"DC FOR AC"… NO HARD-ROCK BAND, BUT A NEW AND UNREGULATED BUSINESS MODEL FOR ELECTRICITY RETAIL MARKETS

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Abstract

Even though the electricity retail markets have been liberalised for several years now, there is still a distinct lack of competition. The recent developments in the field of Smart Metering and a Smart Grid infrastructure, however, offer new opportunities to remedy this shortcoming. Therefore, in the following essay we would like to introduce and discuss a sample business model – which could be realised in the near future – utilising these new technologies: Delivery-by-Call (DC).
The goal of DC is to make it possible to purchase electricity in an automated, digitally driven process for varying time frames from different suppliers. Basically, DC offers an alternative way of distribution for electricity suppliers, i.e. it enables them to sell their product to consumers using DC-services. The consumer benefit herein lies in the possibility to switch between competing suppliers present on the DC-platform within minutes, which enables them to profit from different tariffs of varying suppliers. Thus, DC could prove to be a catalyst for the Smart Grid development by providing a monetary incentive for households to insist on the installation of a Smart Meter.

Keywords: competition; electricity retail markets; Smart Metering; Smart Grid; universal service supply

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1. INTRODUCTION

The ineffective competition on the retail markets for electricity is to a notable extent caused by consumers' hesitation to change their supplier. Hence, the annual switching rates are rather low, e.g. in Germany it does not even exceed five percent.[1] This is largely due to a lack of convenience regarding the switching process and a substantial (real-time) information deficit among consumers. As the German National Regulatory Authority (Bundesnetzagentur, BNetzA) stated in its annual report: "[A]round half the household customers [in Germany] have not yet made any use of competition on the electricity market, either for changes of their contract or supplier. Of the household customers who had cancelled their universal supply contract, the majority decided in favour of another contract from their universal supplier. For this reason the regional dominance of the universal suppliers for supplying household customers continues, with a share of nearly 90 percent."[2] Furthermore, in Germany the price reductions for household electricity supply expected to be caused by liberalisation have not taken place so far. Instead, prices increased by 23 percent during the period of 2006 to 2009.[3] While electricity prices vary significantly across EU-27, as does the share of taxes included, average household electricity prices increased from 0.1329 Euro per kWh for EU-25 in the second half of 2002 to 0.1638 Euro per kWh for EU-27 in the second half of 2009,[4] thus showing a rise quite similar to the one observable in Germany (albeit over a longer period of time).

The basic idea for "Delivery-by-Call" is based on the positive experiences in the German telecommunications markets with a technology and marketing tool known as "Call-by-Call" (dial-around service). Call-by-Call originally was designed to acquaint consumers with competition on the liberalised telecommunications markets. The Call-by-Call service allows the calling party of a telephone call to switch the provider establishing the connection prior to each individual call. This enables customers to make effective use of differences in tariffs between competing telecommunications providers. So-called Open Call-by-Call does not require a previous contract between the caller and the telecommunications provider, and thus customers can override any preselected choice of provider for long-distance, international or even local telephone calls on a call-by-call basis by dialling a short prefix. On the basis of individual calls, consumers in Germany have been experiencing the benefits of competition in the form

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1 *Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway* (2009; 8). Retrieved July 28, 2010, from www.bundesnetzagentur.de/cae/servlet/contentblob/147954/publicationFile/275/MonitoringReport2009Id17592pdf.pdf.

2 *Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway*, 2009 Annual Report, p. 156. Retrieved July 28, 2010, from www.bundesnetzagentur.de/cae/servlet/contentblob/158096/publicationFile/7883/AnnualReport2009pdf.pdf.

3 *Federal Network Agency*, 2009 Monitoring Report, *op. cit.* p. 7 et seq.

4 Data derived from the *Eurostat* Database, *Energy Statistics – prices*. Retrieved July 28, 2010 from http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/database.

of lower prices since 1998, eventually significantly reducing initial hesitation to completely switch their telecommunications provider. The technical coordination and the billing and collection of the due bills for the different providers chosen by a consumer are carried out by a single undertaking, acting as “Call-by-Call”-service provider.[5]

The “Delivery-by-Call”-model could be received in a similar way, potentially increasing consumers’ switching rates in the electricity markets. The model strives to transfer the underlying principles of “Call-by-Call”-services to the electricity retail markets, i.e. the DC-service shall enable its customers to switch between electricity suppliers or tariffs within minutes. Furthermore, particularly supply offers specifically designed for distribution via DC-services could prove to be highly competitive compared to conventional offers. The flexibility inherent to the DC-system would allow consumers to make similar savings in their expenses for electricity as they already enjoy in their telecommunications expenses. However, it is hard to imagine that electricity suppliers would introduce “flat rate”[6] tariffs (i.e. unlimited supply for a fixed monthly rate) since generation of electricity – in contrast to telecommunications services provision – incurs high variable costs due to the consumption of (fossil) energy sources in the generation process. The individual monetary incentive would in turn result in a strengthening of competition on the electricity retail markets, provided enough consumers make use of this new opportunity according to the inherent network effect.[7] Thus the individual DC-customer would – at least unconsciously – act as an “agent of competition”.

