



The 'smart meters' bill: a privacy test based on article 8 of the ECHR

Study commissioned by the Dutch Consumers' Association

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1. Introduction

1.1. Purpose

This report was commissioned by the Dutch Consumers' Association as a result of the 'implementation of the EC Directives on energy efficiency' and 'amendment of the Electricity Act 1998 and Gas Act to improve the operation of the electricity and gas markets' bills, which concern the introduction of 'smart meters', amongst other things. As an addition to the response of the Dutch Data Protection Authority (DDPA) concerning testing these bills against the Personal Data Protection Act (PDPA), the aim of the assignment was to have an independent privacy test carried out based on the right to privacy, as laid down in article 8 of the European Convention on Human Rights.

The study was carried out in accordance with the Statement of Scientific Independence of the KNAW (Royal Netherlands Academy of Arts and Sciences).¹ In writing the report, we received support from our colleagues, Prof. Paul de Hert and Prof. Corien Prins, who provided us with the necessary information and insights, for which we are very grateful. The report was completed on 17 October 2008.

1.2. Background

In July 2008, the Dutch Lower House passed bills that provide for the introduction of so-called smart meters in every Dutch household.² The introduction of these 'smart meters' had already been envisioned at national level in 2006, with a view towards ensuring the smooth operation of the retail energy market,³ and is also a consequence of the compulsory implementation of the Directive on energy efficiency.⁴ This Directive, whose primary aim is to bring about energy savings, prescribes that end users should have energy meters that provide information about actual use. End users must also regularly receive information about this use.

To ensure timely implementation of the Directive, it was decided that this would take place in two stages. Full transposition of the Directive will take place in the 'implementation of the EC Directives on energy efficiency' bill (Parliamentary documents 31320). This bill was submitted to the Lower House in January 2008. When the bill concerning the 'amendment of the Electricity Act 1998 and Gas Act to improve the operation of the electricity and gas markets' (Parliamentary documents 31374) enters into force, the provisions with respect to electricity and gas from the 'implementation of the EC Directives on energy efficiency' bill will lapse.

Although the introduction of 'smart meters' is therefore prescribed by Europe and is based on legitimate grounds, it also has disadvantages, including in relation to the privacy of consumers. The meters record new types of personal data in a new way, making it possible – via a wall socket – to look 'behind the front door' with great

¹ http://www.knaw.nl/nieuws/pers_pdf/Scientific_Independence.pdf.

² Parliamentary documents 31 320 and 31374.

³ Parliamentary documents II 2005/06, 28 982, no. 51.

⁴ Directive 2006/32/EC of the European Parliament and of the Council of the European Union of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (OJ/L 114). The latest date for implementation of the Directive is 17 May 2008.

precision. As a result, grid managers and suppliers of gas and electricity will obtain information about such things as lifestyles, holidays and the types of electronic products present. Not only does this raise questions from a security perspective, but also from a perspective of the right to respect for one's private life.⁵

Against this background, the Dutch Data Protection Authority (DDPA) has criticised bills 31320 and 31374.⁶ The critical reaction from the DDPA primarily concerns the following points:

- The bill is unclear about which parties will have which metering data at their disposal and about the basis on which this data will be processed (after the rollout, which parties will have access to the metering data generated by the smart meters and under which circumstances?).
- Lack of clarity concerning the conditions for processing the personal data in the context of providing additional services (a reason for processing that is totally different from that required for billing).
- It is not sufficiently clear what form explicit permission from the party concerned will take and how the freedom to give and withdraw permission will be guaranteed.
- In the bills the emphasis is placed only on the reason for processing (article 8 of the Personal Data Protection Act (PDPA)), while all provisions of section 2 of the PDPA must be observed.
- There are no provisions concerning periods of storage or security.

Moreover, the DDPA notes that the bill conflicts with articles 8 and 11, paragraph 1, of the PDPA in so far as it obliges grid managers to make quarter-hourly or hourly energy-consumption readings available to the supplier as standard, irrespective of whether explicit permission has been given.

In the first instance, the critical reaction of the DDPA resulted in two amendments, which were later labelled as unnecessary by the minister because of proposed amendments to articles 26ab of the Electricity Act 1998 and article 13b of the Gas Act. In this connection, the clarification given by the minister states: 'The bill includes an obligation for grid managers to grant suppliers access to the metering data of their customers. After collecting the metering data, grid managers use it to exercise their statutory task of managing the grid as efficiently as possible. No permission or any other kind of approval is required from consumers to grant suppliers access. Metering data relating to a shorter time period than one day is excluded from this statutory obligation (...). As a result of this exception, suppliers and third parties only have access to quarter-hourly readings (for electricity) and hourly readings (for gas) if this data may be processed on the basis of article 8, paragraph a, of the Personal Data Protection Act'.⁷

Despite the amendments proposed by the Minister of Economic Affairs, doubts may remain about the need to introduce smart meters in the light of privacy. In their current form they could also violate the right of privacy laid down in article 8 of the European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR).⁸ After all, the regional grid managers will continue to record the quarter-hourly and hourly readings for electricity and gas from all households. The only built-in precondition is a restriction that grid managers may not provide suppliers with metering data concerning a shorter period of time than one day, i.e. quarter-hourly and

⁵ Cf Letter from the Consumers' Association to the Minister of Economic Affairs on the subject of privacy, security and electronic meters, 16 May 2008.

⁶ Letter from the Dutch Data Protection Authority to the Minister of Economic Affairs on the subject of the amendment of the Electricity Act 1998 and Gas Act to improve the operation of the electricity and gas markets (31 374), dated 17 June 2008, reference z2008-00769.

⁷ Lower House, session year 2007-2008, 31374, no. 32, p. 3.

⁸ Bulletin of Treaties 1951, 154; Dutch translation BoT 1990, 156.

hourly readings, without the explicit permission of the end users. For all meter readings concerning a time period longer than one day, the obligation remains for grid managers to grant suppliers access to the metering data of their customers. In addition, it is emphasised that all preconditions laid down in section 2 of the PDPA continue to apply in full (including the provisions concerning security and storage).

The question is whether this removes all objections to smart meters in the light of the right to respect for one's private life. The recording of quarter-hourly and hourly readings not only entails processing of personal data (covered by both the PDPA and article 8 of the ECHR), but could also represent an infringement of the right to inviolability of the home, the right to family life or the right to respect for one's private life, which are also covered by article 8 of the ECHR. After all, information could be derived from the metering data about the conduct of the occupant(s) in the home, such as their presence or absence on specific days and the number of people living there. Besides a test against the Personal Data Protection Act, a privacy test against the ECHR would therefore also be in order. The question here is whether, against that background, the bills would meet the criteria that the ECHR sets with regard to breaches of privacy in article 8, paragraph 2: Are they provided for by law? Do they serve one of the purposes described in paragraph 2? Are they necessary in a democratic society?

1.3. Objective and Central Question

Against this background, the objective of the proposed study was to conduct a privacy test of bills 31 320 and 31374 in as far as they concern the introduction of smart energy meters. The central question was:

Does the introduction of 'smart energy meters', as described in bills 31374 (no. A, revised bill, 3 July 2008) and 31320 (no. B, revised bill, 3 July 2008), meet the criteria of article 8 of the ECHR?

1.4. Approach

1.4.1. Research questions

The present study was organised on the basis of the following research questions arising from the central question.

1. To what extent does the European Directive on energy efficiency require the introduction of smart meters? What scope do Member States have for implementation?
2. Which aspects of the introduction of smart meters could constitute a breach of privacy as provided for in article 8, paragraph 1, of the ECHR and, in this case, which aspects of privacy are breached (e.g. right to inviolability of the home, private life and protection of personal data)?
3. Do these breaches meet any of the criteria laid down in article 8, paragraph 2, of the ECHR?
4. Are the breaches necessary in a democratic society?

1.4.2. Research plan and methodology

The research plan for this study consisted of a concise review of professional literature, with a particular focus on literature and case law about article 8 of the ECHR, and research reports concerning the introduction of smart meters. To clarify the test framework and the relevance of article 8 of the ECHR for Dutch law, there was also an examination of the similarities and differences between the normative framework of 8 ECHR and the normative framework of the Personal Data Protection Act (PDPA).

The structure of the report is as follows. We start with a discussion of the relevant European Directive and bills for implementation in the Netherlands (Section 2). We then go into further detail about smart meters and the possible breaches of privacy they entail (Section 3). Following this, we test whether these breaches meet the criteria stated in article 8 of the ECHR, in particular whether such breaches serve any of the purposes stated and whether the breaches are necessary in a democratic society (Section 4). We conclude with a summary of the results and a conclusion as to whether smart meters can withstand the privacy test of article 8 of the ECHR (Section 5).

2. Compulsory Introduction of Smart Meters?

The introduction of smart meters in the Netherlands is the result of the mandatory implementation of the Directive on energy efficiency. However, the Directive does not determine the degree of 'smartness' in detail. In this section, besides discussing the Directive, we examine the extent to which it makes the introduction of smart meters, as put forth in the Dutch implementing bills, compulsory.

2.1. Legal Basis of the Directive on Energy Efficiency

The Directive on energy efficiency (2006/32/EC) has its legal basis in article 175 of the EC Treaty. The choice of legal basis is important in view of differences in the decision-making process and preconditions, but also in view of the degree of harmonisation required by the Directive. Article 176 of the EC Treaty contains a so-called minimum harmonisation clause, which means that the harmonisation obtained on the basis of article 175 of the EC Treaty is a minimum level. Based on article 176 of the EC Treaty, Member States may aim for a higher level of protection. Such measures, which must be compatible with the EC Treaty, should also be brought to the attention of the Commission.⁹

Furthermore, it is important that article 175 of the EC Treaty provides a basis for the European Council so that, in accordance with the procedure of article 251 of the EC Treaty and after conferring with the Economic and Social Committee and the Committee of the Regions, it can decide on activities that the Community must undertake to achieve the aims of article 174 of the EC Treaty. Article 174 states, amongst other things, that Community policy on the environment will contribute to the pursuit of the prudent and rational utilisation of natural resources.

The second paragraph of article 174 then states that the Community's environmental policy will aim for a high level of protection, taking into account the diversity of situations in the various regions of the Community. This policy is based on the precautionary principle and the principle of preventive action, the principle that environmental damage should as a priority be rectified at source, and the principle that the polluter pays. The second paragraph then states: 'In this context, harmonisation measures answering environmental protection requirements shall include, where appropriate, a safeguard clause allowing Member States to take provisional measures, for non-economic environmental reasons, subject to a Community inspection procedure'.

From the legal basis of the Directive on energy efficiency, there is therefore an implicit obligation to implement as a minimum the rules it contains, with the starting point being a high level of protection. The Member States have the option of taking further-reaching measures to protect the environment. The possibilities – from an

⁹ Mortelmans 2003, p. 937.

environmental standpoint – of taking less-extensive measures are minimal and restricted to provisional measures based on non-economic environmental reasons.

