order' [2014] *International and Comparative Law Quarterly*, 569, 569ff.

35 See for different approaches where to localize the right to data protection Jeanne P. M. Bonnici, 'Exploring the non-absolute nature of the right to data protection' [2014] Vol. 28, *International Review of Law, Computers & Technology*, 131, 138.

36 See Jeanne P. M. Bonnici, 'Exploring the non-absolute nature of the right to data protection' [2014] Vol. 28, *International Review of Law, Computers & Technology*, 131, 137, and Gloria González Fuster/Raphaël Gellert, 'The fundamental right of data protection in the European Union: in search of an uncharted right' [2012] Vol. 26, *International Review of Law, Computers & Technology*, 73, 77, with reference to ECJ, Decision of 09 November 2010, Joined Cases C-92/09 and C-93/09, ECLI:EU:C:2010:662, paragraph 47.

37 Cp. for the assumption of a violation of EU Charter of Fundamental Rights Article 8, since the underlying directive permitted data processing, ECJ, Decision of 08 April 2014, joined cases C-293/12 und C-594/12, ECLI:EU:C:2014:238, paragraph 36. Referring to this Kirsten Bock/Malte Engeler, 'Die verfassungsrechtliche Wesengehaltsgarantie als absolute Schranke im Datenschutzrecht' [2016] *Deutsches Verwaltungsblatt* [DVBl], 593, 596.

Directive, Article 9, Paragraph 2, Character (b), refers to the general data protection directive and the directive on privacy and electronic communications when it comes to the introduction of smart meters because of the energy market directive. The latter regulates the admissibility of data processing. However, the specific risk situation of the introduction of smart meters is less visible in data processing itself, but in the fact that they are to be introduced almost everywhere. Legal issues therefore are on stake already before the data processing begins. Therefore, it is EU Charter of Fundamental Rights, Article 7, which applies here.

II Impairment of EU Charter of Fundamental Rights, Article 7

An impairment of EU Charter of Fundamental Rights, Article 7, exists in particular when the freedom of a person is shortened actively by the Union or its institutions.³⁸ Energy Efficiency Directive, Article 9, Paragraph 1, constricts this freedom by requiring Member States to ensure that under certain circumstances all final users have to install a smart meter and therefore by requiring that the smart meter be physically installed in the apartment. In that regard, the Directive leaves to the Member States no scope in the implementation. For a Member State it is only possible to fulfil its obligations under the Directive by creating national obligations to tolerate the installation.³⁹ This is an abridgement of freedom emanating from the European Union. Also the reservation of implementation of the smart meters under the condition that “in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings” does not open any scope for implementation or even a political discretion. The obligation to implement smart meters is fully verifiable by the courts.

38 Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 12; regarding the question who is addressed by the fundamental rights, see Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 11; and Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 51 Abs. 1 GRC.

39 The ECJ does not even differentiate anymore between the member states' obligation to transform the directive into national law and between the national obligation which is based on the directive, cp. ECJ, Decision of 08 April 2014, joined cases C-293/12 and C-594/12, ECLI:EU:C:2014:238, paragraph 34. There the ECJ states: “As a result, the obligation imposed by [...] the Directive [...] constitutes in itself an interference with the rights guaranteed by Article 7 of the Charter.”

The same applies to the guarantee obligation referred to in Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1. Here the costumers face additionally and at any time access from outside, due to the interoperability of the meter. According what was said above in the context of the Energy Efficiency Directive, also the possibility of an economic assessment of the introduction of the measuring systems, as stated in Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 2, is only an introduction condition which is fully verifiable by the court.

Thus, Energy Efficiency Directive, Article 9, Paragraph 1, and Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1, constitute impairments of the rights guaranteed by the EU Charter of Fundamental Rights, Article 7.

III Justification

1 General Conditions for a Justification

a) No Impairment of the Essence

EU Charter of Fundamental Rights, Article 52, Paragraph 1, Sentence 1, provides that any limitation on the exercise of the rights and freedoms recognized by this Charter must respect the essence of those rights and freedoms. The essence would not be respected if the restriction on the fundamental right means that it is threatened in its existence.⁴⁰ The existence of EU Charter of Fundamental Rights, Article 7, is threatened in its existence if “decision space [is missing], in which people can develop in personal, individual autonomy”⁴¹. That is not the case when “the directive does not permit the acquisition of knowledge of the content of the electronic communications as such”⁴². So it is here: Neither the Energy Efficiency Directive nor the Internal Market in Electricity Directive permit the acquisition of the data collected by smart meters as such. The question of whether

40 Ferdinand Wollenschläger, in Armin Hatje/Peter-Christian Müller-Graff (eds), *Europäisches Organisations- und Verfassungsrecht* (EnzEuR Bd. 1) (Nomos 2016) § 8 marginal reference number 78 with further reference; Philipp Terhechte, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 52 GRC marginal reference number 7.