2. DRAFT OF THE “DELIVERY-BY-CALL”-SYSTEM

The DC-provider offers a paid system service which renders the purchase of electricity from competing electricity suppliers by virtue of smart electronic communications services and equipment technically possible and also handles the necessary contractual framework for switching.

[5] The option for customers to switch to the services of an interconnected provider has been part of the regulation imposed on incumbent operators of fixed telecommunications networks with significant market power as prescribed by Article 12 paragraph 7 subsection 1 of Directive 97/33/EC as amended by Directive 98/61/EC. The Call-by-Call service was specifically designed to accustom consumers to switching their telecommunications service provider.

[6] The Call-by-Call scheme in Germany eventually led to the introduction of so-called flat-rate offers which allow consumers to make an unlimited number of calls using either landline and/or mobile connections without any variable charges for the customers.

[7] Cf. 3.2.

2.1. THE DC-OPERATOR

The technical side of this service encompasses a server infrastructure running software, which is activated by dialling special phone numbers (or by means of data communication). Such phone numbers need to be allocated by the National Regulatory Authority and be assigned to specific tariffs and contract schemes[8] of participating electricity suppliers. For example, the number XXX-09–07–01 could mean that supplier 09 shall deliver electricity for the prices stated in its tariff 07 for one day. Obviously, the information about the various supply offers has to be made conveniently accessible for consumers, for example in tables in daily-published newspapers or on a specialised website. Dialling such a phone number as a registered customer sets off a software process on the DC-server executing the supplier switch. First, the software initiates a telecommunication process aimed at conducting an electricity meter reading at the calling DC-customer's household. To enable this process, the meter must be a "Smart Meter" (at least) capable of remote meter reading. This makes it possible for the DC-operator to obtain the actual meter count by means of a telecommunications process[9], thus superseding the need to conduct a conventional manual meter reading. The data obtained by the remote reading at the time of the switch must be saved in order to be used for later billing and collection. Subsequently, the calling customer's electricity supplier or tariff is changed in the database as indicated by the dialled number. Furthermore, the software automatically informs the old and new suppliers of the switch-over so they can adjust their market behaviour (e.g. purchase of electricity on the wholesale markets) accordingly. In order not to undermine the goal of the EU-unbundling rules[10], the amount of information given needs to be limited to the necessary data (i.e. the old supplier only learns that it lost customer X, the respective meter count and information on the time of the switch). Regarding the frequency of the switches, we would expect a rate of about once every month for household customers and a significantly higher rate for small and medium enterprises, probably multiple times per day.[11]

2.2. THE CONTRACTUAL FRAMEWORK OF DC-SERVICES

To make the DC-services work, the DC-services provider needs to engage in contracts with electricity suppliers as well as consumers. The resulting contractual framework

8 E.g. differing energy mixes.

9 Smart Meters can e.g. be connected to the DC-server through Machine-to-Machine communication (M2M) via mobile GSM-networks.

10 Cf. the provisions on informational unbundling in Articles 12 and 16 of Directive 2003/54/EC.

11 This of course changes dramatically if the initiation of a supplier switch is not dependent on a manual activity (phone call or website) but automated, i.e. if a "Least Cost Router" (cf. 4.) is employed.

would necessarily include the following elements: framework contracts between the DC-services provider and the individual customers and suppliers stipulating the terms of use for the DC-system platform; the electricity supply contracts between the DC-customers and the DC-electricity suppliers are initiated by the aforementioned phone calls and legally concluded by the DC-services provider acting as an authorised contracting agent for both parties. Therefore, the DC-services provider basically engages in a self-deal, which would need to be approved in the framework contracts.

The framework contracts between the DC-services provider and the electricity suppliers should also include a clause legitimating the former to collect on outstanding bills related to the electricity supply contracts. Thus, the DC-customer only receives one monthly bill for his or her electricity supply from the DC-services provider. The bill should be transparent regarding the varying tariffs and electricity suppliers. Furthermore, for marketing reasons, the bill should indicate the relative savings generated by use of the DC-platform in relation to the universal service supply tariff applicable to the individual customer.