2.2. Smart Meters in the Directive on Energy Efficiency

As the title of Directive 2006/32/EC suggests, the aim of the Directive is to foster energy efficiency. In the preamble to the Directive, it can be seen that the Directive contributes to better security of the energy supply and to a reduction of primary energy consumption, to the mitigation of emissions of CO₂ and other greenhouse gases and thereby to the prevention of dangerous climate change. Better energy end-use efficiency will provide opportunities to utilise potential cost-effective energy savings in an economically efficient manner. Moreover, the step towards more energy efficient technologies will stimulate the innovative and competitive capabilities of the Community, on which the emphasis is placed in the Lisbon strategy. The aim of this Directive is consequently not only to further promote the supply side of the energy services sector, but also to create stronger incentives on the demand side.¹⁰

The Directive on energy efficiency proposes various measures with a view to realising potential energy savings. Although appendix III contains an indicative list of examples of possible measures for improving energy efficiency, of which the smart meter is one, the Directive also specifically prescribes the use of smart meters. Paragraphs 28 and 29 of the preamble describe the background of the smart meter:

(28) In defining energy efficiency improvement measures, account should be taken of efficiency gains obtained through the widespread use of cost-effective technological innovations, for instance electronic metering. In the context of this Directive, competitively priced individual meters include accurate calorimeters.

(29) In order to enable final consumers to make better-informed decisions as regards their individual energy consumption, they should be provided with a reasonable amount of information thereon and with other relevant information, such as information on available energy efficiency improvement measures, comparative final consumer profiles or objective technical specifications for energy-using equipment, which may include 'Factor Four' or similar equipment. It is recalled that some such valuable information should already be made available to final customers under Article 3(6) of Directive 2003/54/EC¹¹. In addition, consumers should be actively encouraged to check their own meter readings regularly.

These paragraphs of the preamble find expression in article 13 of the Directive on energy efficiency. This article is presented below, with some emphasis added by us to highlight the most important obligations for the Netherlands with regard to smart meters.

1. Member States shall ensure that, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, final customers for electricity, natural gas, district heating and/or 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.

¹⁰ Paragraphs 1 – 3 of preamble.

¹¹ This Directive concerns common rules for the internal market in electricity (authors' footnote).

When an existing meter is replaced, such competitively priced individual meters shall always be provided, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term.

When a new connection is made in a new building or a building undergoes major renovations, as set out in Directive 2002/91/EC, such competitively priced individual meters shall always be provided.

2. Member States shall ensure that, where appropriate, billing performed by energy distributors, distribution system operators and retail energy sales companies is based on actual energy consumption, and is presented in clear and understandable terms. Appropriate information shall be made available with the bill to provide final customers with a comprehensive account of current energy costs. Billing on the basis of actual consumption shall be performed frequently enough to enable customers to regulate their own energy consumption.

3. Member States shall ensure that, where appropriate, the following information is made available to final customers in clear and understandable terms by energy distributors, distribution system operators or retail energy sales companies in or with their bills, contracts, transactions, and/or receipts at distribution stations:

- a) current actual prices and actual consumption of energy;
- b) comparisons of the final customer's current energy consumption with consumption for the same period in the previous year, preferably in graphic form;
- c) wherever possible and useful, comparisons with an average normalised or benchmarked user of energy in the same user category;
- d) contact information for consumers' organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and/or objective technical specifications for energy-using equipment.

2.3. Compulsory Introduction of Smart Meters in the Netherlands?

With regard to the question of whether the Directive makes introduction of smart meters compulsory in the Netherlands, several points from article 13 are interesting. In the first instance, smart meters must only be introduced in as far as this is technically feasible and cost efficient, in relation to the potential energy savings. Moreover, under the conditions mentioned, the Directive states that competitively priced individual meters must always be *provided*. Although this entails an obligation for the supplier to offer smart meters, it also implies freedom of choice for consumers to opt for a traditional meter.

Furthermore, article 13 imposes the obligation that billing must be based on actual consumption. It is stated that billing must be performed frequently enough to enable customers to regulate their own energy consumption. However, there are no concrete provisions concerning the frequency of metering. Mention is only made of *actual consumption* and a comparison with *the same period*; the article does not determine how often meter readings should be taken.

The Directive therefore seems to impose the obligation to offer individual meters, but not to buy them. The question of whether consumers should still have freedom of choice is not explicitly answered. With regard to the frequency of metering, or the 'smartness' of the individual meters, the Directive also does not prescribe any concrete interval periods. All things considered, therefore, a certain amount of leeway is offered to Member States with regard to implementing the compulsory introduction of individual meters.

2.4. Dutch Implementation of the Directive on Energy Efficiency

In the revised proposal 'Regulations concerning Energy Efficiency' (the EC Directives on Energy Efficiency Implementation Act)¹², smart meters are included in article 2, which is placed in section 2 concerning metering devices for supplying heating or cooling.

Article 2 EC Directives on Energy Efficiency Implementation Act

1. It is the task of managers of heating or cooling grids to ensure that individual metering devices which are able to show the actual energy consumption for heating and cooling and able to provide information on actual time of use are provided to end consumers within a reasonable period when:

- a. an end user so requests, unless providing it is technically impossible or not financially reasonable;
- b. an existing meter is replaced, unless providing it is technically impossible or not cost-effective in relation to the estimated potential savings in the long term;
- c. a new connection is made in a new building;
- d. a building undergoes major renovations.

2. By or pursuant to a governmental decree, rules can be established concerning:

- a. the minimum requirements that metering devices as provided for in paragraph 1 must meet;
- b. the tariffs for the purchase or use of a metering device as provided for in paragraph 1.

3. A manager of a heating or cooling grid must provide a transparent, simple and inexpensive procedure for handling complaints from end users concerning the reliability of the metering device.

The fact that, besides the introduction of smart meters for energy consumption of heating and cooling, smart meters for metering electricity and gas consumption will also come into being is apparent from the proposed article 6:

Article 6 EC Directives on Energy Efficiency Implementation Act

Article 2, paragraphs 1 and 2, part a, and articles 3, 4 and 5 apply by analogy with respect to electricity and gas, provided that, for the purposes of this article and the provisions based on it, the following terms are understood to mean as follows:

- a. Manager of an electricity grid: the grid manager as provided for in article 1, part k, of the Electricity Act 1998;
- b. Manager of a gas grid: the grid manager as provided for in article 1, part e, of the Gas Act.

With regard to article 6, this provision will lapse if the proposed amendment to the Electricity Act 1998 and Gas Act enters into force; this proposal is currently under preparation, with the intention of improving the operation of the electricity and gas markets.¹³ The amended Electricity Act 1998 and Gas Act will then contain the provisions necessary for implementation of the Directive.¹⁴ Based on this bill, the provision concerning smart meters will be included in article 26ab of the Electricity Act and in article 13b of the Gas Act.

Article 26ab Electricity Act

1. Grid managers shall grant suppliers access to metering data concerning consumers, as provided for in article 95a, paragraph 1, in as far as this concerns metering data of customers of the supplier concerned.

¹² Upper House, session year 2007-2008, 31 320, B.

¹³ Upper House, session year 2007-2008, 31 374, A.

¹⁴ Lower House, session year 2007-2008, 31 320, no. 3, 31 320, p. 3.

2. Contrary to paragraph 1, grid managers shall only grant suppliers access to metering data that relates to a time frame shorter than one day in as far as the supplier is entitled to process the metering data concerned based on article 8, part a, of the Personal Data Protection Act.
3. Grid managers shall only grant third parties access to metering data concerning consumers, as provided for in article 95a, paragraph 1, in as far as the third party is entitled to process the metering data concerned based on article 8, part a, of the Personal Data Protection Act.
4. Grid managers will make quarter-hourly and daily metering data available daily free of charge. For other metering data, the grid manager will charge a fee for the related costs.

Article 13b Gas Act

1. Grid managers shall grant suppliers access to metering data concerning consumers, as provided for in article 43, paragraph 1, in as far as this concerns metering data of customers of the supplier concerned.
2. Contrary to paragraph 1, grid managers shall only grant suppliers access to metering data that relates to a time frame shorter than one day in as far as the supplier is entitled to process the metering data concerned based on article 8, part a, of the Personal Data Protection Act.
3. Grid managers shall only grant third parties access to metering data concerning consumers, as provided for in article 43, paragraph 1, in as far as the third party is entitled to process the metering data concerned based on article 8, part a, of the Personal Data Protection Act.
4. Grid managers will make hourly and daily metering data available daily free of charge. For other metering data, the grid manager will charge a fee for the related costs.

From the bills it is apparent that, in the cases described by law and under the statutory conditions, there will be an obligation imposed on grid managers to provide smart meters to end users. This obligation specifically implements article 13 of the Directive on energy efficiency in two respects. Firstly, the bill refers to daily, hourly and quarter-hourly readings, thereby implementing in particular detail the 'period' from the Directive that consumers require to regulate their own energy consumption.

Secondly, it appears that the bill imposes on consumers an obligation to buy smart meters. It cannot be derived directly from the text with certainty whether there is an obligation for consumers to buy smart meters, or whether they will be free to choose a traditional ('dumb') meter. From the standpoint of privacy, freedom of choice between smart or traditional meters is important. For those who think that smart meters constitute a breach of privacy, the choice for a traditional meter could, after all, provide assurances against such breaches.

However, from the grid managers' obligation arising from paragraph 4 to provide metering data to suppliers on a quarter-hourly, hourly and daily basis free of charge, it is clear that the meters of end users must be capable of satisfying this requirement. Although consumers, according to paragraph 2, must give explicit permission for the passing on of quarter-hourly and hourly readings to their suppliers, this does not necessarily mean that consumers could refuse the generation of quarter-hourly and hourly readings as such. Moreover, consumer permission applies only to quarter-hourly and hourly readings and not to daily readings, which means that in any case individual meters must be 'smart' enough to be read remotely and generate daily readings. If consumers could refuse such smart meters, grid managers would have a problem meeting their statutory obligations. The Minister of Economic Affairs therefore clearly appears to assume an *obligation* on the part of end users to switch over to smart meters, in the cases described by law and under the conditions determined

therein.¹⁵ Based on the interpretation given to article 13 of the Directive, smart meters in the Netherlands will have to be much smarter than those prescribed by Europe. According to Europe, the meters only have to 'accurately reflect the final customer's actual energy consumption and provide information on actual time of use'. This does not imply any obligation for grid managers/suppliers to acquire quarter-hourly, hourly or daily readings of metering data. There is no obligation of any kind arising from the Directive that requires this data to be sent from homes to a central data storage area outside of homes. The Directive states that billing by energy distributors, distribution system operators and retail energy sales companies should be based on actual energy consumption and that billing should be frequent enough to enable customers to regulate their own energy consumption. It also does not follow from this that the automatic sending of metering data is a functionality required by the Directive. By making an adjustment to current 'dumb' meters, these could also provide an insight into consumption and consumption times, meaning that – even without being read remotely – they would comply with the concept of smart meters, as made compulsory in article 13 of the Directive: an individual meter that provides accurate information about actual energy consumption and actual time of use.

If we look at the explanatory memorandum to both the implementation of the EC Directives on energy efficiency bill and the amendment to the Electricity and Gas Act bill, there is a persistent assumption that every end user will *want* to have a smart meter and that they therefore must be able to obtain them.¹⁶ The debate about the compulsory nationwide rollout of smart meters is taking place from this viewpoint, with no attention being given to the question of whether end users may refuse the installation of a smart meter, due to privacy considerations for example.