41 Translated from Kirsten Bock/Malte Engeler, ‘Die verfassungsrechtliche Wesengehaltsgarantie als absolute Schranke im Datenschutzrecht’ [2016] *Deutsches Verwaltungsblatt* (DVBl), 593, 595.

42 ECJ, Decision of 08 April 2014, joined cases C-293/12 and C-594/12, ECLI:EU:C:2014:238, paragraph 39.

acquisition is permitted, derives rather from the Privacy Directives.

b) Reservation of Statutory Powers, Recognisability of Purpose and Scope

EU Charter of Fundamental Rights, Article 52, Paragraph 1, Sentence 1, also requires any limitation on the exercise of the rights and freedoms recognised by this Charter must be provided by law. A limitation is provided by law if it is due to a legally binding Union act.⁴³ The Energy Efficiency Directive and the Internal Market in Electricity Directive are binding Union acts, TFEU Article 288 Paragraph 3.

The underlying act has also to reveal its purpose and scope.⁴⁴ These conditions are met. Energy Efficiency Directive, Article 1, Paragraph 1, Subparagraph 1, states that this Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20 % target on energy efficiency and to pave the way for further energy efficiency improvements beyond this date. Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1, lays down that the introduction of smart meters shall assist the active participation of consumers in the electricity supply market. This shall finally assist also the objective of completing the internal electricity market that is laid down in the preamble to the Directive. The purpose of the introduction of smart meters can thus be identified in both directives. The scope of the introduction of smart meters based on Energy Efficiency Directive, Article 9, Paragraph 1, can be identified because the provision contains specific conditions for the adoption. The scope of the introduction of smart meters based on the Internal Market in Electricity Directive can be identified through its Annex I, Paragraph 2, Subparagraph 4, which prescribes that where roll-out of smart meters is assessed positively, at least 80 % of consumers shall be equipped with intelligent metering systems by 2020.

43 Thorsten Kingreen, in Christian Calliess/Matthias Ruffert (eds), *EUV/AEUV. Das Verfassungsrecht der Europäischen Union mit Europäischer Grundrechtecharta. Kommentar* (4th edn, CH Beck 2014) Art. 52 GRCh marginal reference number 62; Philipp Terhechte, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 52 GRC marginal reference number 6.

44 Ulrich Becker, in Jürgen Schwarze (ed), *EU-Kommentar*, [3rd edn, Nomos 2012] Art. 52 GRC marginal reference number 4; Philipp Terhechte, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 52 GRC marginal reference number 6 with further reference.

2 No Concern about the Proportionality of Energy Efficiency Directive, Article 9, Paragraph 1

According to EU Charter of Fundamental Rights, Article 52, Paragraph 1, Sentence 2, a further condition is that, subject to the principle of proportionality, limitations may be made only if they are necessary and genuinely meet objectives of general interest recognised by the Union or the need to protect the rights and freedoms of others. An objective of general interest is an interest protected by Article 3 TEU or a special provision of the Treaties.⁴⁵ The promotion of energy efficiency is, according to TFEU Article 194 Paragraph 1 Character (c), the objective of the Union. Therefore, it is an interest protected by a particular provision of the Treaties and is consequently a recognized objective of general interest.

“The principle of proportionality requires that acts of the EU institutions be appropriate for attaining the legitimate objectives pursued by the legislation at issue and do not exceed the limits of what is appropriate and necessary in order to achieve those objectives”⁴⁶. An act is meant to be appropriate if it is a “useful tool” to achieve the objective.⁴⁷ The link between the time and the amount of electricity consumption makes it possible to identify energy saving potentials.⁴⁸ So, it is a “useful tool” and therefore appropriate for the achievement of the objective pursued by the directive of promoting energy efficiency.