For reasons of consumer protection, electricity supply contracts usually make use of the written form. This serves mainly two purposes: first, to ensure clarity regarding the conditions of the supply, especially the prices. And secondly, to enable both parties to prove said conditions in a legal dispute. Since using the written form for the multitude of possible supply contracts is impracticable, the consumer protection purposes mentioned have to be safeguarded by other means within the DC-system. To begin with, the framework contracts can retain the written form. Moreover, the terms of an individual supply contract could be sent to the consumer via the mobile short messaging service (sms) or as an electronic mail in an abbreviated or complete version respectively. Furthermore, each supply contract's terms should be stored in a database accessible to consumers for an appropriate time. Also, the supplier switch initiated by a phone call could require a confirmation of the chosen supply offer by the consumer after an automated repetition of the terms of the offer. This confirmation could e.g. be the pressing of a key on a touch-tone capable telephone[12] (or a "confirm" button in the software running on the DC-customer's computer).

At this stage we would like to differentiate between two possible ways of realising the DC-system:

On the one hand, the DC-service provider could offer the selection of a "standard supplier"[13], i.e. one electricity supplier is assigned to a certain DC-customer unless said customer changes his or her supplier for a given time frame or predetermined amount of electricity. Upon expiration of such a time- or volume-limited switch, the consumer's supplier in the database would automatically switch back to the "standard supplier". This would need to be taken into account in the billing process, i.e. the

12 E.g. "Press '1' to confirm or '9' to abort".

13 The term "standard supplier" is introduced in this paper and must not be confused with the electricity supplier carrying out a universal service supply obligation (cf. 2.4.).

DC-operator would need to calculate the amount of electricity delivered by the "standard supplier" by subtracting the amounts delivered within time- or volume-based switches from the total amount of electricity delivered within the billing period. The benefit of the DC-model including a "standard supplier" would be that said supplier gains a limited degree of prior certainty regarding the amount of electricity sold in a given month. The consumer benefit would be that – while preserving the flexibility inherent to the DC-system – there would be less need to actively follow the tariff development on a constant basis, since the DC-customer could choose a "standard supplier" offering relatively low prices across the board (although the average prices would of course be higher than those offered by short-term suppliers).

On the other hand, the supply contracts concluded via the DC-platform could stipulate an unlimited supply. Thus, they would only end if and when a DC-customer dials a new DC-phone number to initiate another supplier or tariff switch. This contract design makes the selection of a "standard supplier" expendable.

2.3. DC-RELATED ECONOMIES AND SYNERGY EFFECTS

Implementing the DC-model offers a wide range of economic advantages. Since one of the services performed by the DC-provider for the electricity suppliers is billing DC-customers and collecting the debt incurred, the DC-service provider has to have the relevant consumer data at its disposal. This enables companies already in possession of this data to offer DC-services with less upfront investment and also to possibly utilise their existing customer relations to sell DC-services (depending on the terms of use and data protection requirements for said data). Especially telecommunications service providers already have these means, in particular tried and tested tools of micro-billing, which renders it possible to realise economies of scope by broadening their product range to include DC-services. This also possibly yields economies of scale in their telecommunications departments since the additional customer contacts acquired as DC-service provider might be used to market traditional services. Furthermore, as telecommunications providers are skilled in the handling of micropayments – due to the invoice practice of listing single calls – there is no need for them to develop this component of the DC-service from scratch. These possible synergy effects are among the key economic elements of the DC-business model.

By relying on the DC-service provider, the electricity suppliers can in turn reduce their costs incurred by collecting on electricity bills. Moreover, electricity suppliers entering the retail markets after the establishment of DC could do without setting up departments for billing and collection in the first place. Thus, an electricity supplier specialised in the DC-retail model (e.g. as an electricity reseller) could offer highly competitive prices to consumers and thereby gain a fairly large market share.

Although one might suspect that the flexibility introduced by the DC-system could increase volatility in the electricity grids, thus creating higher costs for transmission and distribution than the current system, the opposite is more likely by virtue of the intelligent electronic communications system (Smart Grid[14]) inherent to DC. The network operators' calculations regarding the charges for transmission and distribution usually include the costs for imbalance energy and control energy required to maintain the physically necessary balance of feed-in and consumption. Imbalances in the electricity grids can be caused either by a surplus in electricity generation or demand usually rooted in a lack of smart market coordination. The DC-system enables the connected suppliers to offer monetary incentives to consumers to adjust their consumption to the current market situation. In times of generation peaks, consumers can be stimulated to increase demand by offering lower prices.[15] Vice versa, by setting higher prices in peak load situations, demand by DC-customers might be reduced. The swift supplier or tariff changes offered by the DC-system thus might help to reduce imbalance in the electricity grids and in turn the network operators' costs for imbalance energy and control energy. This gives the network operators the opportunity to pass part of these savings on to the electricity suppliers, enabling them to increase the competitiveness of their tariffs, especially compared to electricity suppliers not connected to the DC-system. Therefore, the DC-connected electricity suppliers and the DC-provider become the main drivers of the Smart Grid development.