The explanatory memorandum to the EC Directives on Energy Efficiency Implementation Act bill states, with reference to article 2:

that measures for improving energy efficiency should be evenly distributed among all suppliers, grid managers and retail energy sales companies and that all end users should have clear insights into their energy consumption. This goal cannot be achieved unless all grid managers are obliged to install smart meters.¹⁷

In this connection, the explanatory memorandum to the amendment of the Electricity and Gas Act bill states that:

If, for example, suppliers were to roll out smart meters, then the chances are that only between 30 and 35 percent of retail consumers would end up with smart meters due to commercial considerations. That is undesirable because several public-interest benefits, such as guaranteed security of supply and efficient operational management by grid managers, could only be obtained through a 100 percent rollout. To guarantee, therefore, that these benefits are also actually utilised, a regulated rollout is necessary. There must be certainty that the parties responsible for the rollout will also ensure that there is national coverage of smart meters in the near future. (...) By introducing an obligation to equip all retail consumer connections with meters that can be read remotely, there will be a transition phase in which the meter must actually be rolled out.¹⁸

¹⁵ Although in the initial discussions about the smart meter this was not yet the case, since the Parliamentary document Lower House, session year 2007-2008, 31374, no. 2, compulsory use of smart meters has been assumed in the discussions.

¹⁶ Lower House, session year 2007-2008, 31 320, no. 3 and Lower House, session year 2007-2008, 31 374, no. 3.

¹⁷ Lower House, session year 2007-2008, 31 320, no. 3.

¹⁸ Lower House, session year 2007-2008, 31 374, no. 3, p. 12 and 15.

Although the text of the bills does not say so explicitly, it is apparent that there is an underlying obligation in the bills for end users to have such meters. It is precisely this obligation, instead of freedom of choice, that makes the questions of the ECHR criteria and the necessity of introducing these meters in a democratic society extremely relevant. We will discuss this in connection with the test against article 8 of the ECHR in sections 4 and 4.3.

2.5. Smart Meters in Other Countries

Within the scope of this study, we could not make any legal comparison with other European countries. We refer readers interested in international developments to the European Smart Metering Alliance (ESMA), established in May 2007. Its main aim is to collect and disseminate experiences and best practices in the area of smart meters. With 10 other countries, the Netherlands was actively involved in the establishment and execution of this initiative.¹⁹ A general literature scan shows that there are major differences in Europe. Italy has made the most progress in installing smart meters.²⁰ Enel started there in 2002. All households have had smart meters since early 2007. The aims of the rollout were to achieve better control over meter readings and energy demand and to allow other tariff systems and other services to be offered. In Sweden, a law has been enacted that makes it compulsory for suppliers to take actual monthly meter readings. Although it is not prescribed by law how this should be done, in practice it means that all consumer households would be equipped with smart meters from 1 July 2009. In Germany and the United Kingdom, it has been decided for the time being not to proceed with a national, obligatory rollout of smart meters for consumers.

2.6. Conclusion

The Directive on energy efficiency obliges Member States to implement at least the requirements contained therein into the national legal system. It allows Member States the freedom to implement stricter rules to protect the environment. The Directive makes it compulsory to provide individual meters to end users, but does not explicitly oblige end users to use them. However, the Dutch implementing legislation does assume such an obligation. The Directive also does not prescribe any specific interval periods. The Netherlands has opted for detailed interval periods, namely hourly for gas and quarter-hourly for electricity.

¹⁹ <<http://www.esma-home.eu>>. Also see <<http://www.metering.com>>.

²⁰ See, for example, Berg Insight AB, *Smart Metering and Wireless M2M – 5th Edition*, 2008; Jorge Vasconcelos, *Survey of Regulatory and Technological Developments Concerning Smart Metering in the European Union Electricity Market*, 2008. http://cadmus.eui.eu/dspace/bitstream/1814/9267/2/RSCAS_PP_08_01.pdf; Mark Baldock, *Domestic Metering Innovation* <http://www.ofgem.gov.uk/MARKETS/RETMKTS/METRNG/SMART/Documents1/12813-2006.pdf>.

3. Smart Meters in the Light of Privacy, the PDPA and Article 8 ECHR

Before discussing the question of which aspects of smart meters constitute breaches of which areas of privacy, this paragraph first explains what a smart meter is and the parties involved in the metering process. In this regard, we will also look at the various vested interests in the use of smart meters. Following this, in paragraph 3.2, we provide a brief explanation of the concept of privacy and its constituent parts, along with a brief discussion of the legal embedding of the right to privacy in Dutch society. This will be followed in paragraph 3.3 by a discussion of the question of which aspects of smart meters constitute breaches of which areas of privacy.

3.1. Smart Meters and the Parties Involved in the Metering Process

Based on the Dutch bills to implement the Directive on energy efficiency and to amend the Electricity and Gas Act, the smart meter is an electronic meter that measures and records various user household data at high frequency (electricity every 15 minutes; gas once an hour), including power (Watt) and voltage (Volt), with the data being stored in databases.²¹

The Minister of Economic Affairs clarifies the concept of the smart meter by pointing out that the meter itself is not smart but, by adding communications technology to gas or electricity meters, the metering device can be read and controlled remotely. Software can also be added to enable remote regulation, switching off and dimming.²² On the one hand, the technology of the smart meter enables suppliers to offer other energy-related services to their customers (energy-saving tips, for example) besides simple energy supply. On the other hand, it enables grid managers to optimise the operational management of the grid. The smart meter is therefore important in both a commercial and management-related sense, i.e. it is a matter of both private and public importance.²³

In the phrasing of the Minister of Economic Affairs, smart meters concern the following applications:

1. reading energy consumption remotely;
2. switching capacity on and off remotely;
3. measuring and indicating the quality of energy consumption remotely;
4. online interaction between end users and suppliers;
5. real-time response of controls in energy installations.

In this regard, the minister clarifies that functionalities 2 and 3 are related to the public tasks of grid managers; the other functionalities provide a basis for commercial service provision in the context of regulating and controlling consumer energy consumption at home.²⁴

Various parties are involved in the metering process. The Energy Efficiency Implementation Act in the Netherlands distinguishes between the following five parties who are (or could be) involved in the metering process and therefore in the processing of metering data: the end user, the grid manager, the supplier, the metering firm and a third party (energy-savings consultancy). The minister discusses the roles of these parties

²¹ Letter from the Consumers' Association to the Minister of Economic Affairs on the subject of privacy, security and electronic meters, 16 May 2008.

²² Lower House, session year 2005-2006, 28 982, no. 51.

²³ Lower House, session year 2007-2008, 31320, no. 3.

²⁴ Lower House, session year 2005-2006, 28 982, no. 51.

extensively in her letter of 27 June 2008.²⁵ Put briefly, the grid managers collect the metering data generated by the meters. Suppliers have direct access to this data, while metering companies only act on instruction from a supplier or specific end user. A third party, which is outside the relationship between the grid manager, supplier and metering firm, will only have access to metering data with permission from the end user.

3.2. Privacy and Data Protection

3.2.1. *The concept of privacy*

In the literature, privacy is often described as an ambiguous, dynamic and indefinable concept. In his dissertation, Blok nevertheless demonstrates that a right to respect for one's private life has a clear core concerning protection of one's home, confidential communication, one's intimate relations and one's body.²⁶ Privacy involves the protection of one's private life, and it should be noted here that a (more limited) right to privacy is also recognised in public spaces.²⁷ Privacy is therefore an umbrella concept under which various dimensions of the right to privacy fall. For example, a distinction can be made between relational privacy, privacy of information, physical privacy, territorial or spatial privacy, privacy of communication and medical privacy.²⁸

With the ICT revolution and the considerable attention given to privacy in relation to the processing of personal data, nowadays the term privacy is often used incorrectly to refer solely to privacy of information. The term privacy is broader than the protection of personal data. At the same time, protection of personal data is also a broader concept than privacy, because the careful handling of personal data does not necessarily concern privacy-sensitive data. As shown below, the difference between the right to privacy as an umbrella concept for the protection of one's private life and the right to protection against the processing of personal data also finds expression in the law.

3.2.2. *The Dutch Constitution and the ECHR*

Both the Dutch Constitution and the ECHR contain articles offering protection against interference in one's private life, irrespective of which dimension of privacy is involved. The right to respect for one's private life is laid down in article 10, paragraph 1, of the Dutch Constitution. Paragraphs 2 and 3 impose an obligation to lay down statutory rules concerning the protection of one's private life in connection with the processing of personal data. Articles 11, 12 and 13 of the Constitution further define the right to respect for one's private life in relation to the inviolability of the human body, the right to inviolability of the home and confidentiality of correspondence by letter, telephone and telegram.

In the European Convention on Human Rights and Fundamental Freedoms, only article 8 is devoted to the right to respect for one's private and family life. This article concerns the universal right to privacy, encompassing in principle all privacy dimensions. The article reads as follows:

Article 8 ECHR

1. Everyone has the right to respect for his private and family life, his home and his correspondence.

²⁵ Letter from the Minister of Economic Affairs, 27 June 2008 ET/EM/8076922 1, follow-up concerning commitment re privacy aspects of bill 31 374 (market model).

²⁶ Blok 2002. p. 72.

²⁷ Ippel & Hulsman 1997, p. 967-968.

²⁸ Blok & Vedder 2002, p. 24.

2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.

Article 8 of the ECHR plays an important role in Dutch society, partly because the ECHR provides for testing by an independent international court. The jurisdiction of this European Court of Human Rights²⁹ is binding for all parties that are signatories to the Convention. Although, in principle, the ECHR applies to relations between public bodies and citizens, in the Netherlands article 8 of the ECHR can also be invoked in private relationships. Although there has been a lengthy debate and not everyone is pleased with the current outcome, since the ruling concerning a mother on social security in Edam the Dutch Supreme Court has recognised the direct horizontal effect of article 8 of the ECHR.³⁰

With the privacy test based on article 8 of the ECHR, the court employs a two-step test to assess whether a measure conflicts with the right to protection of one's private life. Firstly, in judging a dispute, the Court rules as to whether there is a breach of privacy, as provided for in paragraph 1. If there is a breach, then such a breach is not automatically unlawful. With the second step, a judgement is made as to whether the breach is lawful or unlawful, by testing the breach against the requirements of paragraph 2. In this regard, three requirements are important. Firstly, the breach must be provided for by law; this may concern either legislation or case law, provided that the breach is sufficiently apparent to citizens. Because, in the case at hand, the smart meter is being introduced by law, this criterion is met in any case. Secondly, the breach must meet one of the criteria mentioned in paragraph 2, such as national security or the economic well-being of the country. Thirdly, the breach must be necessary in a democratic society – i.e. a weighing up of interests takes place between the protection of privacy, on the one hand, and the interest that the breach is intended to serve, on the other.

Based on article 8 of the ECHR, there are two kinds of case law: that of the European Court of Human Rights and that of the Dutch judiciary. Both contribute to the interpretation of the right to protection of one's private life. The Dutch courts are obliged to follow the interpretation of article 8 of the ECHR given by the European Court of Human Rights. After all, the Netherlands has recognised the jurisdiction of the European Court of Human Rights, as a result of which the court in Strasbourg is higher in the hierarchy than the Dutch national courts.