A measure is necessary when it is confined to be “strictly necessary”,⁴⁹ the question of necessity also encompassing the adequacy of the act.⁵⁰ If the data collected by a smart meter is

45 See Explanation on Article 52, Explanations relating to the Charter of Fundamental Rights, OJ C 303, December 14th, p. 2 [32]. Regarding this cp. also Philipp Terhechte, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 52 GRC marginal reference number 9. Albrecht Weber, in Klaus Stern/Michael Sachs (eds), *Europäische Grundrechte-Charta. Kommentar* (CH Beck 2016) Art. 7 marginal reference number 23, only sees the reasons mentioned in ECHR, Article 8, Para. 2, as to be sufficient to justify an impairment of EU Charter of Fundamental Rights, Art. 7. Under this assumption, it would be conceivable that energy efficiency would turn out to be a completely unsuitable goal.

46 ECJ, Decision of 08 April 2014, joined cases C-293/12 and C-594/12, ECLI:EU:C:2014:238, paragraph 46 with further reference.

47 ECJ, Decision of 08 April 2014, joined cases C-293/12 and C-594/12, ECLI:EU:C:2014:238, paragraph 49.

48 Ulrich Greveler/Peter Glösekötter/Benjamin Justus/Dennis Löhr, ‘Multimedia Content Identification Through Smart Meter Power Usage Profiles’ <<https://www.nds.rub.de/media/nds/veroeffentlichungen/2012/07/24/ike2012.pdf>> accessed 02 January 2017, 1; Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) 900ff.

49 ECJ, Decision of 08 April 2014, joined cases C-293/12 and C-594/12, ECLI:EU:C:2014:238, paragraph 52.

50 Philipp Terhechte, in Hans von der Groeben/Jürgen Schwarze/Armin

accessible to different persons, the privacy of the individual is restricted.⁵¹ The introduction of smart meters based on Energy Efficiency Directive, Article 9, Paragraph 1, requires, as stated above, no integration into a communications network. The group of persons to whom the collected data will be accessible is therefore limited. The introduction based on Energy Efficiency Directive, Article 9, Paragraph 1, therefore does not involve any particular risk potential. It is conceivable that family members could also have access to the data; EU Charter of Fundamental Rights, Article 7, requires the legislature to protect private life and home from third-party access,⁵² but other family members can already follow most of the doing in the home by their stay in the home. They are therefore already included as family members in the private sector. Recent uncertainties regarding the monitoring of others in the home appear to be justifiable due to this inclusion in the private sphere with regard to the goal of energy efficiency that serves the common good.

Ultimately, therefore, there are no doubts as to the proportionality of Energy Efficiency Directive, Article 9, Paragraph 1.

3 Concerns about the Proportionality of Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1

However, there are concerns regarding the proportionality of Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1. The electricity market is a domestic market. The objective of establishing an internal market is expressly set out in Article 3

TEU. Therefore, the realization of the internal electricity market is a recognized objective of general interest. In particular, the introduction of smart meters, which can provide a more detailed assessment of electricity consumption to network operators, helps to ensure security of supply by allowing network operators to control their network more effectively.⁵³ The introduction of interoperable smart meters is thus a “useful tool” for the Directive’s goal to realize the internal electricity market.

However, it is questionable whether this measure is also necessary. If the data collected by a smart meter is accessible to others, the privacy of the individual is restricted.⁵⁴ In accordance with the Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraphs 4 and 5, at least 80% of all consumers in the European Union should have communication-capable meters. This almost EU-wide introduction of interoperable meters offers a high potential for misuse by (also unauthorized) third parties; large amounts of data are a target for hacker attacks.⁵⁵ The almost EU wide introduction impacts privacy from not only an individual but from the entire population. EU Charter of Fundamental Rights, Article 7, establishes a duty on the part of the Union to protect private life and housing from access by third parties.⁵⁶ It is questionable whether the protection provided for by the Union is sufficient. The ECJ requires that “the EU legislation in question must lay down clear and precise rules govern-

Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 52 GRC marginal reference number 8. Hans D. Jarass, *Charta der Grundrechte der Europäischen Union. Kommentar*, (2nd edn, CH Beck 2010) Art. 7 marginal reference number 15, examines the proportionality of an impairment of EU Charter of Fundamental Rights Article 7 according to the German fundamental dogmatic law.

51 Ulrich Greveler/Peter Glösekötter/Benjamin Justus/Dennis Löhr, ‘Multimedia Content Identification Through Smart Meter Power Usage Profiles’ <<https://www.nds.rub.de/media/nds/veroeffentlichungen/2012/07/24/ike2012.pdf>> accessed 02 January 2017, 7. If the measurement is carried out in two-second intervals, it is in principle possible to conclude the TV program or other audiovisual content, see there.