2.4. UNIVERSAL SERVICE SUPPLY AND SUPPLIER OF LAST RESORT IN THE DC-SYSTEM

According to Article 3 para. 3 of Directive 2009/72/EC *"Member States shall ensure that all household customers, and, where Member States deem it appropriate, small enterprises (namely enterprises with fewer than 50 occupied persons and an annual turnover or balance sheet not exceeding EUR 10 million), enjoy universal service, that is the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable, transparent and non-discriminatory prices. To ensure the provision of universal service, Member States may appoint a supplier of last resort."*

In Germany, the universal service obligation has been implemented in Sec. 36 of the German Energy Industry Act (EnWG), which states that the electricity supplier serving the most household customers in a grid area at a specific time has to offer a

[14] Smart Grid: "An electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers, and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.", cf. *ESMIG*, Smart Metering for Europe, p. 4. Retrieved July 28, 2010 from www.esmig.eu/newsstor/news-file-store/ESMIG%20PP%2009–01%20Smart%20Metering%20for%20Europe-FINAL.pdf.

[15] In certain times of peak generation, wholesale prices for electricity on the spot markets even become negative. In these cases the potential for offering low prices to consumers is particularly high.

standardised supply contract while being obliged to contract at these terms. This obligation is imposed for a period of three years. Furthermore, electricity taken from the grid without a contractual basis (supply of last resort) is by law said to be delivered by the universal service supplier (Sec. 38 EnWG).

When DC is implemented, three possible ways of incorporating a universal service obligation in the system come to mind:

In the first scenario, the universal service supplier itself makes use of the DC-service. This should be considered the best-case scenario for the current legal situation in most Member States. This is due to the fact that no matter how a universal service obligation is imposed by Member State law, it can be fulfilled by selling electricity via the DC-platform. E.g. in Germany, the universal service supplier identified by Sec. 36 para. 2 EnWG could fulfil part of its obligation by contracting with household customers over the DC-platform at its standard terms represented by one of the phone numbers associated with said supplier.

The second scenario is characterised by the universal service supplier not participating in the DC-system. In this case, supply contracts between household customers and the universal service supplier should be amended by a clause empowering household customers wishing to utilise the new opportunities offered by DC to obtain electricity from suppliers via the DC-platform as well.[16] Thus, these households would satisfy their electricity demand from different sources, most of which would be represented on the DC-platform, except for the universal service supplier. To enable the universal service supplier to raise an accurate invoice, the DC-service provider would have to inform the universal service supplier of the total amount of electricity that each of the universal service supplier's customers obtained over the DC-platform. The remaining difference to the total amount of electricity consumed must have been delivered by the universal service supplier independent of the DC-system.

Finally, the universal service obligation could *de lege ferenda* be imposed on the DC-provider itself. This would mean that the national rules regarding universal service obligations implementing Directive 2009/72/EC would have to be amended accordingly. The DC-provider, acting as universal service supplier, could then purchase electricity (e.g. traded on the DC-platform) and resell it on its own behalf to household customers as "universal service reseller". The advantage of this scenario for the DC-reseller would be to have a comprehensive overview of current electricity prices, due to the insight gained by operating the DC-platform, as well as its ability to get significant quantity discounts on the purchase of electricity, enabling the DC-reseller to offer highly competitive supply tariffs. This might foster a development in which a large proportion of consumers could – due to these price advantages – obtain their electricity directly from the DC-reseller. This might one day lead to a

16 Depending on the national laws governing universal service supply, further amendments could be necessary.

dominant position of the DC-reseller on the electricity wholesale and/or retail markets. If such a scenario were to occur, however, the potential negative effects of an electricity reseller with such a dominant position would have to be weighed against the potential consumer benefits. Under the terms of the "more economic approach" of EU competition law (here Article 102 TFEU) the outcome of the balancing of detriments and benefits could indicate whether the DC-reseller's behaviour should be deemed abusive. Similarly, an obligation to offer supply of last resort could be imposed on the DC-provider acting as an electricity reseller.

Therefore, the question of universal service supply and supply of last resort should constitute no obstacle to the DC-model. At most, minimal changes to the current legal frameworks of Member States or the existing contracts between consumers and their universal service suppliers would be required.

2.5. SUMMARY

All in all, the realisation of the DC-business model is legally already possible; especially the provisions on universal service supply prove to be no hindrance. By improving the convenience of an electricity supplier switch, DC stimulates the consumers to utilise their existing right to do so. Depending on the choice described,[17] the DC-service enables consumers to either conclude temporary supply contracts with third parties while retaining one electricity supplier as a "standard supplier" or to enter into unlimited supply contracts which would be cancelled upon choosing a new supplier. No matter which model is favoured, the heightened consumer flexibility increases competition between electricity suppliers, potentially leading to more "consumer-friendly", i.e. lower, prices.