In national case law, in addition to the interpretation of article 8 of the ECHR, the interpretation of article 10 of the Dutch Constitution could also play a role. Here too, with the obligation of the national courts to follow the interpretation given at European level in mind, there should be no marked differences between the interpretations of the two articles. After all, they concern precisely the same subject matter, namely the protection of one's private life. Here again, article 10 of the Constitution must give way to article 8 of the ECHR.³¹ Based on article 94 of the Dutch Constitution all binding provisions of treaties take precedence over national law. This therefore constitutes an important reason for the huge significance of article 8 of the ECHR in the Netherlands.

²⁹ See <http://www.echr.coe.int/echr>.

³⁰ Netherlands Supreme Court 9 January 1987, NJ 1987/928.

³¹ The biggest difference is that in the context of art. 8 par. 2 ECHR restrictions are also possible based on unwritten law, while art. 10 of the Constitution refers to restrictions established by or pursuant to the law. As it is determined both in the ECHR and the ICCPR that these treaties do not affect better national protection, this does not constitute a problem. Art. 53 of the ECHR and art. 5 of the ICCPR.

For this reason, we treat the privacy test against article 8 of the ECHR as the central issue in this report. In this regard, according to the two-step test mentioned above, three questions need to be answered. Does the smart meter constitute a breach of privacy? Does this breach serve one of the ECHR criteria? And is the breach necessary in a democratic society?

3.2.3. The Personal Data Protection Act

When it comes to smart meters, the issue is not only the protection of one's private life in general - more specifically, the processing of personal data also plays an important role. For this reason, we will focus here briefly on the specific legislation that exists in this area in the Netherlands.

The effect of the above-mentioned Constitutional obligation to establish rules concerning the protection of privacy in connection with the processing of personal data can be seen in the Personal Data Protection Act (PDPA). This Act not only has its origins in the Dutch Constitution, but also constitutes the implementation of 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.³²

The major difference between privacy on the one hand and protection of personal data on the other lies specifically in the difference between subjectivity and objectivity. While determining whether there has been a breach of privacy is heavily dependent on the person and context, the rules for processing personal data, as provided for in the PDPA, provide an objective standard for judging whether the data processing is lawful. Although the processing of personal data could constitute a breach of privacy, this is not necessarily the case. Even when the processing of personal data clearly does not infringe privacy, compliance with the rules laid down in the PDPA is nevertheless required. On the other hand, even if the rules of the PDPA are observed when processing personal data, such processing could still be seen by those concerned as a breach of their privacy.

For this reason, the simple stipulation by the minister that the requirements of section 2 of the PDPA must be met is not sufficient to call the smart meter 'privacy-proof'. Besides a test against the requirements of the PDPA, which, following the statements by the minister and an amendment to the bill (see paragraph 3.4), the bill now appears to satisfy, an independent privacy test against article 8 of the ECHR therefore still remains necessary.

3.3. Smart Meters as Breaches of Privacy

3.3.1. Introduction

The compulsory introduction and use of smart meters could lead to breaches of privacy. The processing of personal data that accompanies the introduction and use of smart meters could, moreover, conflict with the rules on the protection of personal data. To provide an answer to the question of whether and, if so, to what extent and on what points the introduction and use of smart meters conflicts with the right to privacy or the right to data protection, we must first determine the precise risks to privacy that smart meters pose.

3.3.2. The risks mentioned by the Consumers' Association³³

³² 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, OJ 1995 L 281/31.

³³ See letter from Consumers' Association to the Minister of Economic Affairs on the subject of privacy, security and electronic meters, 16 May 2008.

In the first instance, one can refer here to the compulsory installation of smart meters mentioned above. This represents a limitation of the freedom of choice of end users concerning the use of resources in their homes. End users could already see this as a breach of their privacy, as they might at least want to decide for themselves whether and, if so, to what extent their energy consumption is logged for their own use, and certainly for use by third parties. Furthermore, any breaches of the right to privacy are closely linked to the processing of data that takes place within the process of smart metering. From such data, after all, various kinds of information about the personal lives of the users can be derived directly or indirectly. In this regard, the Consumers' Association mentions the following:

- lifestyles;
- when a person is (normally) at home;
- whether a person is absent for a longer period (e.g. on holiday);
- the types of electronic products present;
- the activities of people when using electronic products;
- whether the electronic products are new or near the end of their product lives.

Additionally, the Consumers' Association points to the risks associated with the provision and storage of metering data. Suppliers intend to make this information easily accessible to consumers on a web page. As a result, there is a real risk that hackers could gain access to personal data. Apart from the risk of such data being sold to others, for example as a result of its high commercial value for marketing purposes, such data could also prove of value for burglars. After all, with the use of electronic meters one could determine remotely whether/when the occupants are (not) at home and what kinds of electronic devices could be stolen. In this connection, the fact that smart meters raise questions about security and not only about privacy should be clear – especially since it would also be possible to switch off the electricity or gas remotely. This resulted in the following statement in a discussion on the Internet: 'If I were a terrorist, I would know what I would be studying in the coming period'.³⁴

Another important point that the Consumers' Association raises are the applications that smart meters make possible, in cases of non-payment by end users for example. Electronic meters could be used to reduce or totally shut off the electricity supply. Although shutting off the supply is already possible, both the building in of an option of switching it off remotely and the possibility of 'smartly' and partially shutting off power could tempt suppliers to take measures against defaulters more quickly than at present that would restrict one of their basic necessities of life. This requires additional consumer protection and guarantees, both with respect to administrative errors by energy companies and to hacking.³⁵

The next objection is the expansion of the volume of processed data and the relationship with grid managers:

You propose to oblige consumers to record personal energy consumption, quarter-hourly for electricity and hourly for gas, and also to make this personal data available to grid managers – much more data (as well as data that goes much further) than is strictly necessary for issuing accurate bills. Added to this is the fact that grid managers do not need any data at all for issuing bills. If the Lower House approves the capacity tariff, grid managers will

³⁴ <http://sargasso.nl/archief/2008/07/28/kstn-te-slimme-meters>.

³⁵ *Idem*.

receive a consumption-*in*dependent payment. Through the introduction of the supplier model, consumers in future will no longer have any formal relationship at all with grid managers.³⁶

Finally, the Consumers' Association notes that smart meters will not contribute to the intended aim of energy savings:

For example, studies among highly motivated end users show that there is a definite saturation point. At first, the display is like a new toy. The data is checked regularly. However, this routine diminishes quickly over time, with people falling back into old patterns. In addition, smart meters do not provide any energy savings themselves; this would have to come from concrete adaptations, such as insulation, energy-saving light bulbs and 'standby stoppers' – and these are separate from the smart meter. For the remaining customers who will not use the meter or who are already very energy conscious, it would seem to be a waste of money. Their meter boxes will contain expensive electronic and gas meters that consume more energy than the current, 'dumb', mechanical meters.³⁷

3.3.3. Objections by the DDPA³⁸

In the first instance, the privacy objections voiced in the DDPA's advice focus on a lack of clarity concerning the data flows and the question of who will have access to which data and under which conditions. In this connection, the DDPA objects to the so-called supplier model, which is being made compulsory. This model obliges suppliers to bill both supply and transport costs. To realise this, grid managers will have an obligation to grant access to the metering data to suppliers, metering companies engaged by suppliers and third parties, in as far as a basis for this is provided by the PDPA (see article 26ab of the Electricity Act, along with the explanatory notes).

This implies that the grid manager is the sole recipient of the metering data and that the other parties only have access to this data via the grid manager. Elsewhere in the bill it is stated that, after introduction of the bill, suppliers will no longer be dependent on grid managers for obtaining the metering data, but that they may have it collected and validated by a recognised metering firm (paragraph 2.3.7, Explanatory Memorandum).

Furthermore, the bill indicates that open access to smart meters and the metering data must be assured, provided that consumers grant explicit permission for this (paragraph 2.3.3, Explanatory Memorandum).

In this connection, the DDPA states the following:

The bill, however, prescribes that, in all cases, smart meters must at least measure energy consumption quarter-hourly (electricity) or hourly (gas). This high frequency is not necessary for billing. In this context, the collection and use of metering data for other purposes is therefore not possible without permission of those concerned (article 8, par. a, PDPA). Irrespective of such permission, the bill imposes an obligation on grid managers to make quarter-hourly readings of energy consumption available to the supplier as standard. This provision conflicts with articles 8 and 11, paragraph 1, of the PDPA.

Furthermore, the DDPA points out that the bill does not make it possible to enter into agreements in which permission is only granted for the exchange of data at the minimum necessary level.

³⁶ Letter from Consumers' Association to the Minister of Economic Affairs on the subject of privacy, security and electronic meters, 16 May 2008.

³⁷ Letter from Consumers' Association to the Minister of Economic Affairs on the subject of plenary finalisation of bills, 17 June 2008.

³⁸ Letter from Dutch Data Protection Authority to the Minister of Economic Affairs on the subject of amendment of the Electricity Act 1998 and Gas Act to improve the operation of the electricity and gas markets (31 374), 17 June 2008, reference z2008-00769.

With regard to permission for processing personal data, the DDPA notes that the signing of a generally formulated authorisation does not meet the criterion of specifically-given permission, as required by the PDPA. It is also indicated that the persons concerned should have the power to withdraw permission once it has been granted.

With regard to giving energy-saving advice, it is pointed out that it is important that only data that is necessary for providing such advice is processed. Processing of data other than that necessary for the performance of the agreement should only take place on the basis of explicit permission. In this connection, the DDPA further notes that it is conceivable that energy advice could withstand the test of further processing on the basis of article 9 of the PDPA, but that this would not apply to deducing behavioural patterns from the recorded energy consumption.

The DDPA also points to the lack of clarity concerning storage periods and security.

3.3.4. Other privacy objections voiced

In the report entitled *Security analysis of Dutch Smart Metering Systems*, one of the main conclusions of Sander Keemink and Bart Roos is that privacy is undervalued in the discussion concerning smart meters.³⁹ They express concern about the privacy and security risks related to the use of smart meters which can be read remotely and where access to such data by third parties cannot always be precluded. They point out that, according to the technical protocol of these meters, NTA (the already published precursor to an NEN standard), poorly-defined 'third parties' could gain access to the extremely sensitive information recorded by smart meters. They refer not only to obtrusiveness on the part of totally undesired suppliers or data merchants that could annoy consumers, but more specifically to the risks of illegal taps of data flows, something that is not inconceivable given the sensational hacks of other large IT projects.

Besides the interest that burglars will have in information generated by smart meters, the researchers also refer to the potential misuse by various authorities which believe that they should decide themselves how far they can go with the use of information (for example, by linking water readings to lack of occupancy).

As in the case of the Consumers' Association, this report also points to the dangers of low-threshold services provided by suppliers to their customers by means of web pages that provide easy access to their own (consumption) information. This is an invitation to hackers, according to the researchers, especially considering the complex technology of the smart meter, which is therefore susceptible to misuse.

3.4. Amendments based on the Call for Privacy

In a letter dated 27 June 2008, the Minister of Economic Affairs responded to the criticisms of the Consumers' Association and the DDPA. In the first instance, she clarified the bills; secondly, she proposed an amendment to accommodate the privacy objections voiced.