52 Albrecht Weber, in: Klaus Stern/Michael Sachs (eds), *Europäische Grundrechte-Charta. Kommentar* (CH Beck 2016) Art. 7 marginal reference number 5; Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 11; Norbert Bernsdorff, in Jürgen Meyer, *Charta der Grundrechte der Europäischen Union* (4th edn, Nomos 2014) Art. 7 marginal reference number 17; Hans D. Jarass, *Charta der Grundrechte der Europäischen Union. Kommentar* (2nd edn, CH Beck 2010) Art. 7 marginal reference number 40 respectively 12; see also in relation to the obligation to adopt an effective data protection concept under EU Charter of Fundamental Rights, Article 8, Indra Spiecker gen. Döhmann/Markus Eisenbarth, ‘Kommt das „Volkszählungsurteil“ nun durch den EuGH? – Der Europäische Datenschutz nach Inkrafttreten des Vertrags von Lissabon’ [2011] *JuristenZeitung* (JZ), 169, 172.

53 Jan Dinter, ‘Das Gesetz zur Digitalisierung der Energiewende – Startschuss für Smart Meter? Ein Überblick über den Referentenentwurf’ [2015] *EnergieRecht Zeitschrift für die gesamte Energierechtspraxis* (ER) 229, 229; Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) 903.

54 Ulrich Greveler/Peter Glösekötter/Benjamin Justus/Dennis Löhr, ‘Multimedia Content Identification Through Smart Meter Power Usage Profiles’ <<https://www.nds.rub.de/media/nds/veroeffentlichungen/2012/07/24/ike2012.pdf>> accessed 02 January 2017, 7. If the measurement is carried out in two-second intervals, it is in principle possible to conclude the TV program or other audiovisual content, see there.

55 See concerning this also Andreas Mihm, ‘Breite Front gegen digitale Stromzähler’, in: *Frankfurter Allgemeine Zeitung* of 26 March 2016 <www.faz.net/aktuell/wirtschaft/energiepolitik/gesetz-zur-digitalisierung-der-strombranche-weckt-widerstand-14145210.html> accessed 02 January 2017, 21.

56 Albrecht Weber, in: Klaus Stern/Michael Sachs (eds), *Europäische Grundrechte-Charta. Kommentar* (CH Beck 2016) Art. 7 marginal reference number 5; Ino Augsberg, in Hans von der Groeben/Jürgen Schwarze/Armin Hatje (eds), *Europäisches Unionsrecht* (7th edn, Nomos 2015) Art. 7 GRC marginal reference number 11; Norbert Bernsdorff, in Jürgen Meyer (ed), *Charta der Grundrechte der Europäischen Union* (4th edn, Nomos 2014) Art. 7 marginal reference number 17; Hans D. Jarass, *Charta der Grundrechte der Europäischen Union. Kommentar* (2nd edn, CH Beck 2010) Art. 7 marginal reference number 40 respectively 12; see also in relation to the obligation to adopt an effective data protection concept under EU Charter of Fundamental Rights, Article 8, Indra Spiecker gen. Döhmann/Markus Eisenbarth, ‘Kommt das „Volkszählungsurteil“ nun durch den EuGH? – Der Europäische Datenschutz nach Inkrafttreten des Vertrags von Lissabon’ [2011] *JuristenZeitung* (JZ), 169, 172.

ing the scope and application of the measure in question and imposing minimum safeguards so that the persons [...] have sufficient guarantees to effectively protect their personal data against the risk of abuse and against any unlawful access and use of that data”⁵⁷. Energy Efficiency Directive, Article 9, Paragraph 2, Character (b), when introducing smart meters based on the Internal Market in Electricity Directive, refers only to the relevant EU legislation on data protection and privacy; however, the specific risk potential of communicable intelligent meters is not regulated at any point. In order to counteract the specific risk potential, the Union law must itself contain appropriate rules which determine that the measuring devices to be installed can only record in the absolutely necessary measuring interval and the firmware of the devices be adapted in such a way that it performs a statistical summary of the data before the transmission.⁵⁸ Although it has to be admitted, that if a customer can opt out of the implementation obligation, this cost is carried by the public while these customers still profit from other people who are implementing smart meters,⁵⁹ it is another option, that the directives give customers the right to opt-out of the obligation to implement smart meters. As these provisions are missing, it must be assumed that the directive is not limited to what is strictly necessary. Even if Energy Efficiency Directive, Article 9, Paragraph 2, Character (b), should be interpreted as meaning that the provision also refers to EU Charter of Fundamental Rights, Article 7, the lump-sum reference could not overcome the concerns as to the legality of the introduction of smart meters under the Internal Market in Electricity Directive; the EU would therefore be able to escape its protection obligation resulting from EU Charter of Fundamental Rights, Article 7, and to pass it on to the Member States. Consequently, the effect of Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1, is not required until EU law provides that all tech-