Since the potential synergies offered by the DC-model can be evoked first and foremost by concentrating the billing and collection processes of several electricity suppliers in the hands of the DC-service provider, and telecommunications companies already have well-refined systems in these fields, telecommunications companies are predestined to expand their business models to include DC-services. They would then effectively create a new market level upstream of the electricity retail markets.

In a nutshell, the DC-service provider would act in four different capacities:

- it would be the contractual partner of both electricity consumers and suppliers concerning the DC-framework contracts,
- it would conclude the electricity supply contracts between supplier and consumer as an authorised contracting agent of both parties,
- it would carry out the remote meter reading necessary for billing and supplier switches (or retrieve the relevant data from a third party conducting the meter reading),
- and it would bill and collect on behalf of the electricity suppliers.

[17] Cf. 2.2.

3. THE INTEGRATION OF INTELLIGENT ELECTRICITY METERS ("SMART METERS") INTO THE DC-SYSTEM

Key prerequisite for the realisation of the DC-system is the rollout of intelligent electricity meters (so-called Smart Meters), which have to – at least – be capable of remote meter readouts conducted by the DC-operator or a third party in real time.

3.1. THE LEGAL FRAMEWORK FOR SMART METERING

The relevant provisions for the dissemination of Smart Meters are contained in Directive 2006/32/EC. Article 13 para. 1 of this Directive prescribes that *"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. 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 [...] such competitively priced individual meters shall always be provided."*

With regard to the billing for energy consumption, Article 13 para. 2 of Directive 2006/32/EC stipulates that *"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."*

In Germany, these provisions have been implemented in Sec. 21b paras. 3a and 3b EnWG. In addition, Sec. 21b paras. 2 and 3 EnWG already liberalised the metering markets.

According to Sec. 21b para. 2 EnWG the actual user of an electricity connection (e.g. the tenant, not the owner) is entitled to entrust a third party with the meter operation and the metering service provision. The legislative aim is to create competition on the metering markets. Therefore, the DC-operator could – according to these provisions – *de lege lata* assume the roles of meter operator and metering service provider, i.e. take charge of the maintenance and readings. Furthermore, Sec. 21b paras. 3a and 3b EnWG stipulate an obligation to install intelligent meters, particularly in newly constructed buildings or on explicit demand of the consumer mentioned in Sec. 21b para. 2 EnWG. The legal obligation to install advanced meters applies only under the condition that the installation is technically feasible and economically viable. The only provision concerning the metering devices which are to be installed stipulates that they must at least reflect the actual electricity consumption and the actual time of consumption. Since the national legislator has not yet incorporated the requirements for a functioning DC-system in the law, there is no rule regarding the Smart Meters' ability for remote meter reading. However, the law as written does in no way prevent the installation of more advanced Smart Meters. Furthermore, if DC proves to be as beneficial as depicted in the introduction, the national legislators might want to pass laws commanding the installation of DC-capable Smart Meters.

Consequently, it should be pointed out that *de lege lata* neither the legal framework for universal service supply nor the rules on meters and metering services are an obstacle for the realisation of the DC-model. However, more effective incentives for the implementation of the DC-model could be set *de lege ferenda*. For example in Germany, meter operators could be obliged to equip all customers with DC-compatible Smart Meters by amending the relevant Regulation on Metering Access (MessZV).

3.2. REFINANCING AND NETWORK EFFECTS

The construction of the DC-platform and the corresponding Smart Meter infrastructure (approximately 150 Euro[18] per Smart Meter, installation included) is the most significant cost factor of the establishment of the DC-system. Even if the national legislators do not accelerate the DC-development by passing rules regarding DC-capable Smart Meter installation, the DC-business model has the potential to prevail in a competitive environment. The necessary comprehensive rollout of Smart Meters could be achieved by subsidising the Smart Meter installation for consumers with the anticipated system charges earned from the electricity suppliers once the system has been set up. This means that the investment for a Smart Meter infrastructure could be made by the DC-provider itself. This investment would then be refinanced (cross-subsidised) with the DC-system charges paid by the electricity suppliers.