The minister's first clarification concerned the question of which parties will receive access to metering data, based on the bill on the amendment of the Electricity and Gas Act. In this connection, the minister stated that:

³⁹ Keemink & Roos 2008.

1. Grid managers should grant suppliers access to all raw metering data concerning the suppliers' customers. This is provided for in the proposed articles 26ab, paragraph 1 (Electricity Act), and 13b, paragraph 1 (Gas Act).
2. Suppliers should instruct a metering firm to collect, validate and record the raw metering data which a supplier is entitled to acquire in accordance with the law. This is provided for in the proposed articles 95ca, paragraph 1 (Electricity Act), and 44a, paragraph 1 (Gas Act).
3. On instruction from the supplier, a metering firm may provide the recorded metering data required by the suppliers or end users to the supplier and end user concerned. This is provided for in the proposed articles 95ca, paragraph 4 (Electricity Act), and 44a, paragraph 4 (Gas Act).⁴⁰

Moreover, in her response to the advice from the DDPa, the minister confirmed that the whole of section 2 of the PDPA will apply in full to the processing of personal data in the context of the smart metering process.⁴¹

The minister also noted that:

For quarter-hourly electricity and hourly gas readings, a statutory provision that suppliers can automatically acquire these readings is not by definition proportionate in relation to the purpose of the intended processing. Upon considering the concerns of your House and the advice of the DDPa, I am therefore submitting a memorandum of amendment, whereby suppliers (and their metering firms) and third parties may only acquire quarter-hourly electricity data and hourly gas data after explicit permission has been given by the end users in question.⁴²

With this proposal, the minister firmly rejected two previously submitted amendments concerning privacy, based on the following consideration:

The amendment not only refers to the provision of metering data by grid managers and metering firms to third parties, but also to the provision of data, made obligatory in the bill, between grid managers, suppliers and metering firms. The obligatory data processing imposed in the bill may not be prevented by end users. Above, I indicated that the preconditions of the PDPA will continue to apply in full. Acceptance of the amendment in this form would seriously undermine the operation of the supplier model and the realisation of the savings aim of the Directive on energy efficiency. I have therefore referred to the amendment as destructive, in as far as the persons introducing it wish to make the exchange of data between grid managers, suppliers and metering firms, which the bill now makes compulsory, dependent on permission from end users.⁴³

⁴⁰ Letter from the Minister of Economic Affairs, June 2008. 27 June 2008 ET/EM/8076922 1, follow-up concerning commitment re privacy aspects of bill 31 374 (market model).

⁴¹ *Idem*.

⁴² *Idem*.

⁴³ *Idem*.

3.5. Remaining Privacy Objections

It remains to be seen whether the amendment proposed by the minister and the statement that all the conditions of section 2 of the PDPA must be met will resolve all the privacy objections voiced. In our view, the following aspects noted above are those that should be subjected to a privacy test.

- The explicit permission of consumers for the passing on of metering data only concerns quarter-hourly and hourly readings. The daily readings may be passed on to suppliers without permission – and must be passed on based on the legal obligation of article 26ab, paragraph 4, of the Electricity Act and article 13b, paragraph 4, of the Gas Act. These daily readings also contain privacy-sensitive data: for example, whether the occupants are at home or not.
- The construction that consumer permission must be given for the passing on of quarter-hourly and hourly readings does not alter the fact that the meter must be capable of generating such data and passing it on automatically to the grid manager. After all, it would not be cost-effective to develop and roll out different types of meters. It does not seem likely that consumers can prevent quarter-hourly and hourly readings from being generated and passed on automatically to grid managers.
- Apart from data about concrete electricity consumption, smart meters might also be able to derive other types of information. In this regard, the Consumer's Association refers to the types of electronic products present, when such products are generally used, the corresponding lifestyles and/or whether these electronic products are at the beginning or end of their product lives. Is compulsory generation of such privacy-sensitive data justified, given the purpose intended by law?
- The generation and processing of privacy-sensitive metering data – quarter-hourly, hourly and daily readings – constitute a security risk. In principle, this is covered by obliging grid managers, as the responsible parties within the meaning of the PDPA, to secure this data by means of 'suitable technical and organisational measures' (article 13 PDPA). It remains to be seen, however, whether grid managers can be obliged to provide sufficient protection against hackers. The information about electricity consumption – particularly about prolonged low consumption that could indicate that the occupants are on holiday – is, after all, valuable for burglars, meaning that one could expect to see a considerable number of security attacks. Sufficient security, therefore, will presumably have a price tag. The question then is whether it is justified to place such a financial obligation on grid managers.
- The contribution that smart meters are presumed to make to the Directive's intended aim of energy savings must be added to all this. Will the smart meter actually encourage consumers to consume energy more economically or will it, as the Consumers' Association fears, only consume energy itself?

Besides these objections that have been voiced so far in the discussions, and for which it is still necessary to determine whether they can withstand a privacy test against article 8 of the ECHR, we would also like to refer to two privacy aspects that have received little attention until now.

- Smart meters constitute a breach of the right to inviolability of the home and the right to family life. After all, they provide some insights into the comings and goings of the occupants in their homes. This means that one must look not only at privacy of information, but also at the effect that the generation of this data has on spatial and relational privacy. Are the occupants hindered in their right to an uninhibited home life? Do the occupants feel free to enter into relationships? It is by no means unthinkable that some occupants might feel embarrassed by the knowledge that their grid manager is 'watching' behind the front door and, for example, might be able to deduce from the meter readings that, with an otherwise 'average' energy-consumption pattern, the occupant regularly comes home between the hours of 2 and 3 a.m. on Friday nights and consumes more energy the next

morning than on other days. Does this mean that two people are showering in this single-person household? In this regard, smart meters are a new example of technology that makes it possible to see from the outside what takes place inside homes and, all things considered, turns it into the proverbial glass house; in that light what significance can we and do we want to attribute to the right to inviolability of the home?⁴⁴

- New technologies often carry the risk of *function creep*. This means that an application is introduced for a specific purpose and then turns out to have all kinds of additional functions for which it is then also used.

Although legislation can demand that data may be generated and used for a clear-cut purpose, it cannot be precluded that future legislation could also enable the additional use of this data. In this connection, for example, reference can be made to developments around Eurodac – the European database for finger prints of asylum seekers. The database was created to identify asylum seekers. However, based on an amendment to the Eurodac regulations, it will also be used in future for investigative purposes.⁴⁵ We often see this mechanism in relation to applications in the field of security: more or less accidental features of a technology prove useful for investigating criminal offences or providing emergency assistance. A law is then introduced that makes the existence and use of these features compulsory. In the area of telecommunications, this mechanism resulted in the obligatory storage of traffic data (who calls who and when) and the obligatory determination of locations of mobile telephones that call emergency numbers. The possibility must therefore also be taken into consideration that -- because of the usefulness of energy data for investigating criminal offences (such as large-scale growing of marihuana) -- the compulsory introduction of smart energy meters for the purpose of energy savings could result in the future in the obligatory recording over a longer period of time of the energy data generated. Another possibility here might involve combating benefit fraud. With the collaborative project 'Waterproof', the Overijssel municipalities, the Social Insurance Bank and the Employed Persons' Insurance Administration Agency linked their benefit files to files of the drinking water company between April 2004 and 15 February 2005 to investigate benefit fraud.⁴⁶ There is nothing wrong per se with these new additional applications, but they are a possibility that needs to be included in the weighing up of interests.

3.6. Conclusion

Privacy is an umbrella concept that covers various dimensions of the right to privacy. These include protection of the home, the body, confidential communication, intimate relations and family life, as well as the protection of personal data. This last aspect is protected by the Personal Data Protection Act, which appears to be central to discussions in the Netherlands about privacy and smart meters. Partly in response to criticism from the Consumers' Association and the Dutch Data Protection Authority, the minister has modified the bill by requiring that the explicit permission of consumers be obtained in order for quarter-hourly and hourly readings to be passed on to suppliers and third parties, emphasising that all conditions of section 2 of the PDPA will remain in effect, including the link to a specific purpose, the right of inspection, destruction after use and suitable security measures.

Not all privacy objections have necessarily been resolved by this. The generation of daily readings and data about types of devices (and related lifestyles), the compulsory use of meters that also generate quarter-hourly and hourly readings and pass them on to grid managers, and the imposition of a substantial security obligation on

⁴⁴ See Koops, Van Schooten & Prinsen 2004; Koops & Prinsen 2005.

⁴⁵ Cf. Prins 2008.

⁴⁶ See <http://cms.enschede.nl/nieuws/persberichten/00855/view.html>.

grid managers are aspects of the bill that constitute breaches of privacy. Moreover, privacy comprises more than data protection: smart meters also put pressure on the right to inviolability of the home, the right to family life and intimate relations. It is therefore clear that the smart meter, as put forward in the current bill, constitutes a breach of privacy in various respects, as provided for in article 8, paragraph 1, of the ECHR. A test must therefore be carried out to establish whether these breaches meet the requirements of article 8, paragraph 2, of the ECHR: do they serve one of the criteria mentioned and are they necessary in a democratic society?

4. Smart Meters and the Privacy Test of Article 8 ECHR

4.1. Introduction

In this section the introduction of smart meters is tested against article 8 of the ECHR. As mentioned above, the installation and use of smart meters could be seen as a breach of the right to the protection of privacy. For this reason, the test will need to focus on the second step of the test, the question of whether the breaches of the right to protection of privacy are justified. Smart meters meet the requirements of the first part of this second step – that of being provided for by law – because they will be introduced by law. We will therefore confine our discussion to the aspects of the criteria (paragraph 4.2) and necessity in a democratic society (paragraph 4.3).

We should note in this regard that, in practice, the European Court of Human Rights hesitates between a strict and a flexible necessity test.⁴⁷ According to the first test, a breach of privacy must be strictly necessary to achieve certain justified objectives in a democratic society (an urgent social need) and may not extend further than is strictly necessary. The breach must also be pertinent (namely, relevant to the aim to be achieved) and reasonably proportionate to this aim.⁴⁸ The more flexible test simply comes down to a reasonableness test, which gives governments greater scope. The jurisprudence shows that, in cases such as camera surveillance, preventive searches and compulsory identification, the Court generally applies the flexible test.⁴⁹

The fact that Member States are regularly given a reasonable margin for discretion, in particular for measures relating to national security and combating crime, naturally does not discharge them from the obligation, in developing prudent policies (especially in areas other than security), to take the criteria that are part of the strict test as a starting point. The government should make every effort to minimise breaches of citizens' rights as much as possible by considering alternative solutions and then endeavouring to achieve its aims 'in the least onerous way as regards human rights'.⁵⁰ In the text that follows, we will therefore take the criteria that are part of a strict test against article 8 of the ECHR as a starting point.

4.2. The Criteria of Article 8, Paragraph 2, of the ECHR

According to paragraph 2 of article 8 of the ECHR, breaches of privacy are only permitted if they are made

⁴⁷ De Hert 2005.

⁴⁸ De Hert 2004.

⁴⁹ De Hert & Nehmelman 2006.

⁵⁰ ECHR 2 October 2001 (*Hatton et al. – United Kingdom*), Appl. No. 36022/97, *NJB* 2001, no. 51.

in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.