nically possible measures are taken to exclude systematic monitoring from the outset.

IV Interim Results

EU Charter of Fundamental Rights, Article 7, applies on the implementation of smart meters through EU law. Energy Efficiency Directive, Article 9, Paragraph 1, and Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, Sentence 1, constitute impairments of the rights guaranteed by the EU Charter of Fundamental Rights, Article 7. Both Directives do not impair the essence of the fundamental right. The impairment of EU Charter of Fundamental Rights, Article 7, is based on a legally binding EU act and the Directives’ purpose and scope is recognisable. Whereas there are no concerns about the proportionality of Efficiency Directive, Article 9, Paragraph 1, concerns exist regarding the lawfulness of Internal Market in Electricity Directive, Annex I, Paragraph 2, Subparagraph 1, due to a lack of protection.

F Smart Meters in the United States

Concerns regarding smart meters do not only exist in the European Union but also in the United States of America. Interestingly, sometimes health is the primary concern of the public, not privacy.⁶⁰ Privacy concerns derive from the public’s dismay of the disclosure of personal information.⁶¹ Similar to the law of the EU, one could inquire: should the privacy of the public be protected already under opt-out options for individual customers from installations obligations or is it adequate to protect personal data when it is acquired by this new technology? This question is linked to the matter of how a significant balance of privacy issues and the goals of a new electricity and energy framework can be created.⁶²

⁵⁷ ECJ, Decision of 08 April 2014, case C-293/12, ECLI:EU:C:2014:238, paragraph 54.

⁵⁸ Cp. Ulrich Greveler/Benjamin Justus/Dennis Löhr, ‘Hintergrund und experimentelle Ergebnisse zum Thema „Smart Meter und Datenschutz“’ <http://1lab.de/pub/smartmeter_sep11_v06.pdf> accessed 02 January 2017, 5.

⁵⁹ Nancy J. King/Pernille W. Jessen, ‘For privacy’s sake: Consumer “opt outs” for smart meters’ [2014] *Computer Law & Security Review*, 530, 532), Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 887.

⁶⁰ conEdison, *Advanced Metering Infrastructure Business Plan*, 10/15/2015, 13.

⁶¹ Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 881 and 885.

⁶² Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 893.

Legal considerations regarding the business of privacy in US law concern the US Constitution's Fourth Amendment.⁶³ It states as follows:

“The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.”

The Fourth Amendment, as clearly outlined in the Constitution, protects the public against unreasonable state interventions. Therefore, the academic discussion in the US focuses mainly on the inquiry of the odds of a potential government overreach in which law enforcement might discover about illegal behavior or use the data as evidence.⁶⁴ The US Supreme Court has ruled that if data is willingly revealed to third parties, then there is no right to data protection under the Fourth Amendment.⁶⁵ This salient decision constituted the widely so-called “third-party doctrine”.⁶⁶ Consequently, this doctrine evokes the question of whether smart meter data is willingly revealed: “Thus, under the third-party doctrine, consumers seemingly have no reasonable expectation of privacy in the smart meter data contained in electric utility records either.”⁶⁷ The third-party doctrine is under paramount critique;⁶⁸ it is questioned, whether the third-party doctrine should be replaced by a so-called “doctrine of consent”.⁶⁹ The cause of this predicament is due to two underlying assumptions by the third-party doctrine: “first, that there was a choice to disclose information to a third party; and second, that