On the other hand, third parties independent from the DC-provider could foster the dispersal of DC-capable Smart Meters, thus aiding the establishment of the required Smart Meter infrastructure. In return, said third parties could charge the DC-provider for drawing on these capacities. Whether the Smart Meter infrastructure is erected by the DC-provider or third parties will be determined by the business models involved. Moreover, the DC-system charge collected from the electricity suppliers using the DC-platform should in part consist of the costs incurred by

18 *Franz et al.*, Potenziale der Informations- und Kommunikations-Technologien zur Optimierung der Energieversorgung und des Energieverbrauchs (eEnergy), 2006, p. 114. Retrieved July 28, 2010 from www.bmwi.de/BMWi/Redaktion/PDF/Publikationen/Studien/e-energy-studie,property=pdf, bereich=bmwi,sprache=de,rwb=true.pdf.

maintaining and extending the Smart Meter infrastructure. Since these charges would not be subject to regulation by the respective National Regulatory Authorities – other than e.g. the termination fees in the mobile telecommunications markets – the pioneers of the DC-development would have leeway to yield significant profits. Part of those profits could be employed to cross-subsidise the Smart Meter infrastructure build-up. Even in the regulated mobile telecommunications sector, such downstream cross-subsidisation is generally used to equip consumers with mobile telephones, in spite of the regulatory-induced lower margins.

Furthermore, the more electricity suppliers and consumers make use of the DC-platform, the more profitable the investments become. This is due to the network effect created by the interdependent attractiveness of the DC-system for consumers as well as electricity suppliers; the DC-service becomes more beneficial for a consumer the more electricity suppliers are present on the DC-platform since the increased competition generated by a higher number of offers naturally leads to lower prices. In turn, every consumer connected to the DC-system is an incentive for an electricity supplier to employ the new distribution tool DC. The potential network effects created are similar to the ones observed on the mobile telecommunications markets. Since the development of network effects on these markets was strengthened by the cross-subsidisation of terminal equipment, which led to a comprehensive market penetration, the DC-provider would have an incentive to cross-subsidise Smart Meters (the DC-terminal equipment) in order to animate consumers to use the DC-platform, activating said network effects.

Due to these network effects, the DC-model as a way of distribution is likely to prevail in competition. Admittedly, every electricity supplier interested in DC will balance the potential disadvantages posed by the high exposure to competition represented on the DC-platform against positive effects of participation, namely economies of scale gained by access to a large number of consumers without upfront investment in its own distribution capacities. But electricity suppliers should not forget what many a company had to learn the hard way: “You snooze, you lose!”

3.3. ESTABLISHING THE DC-INFRASTRUCTURE – A BUSINESS CASE

In view of the significant necessary investments in a Smart Meter infrastructure, however, it cannot be ruled out that a refinancing scheme solely based on the DC-system charges as described above might not be sufficient. Since the attractiveness of the DC-system for the suppliers largely depends on the number of consumers connected, electricity suppliers might abstain from participating at first. In turn, the resulting low number of suppliers present makes it unlikely that consumers perceive DC as a viable alternative to conventional electricity supply contracts. The following business case could serve to reach a critical mass of consumers connected, thus increasing the likelihood of successful refinancing.

Instead of offering a system service for electricity suppliers and consumers, the future DC-provider could enter the electricity retail markets as a reseller of electricity, i.e. as a competing electricity supplier. This DC-reseller would conclude fixed-term supply contracts with consumers including the installation of a Smart Meter. The duration of the contracts has to be sufficient to refinance the Smart Meter installation. The offer of tariff flexibility within these supply contracts incorporating the Smart Meter infrastructure could be the DC-reseller's unique selling proposition. The establishment of a DC-platform enabling consumers to change their tariffs in a manner similar to the supplier switches described above would make it possible for consumers to adjust their electricity supply according to personal preference within short time intervals. For example, consumers might choose to obtain electricity from renewable energy sources only or might prefer an energy mix or choose to be supplied at the lowest price available. Furthermore, the installation of Smart Meters allows consumers connected to the DC-tariff platform to benefit from load-variable tariffs. By adjusting their consumption to the current market situation, i.e. by shifting their demand from peak load to off-peak times, consumers could reduce their household's expenses for electricity. As customers of the DC-reseller, consumers would not only enjoy increased control of their electricity consumption and expenses, but also more transparency with regard to both, the tariff in effect at the time of consumption as well as subsequent billing. Furthermore, realising the DC-resale business model as an established telecommunications provider potentially offers similar economies of scale and scope as well as synergy effects as described above.[19]

According to this scenario, the DC-reseller would increase competition on the electricity retail markets as a new supplier. In addition, the DC-reseller's supply offers would promote a certain "intra-brand" competition on the DC-platform between the varying sources of electricity as represented by the tariffs.