The Directive states energy savings as the sole aim of introducing smart meters. The preamble emphasises the efficiency benefits and the empowerment of consumers to take decisions about their own energy consumption, while article 13 of the Directive states that the introduction of smart meters 'is proportionate in relation to the potential energy savings' (see paragraph 2.2). The emphasis in the Directive in relation to smart meters is therefore on *empowerment* of consumers, whereby it is assumed that by providing them with better insights into their energy consumption, they will be more economical in their use of energy.

In the case of the Dutch bills, the purposes of smart meters given by the legislator seem broader. As indicated in paragraph 3.1, a smart meter should have the following functionalities:

1. reading energy consumption remotely;
2. switching capacity on and off remotely;
3. measuring and indicating the quality of energy consumption remotely;
4. online interaction between end users and suppliers;
5. real-time response of controls in energy installations.

These relate not only to potential energy savings by consumers (functionality 1), but also to 'assuring the security of supply and efficient operational management by the grid manager'⁵¹ (functionalities 2 and 3), as well as commercial services in the framework of regulating and controlling the energy consumption of consumers in the home (functionalities 4 and 5). In this way, individual energy meters are linked to the complete reform of the energy sector and are in part an instrument to ensure the efficient, reliable and fair operation of the market.

The goal of energy savings can be seen as a contribution to the criterion from article 8, paragraph 2, of the ECHR concerning the economic well-being of a country. Very indirectly, it may also contribute to public security or the protection of public health, given that the desired energy savings are in part being realised with a view to curtailing the risks of climate change. Besides energy savings, the other aims that the Dutch legislator appears to be pursuing with smart meters, namely the contribution to an efficient, reliable and fair market, could also be placed under the criterion of economic well-being.

We can therefore conclude that the smart meters bill meets the criteria of article 8, paragraph 2, of the ECHR.

4.3. Necessity in a Democratic Society

The crux of the privacy test against article 8 of the ECHR is the third aspect of the second step: is the measure necessary in a democratic society? As stated, this means that there must be an urgent social need, that the measure is relevant to achieving the aim, that it does not extend further than necessary and is reasonably in proportion to the aim. The last point implies that there are no less radical alternatives that are also suitable for achieving the aim (subsidiarity) and that the benefit is reasonably in proportion to the cost (proportionality). To answer this question, we will first take a closer look at the various aspects that need to be involved in the

⁵¹ Lower House, session year 2007-2008, 31 374, no. 3, p. 12.

consideration (paragraph 4.3.1). We will then infer from this whether there is a question of necessity in a democratic society (paragraph 4.3.2).

4.3.1. *Considerations*

1. *Which privacy risks are inherent in the smart meter?*

To a certain extent, the metering data generated by this meter are privacy sensitive. This particularly applies to the quarter-hourly and hourly readings because they continuously measure the energy consumption and thereby reflect the lifestyles of the occupants of a house. They provide indications of when the occupants rise in the morning, when they leave and return home and when they go to bed. Information can also be deduced from the quarter-hourly electricity readings about the types of devices people have in their homes and the intensity with which they are used. Regular above-average electrical consumption at night (with a normal pattern during the day), for example, could indicate a water bed. Use of appliances with characteristic cycles of energy consumption, such as washing machines, could also conceivably be inferred. We mentioned an example previously of a person who regularly comes home late at night during the weekend and consumes more than an average amount of gas the next morning. That would suggest that an extra person is using the shower.

Although daily readings are less privacy sensitive than quarter-hourly and hourly readings, information about the personal lifestyles of consumers can also be obtained from daily readings. After all, they show when the occupants are absent from their homes for a day or longer, and they provide an insight into the number of persons that make use of the house.

Privacy sensitivity increases when the smart meter, as is also the intention, is linked to other applications.

Examples are devices for decentralised generation, home electronic systems, such as alarm systems, and automatic operation of household applications. The regulating function allows these applications to be regulated based on the data generated by the meter, e.g. attuning own production and consumption to tariffs that apply in specific periods.⁵²

This 'regulating function', after all, provides an insight into the use of household applications, both the types of devices in use and the ways in which they are employed. This applies particularly when the devices are fitted with sensors or RFID chips and are linked, with the possibility existing of switching them on and off remotely.⁵³

The privacy sensitivity of data not only concerns the protection of personal data. As indicated in paragraph 3.5, smart meters also breach the right to inviolability of the home and the right to respect for family life. The home is the very place where people should be able to be themselves without inhibition – a core value that the right to inviolability of the home is intended to protect. As metering data, especially the quarter-hourly and hourly readings, could provide an insight into lifestyles and relationships, people could feel hindered from freely going about their normal activities. That is a significant violation of privacy.

⁵² Lower House, session year 2007-2008, 31 374, no. 3, p. 14.

⁵³ Cf. Ofgem 2006, p. 38: 'Future considerations include remote control of household appliances and safety services'.

Additionally, it is not only values such as autonomy and self-development, which partly underlie the right to respect for one's home and family life, that are at stake, but also the security of home and family. As noted in paragraph 3.3.2, metering data, including daily readings, are a desirable target for burglars because they provide an insight into when occupants are present or absent. With elaborate meters that can be operated remotely, there is another risk that burglars could try to hack into smart meters remotely, to switch off the alarm system for example. This means that the meters themselves will have to be well protected against unauthorised access from the outside, but also, in particular, that the reading of meters from outside the house, as well as standard data transport to the grid manager, will require a high level of security. With a compulsory rollout of smart meters, this risk will be imposed on consumers. They will have to rely on the suppliers to guarantee their security. That is not to say that adequate security is impossible. However, with complex IT products, of which the smart meter is one (especially when linked within networks), experience shows that security is equally complex and often underestimated. At present, there are certainly no assurances that smart meters will sufficiently preclude security risks.⁵⁴

Finally, the phenomenon of *function creep* must also be included in the considerations (see paragraph 3.5). The metering data will be generated for energy savings and for the efficient, reliable and fair operation of the market in the energy sector. However, it is also of interest to other parties. Investigative and security services will be interested in energy data, especially the quarter-hourly and hourly readings, but also the daily readings because they provide an insight into the presence and absence of persons, lifestyles and the number of people in a dwelling. They have ample authority to request data relevant to investigating criminal offences (see in particular article 126nd, Code of Criminal Procedure) or in the interests of national security (see, e.g., article 17 of the Intelligence and Security Services Act 2002). In certain cases, even the public prosecutor -- with authorisation from an examining magistrate -- can demand that grid managers pass on all future energy data of a specific dwelling in real time to the judicial authorities (article 126ne of the Code of Criminal Procedure). As this concerns already existing powers, there is no question of *function creep*: it will be possible for energy data to be used for criminal investigations and national security in any case. That is not the case with other parties; for example, insurance companies could be interested in the metering data from smart meters. It is conceivable, for example, that they might establish new requirements for the use of electrical appliances or that their general terms and conditions will require access to the metering data stored with grid managers.⁵⁵ The addition of new functionalities is even anticipated explicitly by the minister:

The innovation of the meter does not stop with the nationwide rollout. After the rollout, all retail consumers will in any case have a standard meter that meets the prescribed requirements. It is expected that this standard will be re-evaluated every two or three years and adapted to the latest developments. It will usually be possible to make modifications remotely with the use of software, which improves innovation while lowering the cost substantially.⁵⁶

The question is whether consumers will always have a voice in the expansion of functionalities, or whether they will be obliged to allow the provision of metering data to or remote control by other parties and/or for other purposes than energy savings or reliable energy supply. As this concerns privacy-sensitive data that affects the

⁵⁴ Cf. Keemink & Roos 2008.

⁵⁵ Cf. Foley 2008.

⁵⁶ Lower House, session year 2007-2008, 31 374, no. 3, p. 15.

right to inviolability of the home and respect for family life, each expansion of functionality will need to pass the privacy test of article 8 of the ECHR.

We can conclude that the obligation to have metering data generated by smart meters and passed on to grid managers is a significant breach of privacy, in particular of the right to inviolability of the home and the right to respect for family life, not only because occupants could feel hindered in their right to an uninhibited home life, but also because there are accompanying security risks. The breach becomes even greater if the meter is expanded with new applications or functionalities, making it possible, for example, to switch devices on or off remotely.

The significant breach of privacy is not necessarily an infringement of article 8 of the ECHR, but it means that it should only be allowed in cases of urgent social need and in the absence of less radical alternatives. We will analyse these aspects in the following questions.

2. To what extent do smart meters contribute to the objective of energy savings?

The only purpose of smart meters stated in the Directive is that of energy savings. Although more objectives are attributed to them in the Netherlands, saving energy is also one of the main ones. However, it is not clear whether smart meters will actually contribute to energy savings. Research findings are somewhat contradictory. There is certainly no firm evidence of energy savings. In response to questions raised in Parliament, the minister refers to the following study:

Furthermore, there is considerable information concerning pilot projects in various countries. An expert in the area of feedback--- Sarah Darby (Environmental Change Institute, University of Oxford) – has shown in various studies (the latest in April 2006) that actual information about consumption is necessary for energy savings and that field research shows that the savings are between 0 and 15 percent. Field data from Canada, the UK, Norway and other Scandinavian countries shows that the largest savings are realised (5-15%) when feedback takes place via user-friendly displays on which actual consumption, costs and historical use can be seen immediately.⁵⁷

Figures from such pilot projects may be optimistic, because the initial enthusiasm about a new gadget wanes after a time.⁵⁸ An important observation in any case is that consumers will consume less energy if they can read their energy consumption data directly on a user-friendly display, which could be attached to the meter. The indirect construction in the Dutch bill to pass on the metering data automatically to grid managers, who can then present the data clearly to consumers – whether or not via third parties – on a web page to which consumers can log in is, in that light, a rather time-consuming process, but presumably also less effective in terms of energy savings.

That does not mean that specific, environmentally and/or price-conscious consumers could not be spurred on to save energy, by means of tailored advisory services for example:

⁵⁷ Parliamentary questions with response 2007-2008, no. 373.

⁵⁸ Cf. Parsons 2007: 'Current European Experience (...) reported that customers show little interest after initial enthusiasm'.

If retail consumers give their permission, innovative products and services could be offered online, such as special tariffs for specific hours during the day and energy-saving advice. Third parties could also make use of this metering data to offer commercial services, provided they are authorised to do so by the customer. These energy-saving services, with regular feedback of consumption data, would give retail consumers an opportunity to adapt their consumption or react to price developments, for example.⁵⁹

In this regard, no indication is given as to which consumer segment would be interested in such services and would use them to actually economise on energy. We suspect that this would only concern a (small) minority of retail consumers. Seen in that light, an obligation for all consumers is not necessary. The voluntary purchase of attractively-priced smart meters would be sufficient for this segment. Moreover, it does not seem necessary to systematically collect and store all energy data for these consumers. For purposes of advice, temporary metering could also map out the consumption pattern just as well, and to be able to respond to price developments, it would not be necessary to record quarter-hourly/hourly readings, or even daily readings.

It can be concluded that there is no empirical evidence that smart meters, with the passing on of metering data to grid managers, as proposed in the Dutch bills, would actually contribute to energy savings. The alternative of a user-friendly display in the meter box would appear to be more effective in getting consumers to be more economical in their consumption of energy. For consumers interested in added-value services, such as energy-saving advice, the voluntary purchase of smart meters would suffice.