the consent to disclose information to a third party remains viable even if the third party permits the government, to whom no consent was given, to access the data.”⁷⁰ It remains disputable if this consent also means consent to third party actions like a search of home.⁷¹ In addition, the argument deems questionable whether consumers truly have the “choice” deemed to be existent and protected; if the matter in question is whether to implement a smart meter or to forego retail electric service,⁷² then the legal value of the consent may be dubious in comparison to other cases.⁷³ In the author's opinion, the assumption of no reasonable expectation of privacy should require a qualified choice, thus a choice between alternatives of service, not just a yes or no. In a case of the use of thermal imaging to detect a marijuana plantation, the US Supreme Court deemed it to be equivalent to entering an individual's home and therefore compromise their right to privacy.⁷⁴ Meanwhile, in the case of the Naperville Smart Grid Initiative, a federal district court concluded that there was no reasonable expectation of privacy and therefore no protection through the Fourth Amendment of smart meter data.⁷⁵ Despite all these legal considerations, smart meter data risks great vulnerability due to a possible lack of protection under the US Constitution; it, then, may be the responsibility of the legislator to enact protection.⁷⁶

63 Of course, there are also state constitutional protections involving privacy.

64 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 885ff with further references.

65 *Smith v. Maryland*, Decision of 20 June 1979, 442 US, 735 [743ff with further reference], see Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 888.

66 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 888; see also Richard M. Thompson II, *The Fourth Amendment Third-Party Doctrine* (Congressional Research Service 2014) 1ff.

67 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 890.

68 Richard M. Thompson II, *The Fourth Amendment Third-Party Doctrine* (Congressional Research Service 2014) 17ff.

69 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 890.

70 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 890.

71 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 890.

72 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 893. Note in some cases, like in the case of California, consumers who opt out do not face this dilemma. They continue to receive service but must pay a nominal fee for use of analog meters.

73 See more generally Richard M. Thompson II, *The Fourth Amendment Third-Party Doctrine* (Congressional Research Service 2014) 17ff.

74 *Kyllo v. United States*, Decision of 11 June 2001, 533 US 27 [40], cp. Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 888.

75 See Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 891ff with reference to the case. See therefore the Final Judgement in *Naperville Smart Meter Awareness v. City of Naperville*, Decision of 26 September 2016, Case 1:11-cv-09299 (Northern District of Illinois). See for a summary of another case dealing with smart meters Nancy J. King/Pernille W. Jessen, ‘For privacy's sake: Consumer “opt outs” for smart meters’ [2014] *Computer Law & Security Review*, 530, 535, referring to the Maine Supreme Judicial Court's decision of 7/12/2012 *Friedman and others v. Public Utilities Commission*.

76 Megan McLean, ‘How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure’ [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 893ff and 900ff.

Similar to the European Union, where the implementation of smart meters is both an issue at the supranational as well as at the national level, the implementation of smart meters in the US is both an issue at the federal and state level. The obligation to install smart meters is generally imposed on consumers through their local energy utilities.⁷⁷ The activity of these energy utilities is overseen by state-level public utilities commissions.⁷⁸ Following years of unregulated use of smart meters in the US, the federal Congress enacted the Energy Independence and Security Act of 2007. This milestone in smart meter-related law required the National Institute of Standards and Technology (NIST) to draft a framework for the implementation of two-way communication capable smart meters.⁷⁹ The National Institute of Standards and Technology then drafted the NIST Framework and Roadmap for Smart Grid Interoperability Standards.⁸⁰ Nevertheless, the states also considered the implications of the implementation of smart meters in a serious manner.⁸¹ As an example, California leads in addressing smart meter privacy.⁸² In 2013, California enacted a bill entitled: "Privacy: customer electrical or natural gas usage data."⁸³ The legislative counsel's summary of the bill states:

"bill would prohibit a business from sharing, disclosing, or otherwise making accessible to any 3rd party a customer's electrical or natural gas usage data without obtaining the express consent of the customer and conspicuously disclosing to whom the disclosure will be made and how the data will be used. The bill would require a business and a nonaffiliated 3rd party,

pursuant to a contract, to implement and maintain reasonable security procedures and practices to protect the data from unauthorized disclosure. The bill would prohibit a business from providing an incentive or discount to the customer for accessing the data without the prior consent of the customer. The bill would require a business to take reasonable steps to dispose that customer data within its custody or control when the data is no longer to be retained by the business, as specified. The bill would authorize a customer to bring a civil action for actual damages not to exceed \$500 for each willful violation of these provisions."⁸⁴