In a DC-business model with the DC-provider acting as electricity reseller, the DC-reseller would have a particular interest in fostering the development of a Smart Grid infrastructure. Smart Grids can be defined as "an electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers, and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies."[20] Smart Metering plays a key role in the development of Smart Grids. The drawing-up of detailed consumption profiles facilitated by Smart Meters creates the transparency necessary for a targeted load control for the purpose of an indirect, incentive-based load management, e.g. by transmission of price signals.[21] Furthermore, decentralised production, the greater use of renewable energy sources, particularly wind, and the growing trade in electricity create complex

[19] Cf. 2.3.

[20] Cf. *ESMIG*, *op. cit.*, p. 4.

[21] *Przybylski and Focke*, "Ist Smart Metering auf Erfolgskurs?", Energiewirtschaftliche Tagesfragen (et) 2009, 54, 56.

conditions[22], which make an efficient use of information and communications technologies essential.[23] Moreover, in the traditional form of electricity generation, power plants are predominantly connected to the transmission grid, but the increasing number of small generators with decentralised production units connected to the distribution grids requests a new operational approach. For instance, dispersed generators are combined to virtual power plants in order to make production more controllable (i.e. by combining different types of power plants), or distributed generators and the demand side are integrated into micro grids. Both solutions, however, implicate increased needs for information in order to be effective, and thus depend on a modernised technology infrastructure and new market models. By establishing means of direct communication with electricity generators, especially with those relying on volatile renewable energies, the DC-reseller would be able to adjust its electricity supply tariffs for consumers to the fluctuating generation capacity available. As the development of a Smart Grid infrastructure is left to the market, with the current regulatory framework providing no significant incentives for transmission or distribution network operators to make investments, a business model relying on an effective Smart Grid infrastructure with capacities for cross-subsidisation, such as DC, could prove to be invaluable. The DC-business model could be a catalyst in the development of Smart Grids, increasing the overall capability to integrate the growing amount of de-centrally generated (renewable) electricity.

The DC-system would include as a main component the electronic communication between different actors of the electricity supply chain, namely between consumers and generators of electricity via Smart Meters and the DC-platform. The introduction of the DC-system could thus serve as an important first step towards the development of a "Smart Market" design encompassing all players involved (especially generators, consumers, suppliers and traders of electricity as well as providers of associated services) and providing electronic communications channels between them.

3.4. DC AND THE POSITION OF THE FEDERAL NETWORK AGENCY ON "SMART METERING"

Furthermore, the DC-model could serve to generate an interest in Smart Meter installation among consumers which – at least in Germany – is currently too low to safeguard a sufficient Smart Meter distribution. The BNetzA states in its report on Smart Metering of March 10, 2010 in this regard: *"Consumers have not yet grasped the possibilities offered by Smart Metering. They neither know what Smart Meters are about, nor do they see that these devices are a basic component of modern households.*

[22] *Bauknecht et al.*, "Optimierungsstrategien für Netzbetreiber", Energiewirtschaftliche Tagesfragen (et) 2009, 56 et seq.

[23] Cf. *Joeris*, "E-Energy – smarte Veränderung der Energiebranche", Energiewirtschaftliche Tagesfragen (et) 2009, 22 et seq.

This circumstance is sure to pose a problem on any road chosen for the Smart Grid development that depends mainly on the consumers' goodwill. But the current concept [in Germany] utilizing laws to offer the consumers the possibility to modernise their electricity meters by Smart Meter installation without obliging them to do so fails to clear this hurdle. The companies offering Smart Meter installation and services have no convincing arguments towards the consumers since a Smart Meter installation has no inherent economic benefit. Thus these companies wait for a future development, especially the comprehensive availability of load-variable tariffs, which are currently absent. For these tariffs have the ability to provide the economic incentive needed for Smart Meter installation, as the use of a load-variable tariff depends on the Smart Meter's coordination. Hence, the actors currently not actively supporting a Smart Meter rollout could be coaxed into action by a development in the tariff structures."[24]

As there are different suppliers for Smart Meters on the market, regulatory provisions should be issued on an administrative level by the National Regulatory Authority in order to ensure compatibility of the Smart Meters with the DC-system (data formats, communication channels etc.). In Germany, the BNetzA could set out rules to this end by making use of its competence according to Sec. 13 No. 5 in conjunction with Sec. 21 paras. 2 and 1 of the MessZV.[25] Thus, the BNetzA could make a substantial contribution to the realisation of the DC-model.

But it is in no way necessary for the National Regulatory Authorities to take action since it is easily conceivable that a de-facto industry standard will be achieved by way of a large-scale comprehensive rollout[26] of Smart Meters within the DC-model. This industry standard would make any standardisation rules enacted by a government agency superfluous. The benefits of the DC-platform for electricity suppliers and consumers would be incentive enough for these groups to insist on DC-capable Smart Meter distribution, thus encouraging Smart Meter manufacturers and distributors to meet this demand. Therefore, the specific technical requirements of DC with regard to metering and metering data transmission would prevail in a competitive market for electricity meters.