3. To what extent does the meter contribute to an efficient, reliable and fair energy market?

Besides energy savings, the aim of the Dutch smart meter is also to promote an efficient, reliable and fair energy market. Firstly, this entails guaranteeing *security of supply*. For this purpose, the switching function is particularly important. This allows 'grid managers to switch capacity on or off remotely. This could be necessary to prevent a large-scale failure, or in the event that a building is temporarily vacant.'⁶⁰ Switching off the supply in the case of a temporarily vacant property would not be necessary to guarantee security of supply. Presumably, the main concern here is to be able to respond rapidly to large-scale failures. The bills do not make clear how often this happens in the Netherlands or the extent to which switching capacity on and off remotely would be necessary. In addition, the minister states that a 100 percent rollout is necessary to guarantee security of supply (see paragraph. 2.4), but does not offer any arguments in support of this assertion. In our view, it seems unlikely that security of supply will depend on full coverage of smart meters with switching functions. After all, with the current 'dumb' meters, consumers are virtually always assured of energy. In fact, one could argue exactly the opposite, namely that if high coverage is achieved with an energy supply that can be switched remotely, security of supply might decline: the risk of large-scale criminal or terrorist attacks on energy supplies to consumers would, after all, increase if, via an unknown program error, hackers could shut down a large number of connections.

Secondly, emphasis is placed on the importance of *efficient operational management* by grid managers. Temporarily switching off services to vacant buildings remotely is an example of increasing efficiency, as is the automatic passing on of meter readings, meaning that it would no longer be necessary for meter readers to visit

⁵⁹ Lower House, session year 2007-2008, 31 374, no. 3, p. 14.

⁶⁰ Lower House, session year 2007-2008, 31 374, no. 3, p. 14.

homes. In our view, this would represent a substantial contribution to efficient operational management by grid managers. The minister also puts forward the argument that, with smart meters,

the entire administrative process chain [would be] considerably more efficient. Both the energy companies and customers would have 'firm' meter readings at any given time, as a result of which disputes about 'estimated' meter readings would be a thing of the past. The current margins for error and obscurities would be limited to a large extent and accurate billing would be possible.⁶¹

Let's hope that the current 'dumb' meters are not so dumb that they result in inaccurate billing. The argument only covers the fact that current billing is based on estimated consumption, which is subsequently corrected for actual consumption. This sometimes results in complaints or even disputes, but numbers and the man hours associated with complaints are not mentioned to substantiate this problem. In our view, this is of minor importance. In any case, it could be resolved by providing consumers who complain or habitually complain with smart meters; compulsory use by all consumers is not necessary for this purpose.

The third aspect arising from the Parliamentary documents is fraud detection. The signalling function supports the detection of leaks and fraud because abnormal consumption could be traced early on. Grid managers possess detailed information about the total amount of power fed in and ordered by suppliers. So-called grid losses show up if these totals do not correspond to the meter readings. A signal will also be automatically sent if the individual meter is manipulated.⁶²

In Italy, combating fraud was one of the most important reasons for the introduction of smart meters (besides the fact that the old meters were due for replacement in any case). In the Netherlands this is mentioned as an objective but not as the main objective. Nevertheless, making use of smart meters to trace and combat more cases of fraud more rapidly could be relevant. With a lack of data to support this argument – no indication is given of how large the problem of fraud is in the Netherlands -- it is difficult to estimate whether this is a pressing reason for introducing smart meters.

Fourthly, there is the possibility – related to some extent to combating fraud – that smart meters could be used to reduce or shut off power remotely in the event of non-payment of bills. The reduction of the power supply in particular is an innovation with respect to current meters:

This [switching] function also makes it technically possible to restrict the amount of electricity supplied as an alternative to shutting off power to retail consumers. This links in with the possibility provided for in article 95b, paragraph 8, of the Electricity Act 1998 of establishing rules relating to shutting off the supply of power and preventive measures to avoid shutting off power.⁶³

This functionality opens up the possibility of providing nuanced incentives to consumers who get behind in their payments (or who are in danger of getting behind). It contributes to efficient operational management by

⁶¹ Parliamentary questions with response 2007-2008, no. 373.

⁶² Lower House, session year 2007-2008, 31374, no. 3, p. 14.

⁶³ *Idem*.

suppliers and would also benefit consumers, if the occasion should arise, as they would not be totally cut off from one of the basic necessities of life.

It can be concluded that, to a certain degree, smart meters could contribute to an efficient, reliable and fair energy market. Presumably, the switching function will benefit operational management by grid managers and suppliers, while the signalling function will contribute to combating fraud. It should be noted here, however, that efficient operational management is hardly an 'urgent social need' that could justify a significant breach of privacy. Combating fraud is, although in the absence of fraud data, it is difficult to determine whether it would be proportionate to compel consumers to have meters with online connections and a signalling function for this reason.

4. Are there less radical alternatives available?

The Parliamentary documents devote relatively little attention to alternatives to smart meters. In the bills, smart meters are presented as a combined package of various functionalities: the functions of metering, switching, signalling, communicating and regulating. In addition, the impression is given that the Directive on energy efficiency makes it compulsory to install these smart meters in consumer households:

The Directive, whose primary aim is energy savings, states that end users *must* have energy meters that provide information about actual use. End users should also regularly receive information about this consumption.⁶⁴

The Directive, however, is less compelling: individual meters should be *provided* to consumers, in as far as this is cost-effective in relation to the potential energy savings; that does not necessarily entail an obligation to use them. The Directive refers to individual meters 'that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use'; this does not necessarily involve passing on metering data to grid managers online, which can then be placed on a web page for consumers to view. Moreover, the Directive refers to periodic information that would enable consumers to make conscious energy choices, but does not mention any quarter-hourly/hourly or daily readings.

This raises the question of whether there are alternatives available that could also be used to implement the Directive, with fewer breaches of privacy than is the case with the smart meters proposed in the Netherlands. These alternatives should be carefully studied and included in the considerations. At least three alternatives – which, incidentally, are not mutually exclusive – are worth considering.

A. INTRODUCTION ON A VOLUNTARY BASIS

The Parliamentary documents do not provide any convincing arguments for the compulsory use of smart meters by all consumers. Complete coverage of smart meters is not necessary to guarantee security of supply. Efficient operational management by grid managers – also mentioned by the minister as a matter of public interest that would require a 100 percent rollout⁶⁵ – would benefit from a large-scale introduction, but a partial introduction would also benefit efficiency. Moreover, although efficient operational management by grid managers is a matter

⁶⁴ Lower House, session year 2007-2008, 31 374, no. 3, p. 2 (emphasis added).

⁶⁵ Lower House, session year 2007-2008, 31 374, no. 3, p. 12 and 15.

of public interest, because it entails public funds, it is not of the order of magnitude of an 'urgent social need' that could justify a significant breach of privacy.

Concerning the primary objective of the smart meter, energy savings, it is also difficult to see why all consumers would need to have the proposed smart meters in their homes. As noted under question two, there is no firm evidence that smart meters spur consumers on to save energy. This will be the case with some and not with others. The effect with one group is diminished by the fact that the smart meter itself consumes more energy than the current 'dumb' meter, meaning that the non-energy-saving group will actually consume more energy. Net energy savings would therefore be better served by the voluntary use of smart meters by consumers: after all, smart meters would then be used by consumers who want to deal with their energy consumption in an environmentally and price-conscious manner. In this connection, reference can also be made to the reserved policy in the United Kingdom, based on a round of consultations:

while its impact assessment work suggests a reasonably positive case for rolling out smart meters to small businesses, *the economic case is more questionable for a domestic rollout*. Given the complexity of the issues and the number of variables involved, the government wishes to discuss these impact assessments further with stakeholders before taking final decisions on the way forward.⁶⁶

One conclusion of John Parsons, Project Manager at the European Smart Metering Alliance, concerning current European experience was: 'Demand response is a key driver'.⁶⁷ Smart meters should be introduced in a demand-driven rather than a supply-driven way.

The conclusion is that there are no convincing arguments given in the bills for making smart meters compulsory. The primary aim of energy savings could be achieved just as well – or perhaps even better – with voluntary use of smart meters.

B. AN INDIVIDUAL METER WITH A DISPLAY

In answering question two, it has already been noted that the minister herself mentioned field data 'that shows that the largest energy savings are realised (5-15%) when feedback takes place via user-friendly displays on which actual consumption, costs and historical use can be seen immediately'.⁶⁸ The alternative of a user-friendly display in meter boxes, and/or on the individual devices that consume the most energy, appears to be more effective than the roundabout route of persuading consumers to economise on energy via the grid manager and a web page.

From a privacy standpoint, this alternative is much less radical: the privacy-sensitive data does not have to be sent to a grid manager or supplier – they could make do with periodic data necessary for billing, based, for example, on bimonthly energy consumption.⁶⁹ There are also far fewer security risks attached: malicious persons could not read the displays from outside the dwelling.

⁶⁶ 'U.K. government stalls on nationwide smart meter rollout', 7 May 2008. <<http://www.metering.com/node/12390>> (emphasis added).

⁶⁷ Parsons 2007.

⁶⁸ Parliamentary questions with response 2007-2008, no. 373.

⁶⁹ This period is mentioned in Lower House, session year 2007-2008, 31 374, no. 3, p. 23.

As such, individual meters with displays do not advance the aims of security of supply, efficient operational management and fraud detection, which require the switching and signalling functions. Incidentally, these could be combined with a display in the home: the metering function, as such, is separate from the switching and signalling functions.

C. ITEMISED BILLS

Another alternative for offering consumers an insight into their energy consumption would be to send itemised bills of actual energy consumption, comparable to the itemised bills that telecommunications companies send to consumers. This requires a meter that records data on energy consumption per unit of time, as is the case with the proposed smart meter that records quarter-hourly and hourly readings, but without then passing these on directly to a grid manager. The data could be read periodically by the supplier and mentioned on the bill. Just as with displays, this would appear to make it possible for consumers to deal with energy in a more conscious way:

The studies that have been undertaken are not always clear regarding what proportion of the likely load reduction would be derived from better billing information (and therefore could be realised with a simple innovative meter that enabled bills to be based on accurate meter reads) and what would require better in-house consumer display of information on usage and cost (and therefore requiring a more expensive sophisticated meter). We have assumed that half of the benefit (i.e. 0.5%) could be expected to result from the improved accuracy of billing that would result from a simple innovative meter alone.⁷⁰

However, with respect to individual meters with displays, the disadvantage of this is that privacy-sensitive data is recorded and sent to third parties – the suppliers. This is, however, somewhat less radical than supplying metering data directly, particularly because it entails fewer security risks.

D. USE OF STATISTICAL AND ANONYMISED DATA

To achieve the aim of energy awareness, it is not necessary to record all energy data from consumers continuously. Once consumers are aware of how much energy they consume, for example, when they use a certain device, with or without price differentiation at different times of day, this could serve to modify their behaviour. When they then see that their modified behaviour reduces the amount of energy consumed, the intended effect will have been achieved, and it will not be necessary repeatedly to inform consumers that their new behaviour continues to require less energy than their former habits. Or, if people (who are sensitive to such information) are repeatedly reminded of the wasteful energy effects of leaving lights on in empty rooms, they will also modify their behaviour; if they have not done so after ten times, the chances are that they will not change their habits, even after 100 times. Energy consumption often concerns patterns, which are easy to map out by means of temporary random observations.