It should be noted that both enacted federal and state laws concerning smart meters, in majority, refer to the protection of the data already collected by smart meters.⁸⁵ On one hand, in contrast to EU law,⁸⁶ different states within the US offer a sector-specific solution that can address and eventually troubleshoot the issues emanating from smart meters better than the EU's data protection concept. On the other hand, however, also in the US the absence of nationwide opt-out options should be noted.⁸⁷ Finally, it is argued, that there should be regulation of data distribution in lieu of the regulation of installation.⁸⁸ From the viewpoint of EU law and reasoning, it has to be stated that the risk derives not only from the government but predominantly from third parties through unlawful assessment of data once collected. Taking this into account, the regulation of installation and therefore the availability of opt-out mechanisms for consumers should be strongly recommended. In light of the disadvantages and costs for the public, these opt-out mechanisms do not have to be cost-free.⁸⁹

77 Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 533.

78 Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 533.

79 Energy Independence and Security Act of 2007 Section 1305.

80 The NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0., is available at <https://www.nist.gov/sites/default/files/documents/public_affairs/releases/smartgrid_interoperability_final.pdf> accessed 02 January 2017. Cp. also p. 23 of the document, Joel B. Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015) 898ff; and Joseph P. Tomain/Richard D. Cudahy, *Energy Law in a Nutshell*, (2nd edn, West 2011) 404ff.

81 See for state-specific concepts Megan McLean, 'How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure' [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 894ff, and for a summary Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 535.

82 Cp. Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 535.

83 See http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1274 (last visited 12/26/2016).

84 Assembly Bill No. 1274 <http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1274> accessed 02 January 2017.

85 Cp. Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 533.

86 Cp. Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 533.

87 Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 533.

88 Megan McLean, 'How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure' [2016] Vol. 18, *Vanderbilt Journal of Entertainment & Technology Law*, 879, 901ff.

89 Cp. Nancy J. King/Pernille W. Jessen, 'For privacy's sake: Consumer "opt outs" for smart meters' [2014] *Computer Law & Security Review*, 530, 536ff.

G Conclusion and Summary

Smart meters offer a way to address challenges created by the growing production and availability of volatile renewable energies (including wind and solar), but smart meters also create problems with respect to data protection. Under EU law, two legal bases for the implementation of smart meters can be distinguished: the first is referred to in the Energy Efficiency Directive and the second is referred to in the Internal Market in Electricity Directive, Annex I. It has two objectives: on the one hand, it aims to promote energy efficiency; on the other hand, if the intelligent meters are equipped with the capability of interoperability, they are intended to promote the internal electricity market. However, there are concerns about this interoperability. The EU Charter of Fundamental Rights, Article 7, protects a private space for social life and communications, while Article 8 protects personal data in terms of how it is processed and the extent to which individuals are able to access such data. The EU Charter of Fundamental Rights, Article 7, requires EU legislators to create adequate data protection concepts. Therefore, legislators can only justify impairment of rights by implementing such data protection concepts. Smart meters can collect data from which it is possible to derive information about private behaviour. Such data collection occurs when smart meters are installed in private homes. It is questionable, given the networking of millions of households, the resulting significant potential for misuse by third parties and the danger for the essential fundamental right of respect for private life and housing, whether the obligation to implement almost EU-wide interoperable and intelligent meters is proportional under European Union law. At present, there is some evidence that the Union has failed to fulfil its protection mandate under EU Charter of Fundamental Rights, Article 7. Ultimately, the Union legislature should therefore adopt an area-specific protection concept, solely in the interest of the development of electricity networks, which contains detailed rules to remove the concerns about the legality of interoperable smart meters. Both in the EU and the USA., protection against the risks that are emanating from smart meters, are more or less tackled through legal provisions that concern data processing. It is to be said, that, in both the EU and the USA., smart meters constitute an

impermissible invasion of privacy rather than an intelligent-efficient energy management system.

H Knowledge Gap and Further Research

Further research should focus on all the above-mentioned issues: What is the relation between EU Charter of Fundamental Rights, Article 7 und 8? In how far can we derive from these provisions an obligation for the European Union to protect the individual's privacy and data? When and where does EU Charter of Fundamental Rights, Article 7, apply and when and where EU Charter of Fundamental Rights, Article 8? Is the argument, that the EU must have a sector-specific protection concept, valid? Where exactly can be found lacks of protection in the Privacy Directives and the soon getting into force General Data Protection Regulation? Finally, a detailed, sector-specific protection concept which tackles the risks evolving from smart meters and balances their disadvantages and advantages, should be drafted. It shall include both regulation of smart meter installation and data processing and distribution.

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