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24 Non-verbatim translation by the authors of the *Federal Network Agency's report:* "Wettbewerbliche Entwicklungen und Handlungsoptionen im Bereich Zähl- und Messwesen und bei variablen Tarifen", 2010, p. 6. Retrieved July 28, 2010 from www.bundesnetzagentur.de/cae/servlet/content blob/151968/publicationFile/6321/BerichtZaehlMesswesenpdf.pdf.

25 Cf. Sec. 12 para. 1 sentence 2 MessZV: "Soweit Mess- oder Stammdaten betroffen sind, muss das Format die *vollautomatische Weiterverarbeitung* im Rahmen der Prozesse für den Datenaustausch zwischen den Beteiligten ermöglichen, insbesondere auch für den *Wechsel des [Strom-] Lieferanten*" (emphasis ours).

26 Cf. 3.2.

4. OPPORTUNITIES AND PERSPECTIVE

The realisation of the DC-model offers significant economic advantages for all parties involved.

First of all, DC would create substantial new opportunities for electricity suppliers to sell their product, enabling them to take advantage of the resulting economies of scale. Admittedly, a higher exposure to competition induced by the DC-platform may first and foremost be perceived as a disadvantage by electricity suppliers. However, especially small and medium-sized suppliers, such as municipal utilities having had little success in acquiring customers outside of their traditional local clientele so far, could benefit from this opportunity. By making use of the DC-system, they would become capable of addressing a multitude of consumers without the necessity to expensively expand their own distribution capacities (in particular those for billing and collection of outstanding debts). An early participation in the DC-distribution system or even in a pilot scheme could first and foremost prove lucrative for smaller electricity suppliers. They could establish a brand known among consumers with supply offers especially tailored to the DC-system and thus become successful players on the nationwide market created by the DC-system. Furthermore, electricity suppliers could sell temporary overcapacities – e.g. those generated by renewable energy sources such as wind and solar power plants – more easily by placing offers on the DC-platform accordingly (instead of incurring costs for overloading the electricity networks by the feed-in of electricity without corresponding demand).

The consumers would profit from the reduction of electricity prices due to the higher degree of competition, and, above all else, the suppliers' savings rendered possible by the expected cost advantages in the area of distribution passed on to the consumers. Moreover, it is likely that other opportunities arising from the comprehensive rollout of Smart Meters induced by the DC system will be beneficial for consumers. For example, the consumers' Smart Meter could assume the function of a so-called "Least Cost Router" known from the "Call-by-Call" telecommunications business, i.e. automatically identify the cheapest electricity supplier available under real-time terms and initiate the necessary switching processes to always utilise the most cost-effective offer. In addition, an alternate way of operating one's DC-account in the form of an appropriate website hosting a user interface allowing the DC-customer to change his or her electricity supplier seems to be a good way to attract a broader group of consumers. Especially the younger generation might be more easily convinced by a web-based solution.

The DC-provider's incentive is the return on investment "guaranteed" by the unregulated system charges paid by the electricity suppliers. Furthermore, if DC proves to be successful, the DC-provider could gain a dominant position on a market upstream of the electricity retail markets, enabling it to yield long-term profits similar to those generated by the electricity network operators. Moreover, offering DC-services could grant access to a broader base of consumers which could be utilised to market additional services associated with the DC-provider's core business, as long as the consumers consent to such a use of their data.

For the economy as a whole, the DC-system could be beneficial insofar as it might accelerate the necessary Smart Grid development. Since the realisation of DC-services requires a comprehensive rollout of metering devices which can be read out remotely, it is only a small step to take this chance to install "smarter" meters at only little additional costs. These meters could, for example, be capable of additional functions such as automatic load course measurement and adjusted control of consumption of household appliances.[27] This would lead to a more efficient use of the electricity fed into the system, especially of electricity which is produced from relatively unstable energy sources, like wind and solar power. The household electricity consumption could automatically be adjusted to their "unpredictable" production using these improved Smart Meters.

All in all, the supplier and tariff switches facilitated by the DC-system would allow market participants to place specific production peaks on the market within a narrow timeframe, allowing their consumers to benefit from off-peak tariffs. Furthermore, by establishing the DC-system, the efficiency gains expected from a Smart Grid infrastructure can be implemented faster. Some of these advantages would be the smoothening of the demand curve resulting in an optimised utilisation of the electricity grid as well as the generation capacities available. The Smart Grid development also fosters the changeover to renewable energy sources. But since these positive effects can only be achieved if there are economic incentives for consumers, DC, by enabling savings through access to complex, variable tariff structures, could be an invaluable investment.

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[27] Cf. *Franz et al.*, *op. cit.* p. 129 et seq.

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