When it comes to applying energy advice, profiles of characteristic energy consumption could also be useful, which are compiled from anonymised statistics. There are also disadvantages to using profiles – for example, stigmatisation – but they would not be significant in an application such as energy advice. After all, people who do not recognise themselves in this profile could ignore this advice.

⁷⁰ Ofgem 2006, p. 24.

4.3.2. *Weighing up of justification*

Based on the aforementioned considerations, we can now weigh up whether the breach of privacy made by the smart-meter bill is justified by necessity in a democratic society. We would like to remind you that this requires an urgent social need that the measure actually meets and that the measure must satisfy the requirements of subsidiarity and proportionality.

This can best be answered for the various aspects of the combined package of the smart meter proposed in the Netherlands that are relevant from a privacy standpoint:

- a. the quarter-hourly and hourly readings that are generated and passed on to grid managers and that, provided consumer permission has been given, must be passed on to suppliers;
- b. the daily readings that are supplied to grid managers and must be passed on to suppliers;
- c. the metering data that must be passed on to third parties, provided consumer permission has been given;
- d. the possibility of switching capacity on and off remotely;
- e. a signalling function for fraud detection;
- f. the compulsory use of smart meters by consumers.

Re a. Generating and passing on the **quarter-hourly/hourly readings** to grid managers, even if they are not passed on to suppliers, affect the privacy of consumers significantly, while there is insufficient evidence that this will actually contribute to energy savings. On the contrary, a much less privacy-intrusive alternative of a display in the consumer household would seem more appropriate. For the aims of quality control and security of supply, integral and continuous transmission of the energy consumption of consumers is also not necessary. Partial coverage, anonymised aggregation of data and a much lower frequency than quarter-hourly or hourly would be sufficient. Moreover, an urgent social need in respect of which current energy meters have considerable shortcomings has not been substantiated. This aspect of a smart meter cannot therefore withstand the privacy test. We could make this conclusion even more emphatically: it is incomprehensible that the legislator is proposing a measure that constitutes a significant breach of the right to inviolability of the home and the right to respect for family life with so little substantiation of convincing arguments that would justify this breach.

Re b. The generation and passing on of **daily readings** to grid managers and suppliers constitute less of, but still to a certain extent, a breach of privacy. In this regard, an insight into lifestyles and personal relationships plays less of a role, although some information about these could also be inferred from the daily readings. Security risks in particular come to the fore here because malicious persons could infer and misuse information about the presence and, especially, the absence of the occupants. This risk could be reduced through proper security, but this places considerable responsibility on the providers of smart meters and grid managers. Plenty of experience has been acquired of inadequate information security, which should compel us to show restraint. A display in the home itself, without the passing on of metering data, should be given preference in this respect too. Furthermore, the same considerations apply here as to quarter-hourly and hourly readings with respect to achieving the intended aims: there is no urgent social need for which it is proportionate to generate and pass on the daily energy consumption of consumers. This aspect therefore cannot pass the privacy test either.

Re c. The supply of **metering data to third parties** with consumer permission is especially important for added-value services, such as energy advice. The fact that consumers must grant permission for this does not make this a breach of privacy as such. However, it implies that such permission should be explicit and informed: consumers must know precisely for what they are granting permission. However, as the metering data in the

current proposal is a consequence of the automatic and direct supply to the grid manager, which does not pass the privacy test under (a) and (b), a different construction will have to be found if this is to be made possible. For this purpose, third parties could enter into separate agreements with consumers, for example to record the data from the meter box temporarily (e.g. via the display device) and give advice on the basis of this.

Re d. The possibility of **switching capacity on and off remotely** does not further the goal of energy savings, but rather that of an efficient, reliable and fair energy market. The switching function could be useful to ensure the security of supply when major failures occur, but there is a lack of substantiation to be able to say whether this occurs often enough to compel all consumers to have meters with switching functions. The switching function contributes to more efficient operational management, but this is not an urgent social need. It also offers an interesting possibility for partial – nuanced – shutting off of power to (potential) defaulters, which would seem better for those concerned than a complete shutdown of power, but here too the data to assess whether this is a proportionate measure is lacking. After all, in addition to the possible efficiency benefits there are security risks associated with the switching function being attacked by malicious persons. This security risk constitutes a certain breach of privacy. All things considered, it cannot be concluded that introducing a meter with a switching function is necessary in a democratic society. Substantiation of this with arguments and data is lacking. Nor, for that matter, can one reach an opposite conclusion. This point requires additional research.

Re e. The signalling function for fraud detection could be a useful functionality that would be better able than the current meters to identify and curtail fraud in a timely, effective fashion. However, there is no substantiation at hand to indicate whether such a function is urgently required for combating fraud; this requires empirical evidence about the prevention of energy fraud in consumer households, along with some substantiation of the argument that the smart meter itself is less susceptible to fraud than the 'dumb' meter. For the signalling function, the same conclusion applies as for the switching function: more research is necessary before it can be determined whether this measure satisfies the requirements of article 8 of the ECHR.

Re f. The Directive on energy efficiency does not require the **compulsory use** of smart meters by consumers. Individual meters must be provided to consumers to help them increase their energy awareness. There is no obligation to pass on detailed metering data directly and automatically or with regard to integral use. The Member States may take further-reaching measures for the protection of the environment, or to foster greater energy savings. As there is no clear evidence that smart meters, as proposed in the Netherlands, would actually contribute to energy savings, this further-reaching measure cannot be based on the Directive. On the contrary, voluntary use by consumers is more likely to benefit energy savings, considering the fact that environmentally and price-conscious consumers will want to have smart meters in their homes while, for other consumers, they will result in slightly more energy consumption. The placing of displays in meter boxes, as an alternative to smart meters involving the convoluted approach of metering data being passed on to a grid manager and then posted on a web page, would seem more likely to contribute to energy efficiency. The compulsory use of smart meters by consumers would therefore seem to have been inspired only by efficiency considerations. That is not an urgent social need that would justify the significant breach of privacy through the use of smart meters. Here too there is a notable lack of convincing arguments and substantiation to support the legislator's proposal of a measure that obliges consumers to accept restrictions of their right to the inviolability of the home and to respect for family life.

5. Summary and Conclusion

The aim of the proposed study was to conduct a privacy test of the introduction of smart meters, as proposed in bills 31 320 and 31374. We started with the research question of whether smart meters meet the requirements of article 8 of the ECHR, which sets out the right to privacy. The research approach for this study consisted of a concise literature review, giving special attention to professional literature and jurisprudence on article 8 of the ECHR, and research reports concerning the introduction of smart meters.

The European Directive on energy efficiency only obliges Member States to implement as a minimum the provisions contained therein in national law. The Directive leaves Member States the option of implementing stricter regulations for the protection of the environment. It prescribes an obligation to provide individual meters to end users, but not an explicit obligation for end users to actually use them. The Dutch implementing legislation is expressly based on such compulsory use. Furthermore, the Directive does not prescribe any specific interval periods. In the Netherlands, it was decided to have detailed interval periods, namely hourly for gas and quarter-hourly for electricity.

Privacy is an umbrella concept that covers different aspects of the right to privacy. These encompass protection of the home, the body, confidential communication, intimate relations and family life, as well as the protection of personal data. This last aspect is protected by the Personal Data Protection Act, which in the Netherlands seems to be at the core of discussions about privacy and smart meters. Partly in response to criticisms from the Dutch Consumers' Association and the Dutch Data Protection Authority, the minister has amended the bill to require the explicit permission of consumers in order to pass on quarter-hourly and hourly readings to suppliers and third parties, emphasising that all conditions of section 2 of the PDPA will apply, including the requirement of a link to a specific purpose, the right of inspection, destruction after use and suitable security measures.

However, this has not resolved all privacy objections. The generation of quarter-hourly/hourly and daily readings from which information can be derived about lifestyles and the presence or absence and numbers of persons, along with the compulsory use of smart meters that generate quarter-hourly and hourly readings and pass them on to grid managers, as well as the imposition of a weighty security obligation on grid managers, are aspects of the bill that constitute a breach of privacy. Moreover, privacy consists of more than data protection: smart meters also put pressure on the right to inviolability of the home and the right to respect for family life.

It is therefore clear that smart meters, as proposed in the current bill, constitute various breaches of privacy as laid down in article 8, paragraph 1, of the ECHR. For this reason, it is necessary to test whether these breaches satisfy the requirements of article 8, paragraph 2, of the ECHR: are they provided for by law, do they serve one of the criteria mentioned and are they necessary in a democratic society? They satisfy the first two points: they are provided for by law, and the smart meter bill serves the criterion mentioned in article 8, paragraph 2, of the ECHR concerning economic well-being. The core of the privacy test concerns the third point: is the measure necessary in a democratic society?

Here we are employing a strict test against article 8 of the ECHR: wherever possible, the government should minimise violations of citizens' rights by considering alternative solutions and then endeavouring to achieve the aims it has in mind 'in the least onerous way as regards human rights'. A measure that constitutes a breach of

privacy would be acceptable if there is an urgent social need that the measure actually meets and it satisfies the requirements of subsidiarity and proportionality.

Based on an analysis and weighing up of the various considerations, we conclude that three aspects of the smart meter cannot pass the privacy test of article 8 of the ECHR: the generation and passing on of **quarter-hourly/hourly readings** to grid managers, and of **daily readings** to grid managers and suppliers, and the **compulsory use** of smart meters are not necessary in a democratic society. On these points, the introduction of the smart meter is an infringement of article 8 of the ECHR.

There is too little substantiation to determine whether it is necessary to build in a **switching function** that would enable capacity to be switched on and off remotely and a **signalling function** for combating fraud. The supply of **metering data to third parties** with (explicit and informed) consumer permission does not constitute a breach of privacy as such, but it should be separate from the obligation to pass on metering data to grid managers.

The main reason for this conclusion is that the bills, particularly the points concerning detailed metering data and compulsory use, provide insufficient substantiation as to why these steps would be necessary in a democratic society. It is not clear whether this would actually foster energy savings; in as far as the smart meter is intended to increase efficiency, this aim could be achieved, but it is not an urgent social need. There are alternatives that entail far fewer breaches of privacy, such as individual meters with displays placed in the home itself (without passing on metering data directly to the grid manager), as well as the use of statistical and anonymised data, which might also effectively serve the intended aims. These alternatives have not been sufficiently researched, meaning that the compulsory introduction of smart meters does not meet the requirements of subsidiarity and proportionality. With the bill, insufficient consideration has been given to the fact that the smart meter is a measure that constitutes a significant breach of the right to inviolability of the home and the right to respect for family life. To justify such a breach, much more substantiation with convincing arguments and empirical data is required. In the absence thereof, the proposal in its current form would therefore have to be rejected.

There could be suitable alternatives available that would constitute far less of a breach of privacy and would also contribute to the intended objectives. Instead of compulsory use, smart meters could be offered to consumers on a voluntary basis. Consumers could also have the option of placing an individual meter with a display in their homes, which would not pass on detailed metering data to grid managers, but would provide a direct insight into actual energy consumption. With respect to installing the switching and signalling functions, additional research could be performed in the meantime to determine whether these need to be introduced on a large scale.

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