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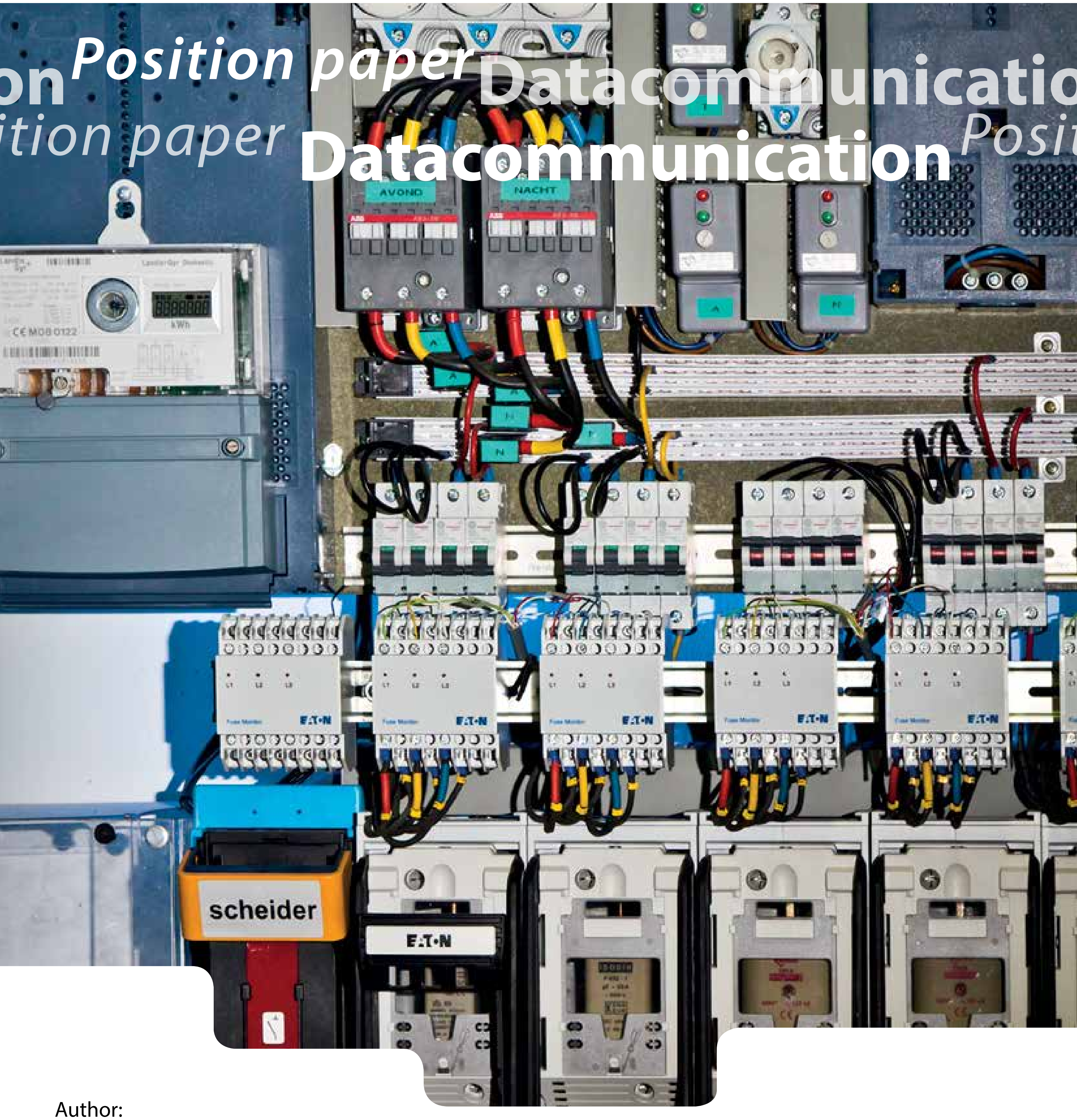
Position paper Datacommunication



Author:
Telecom Project Group,
Netbeheer Nederland (Cogas, Rendo, Westland Infra,
Endinet, Stedin, DNWB, Enexis, Alliander, TenneT)

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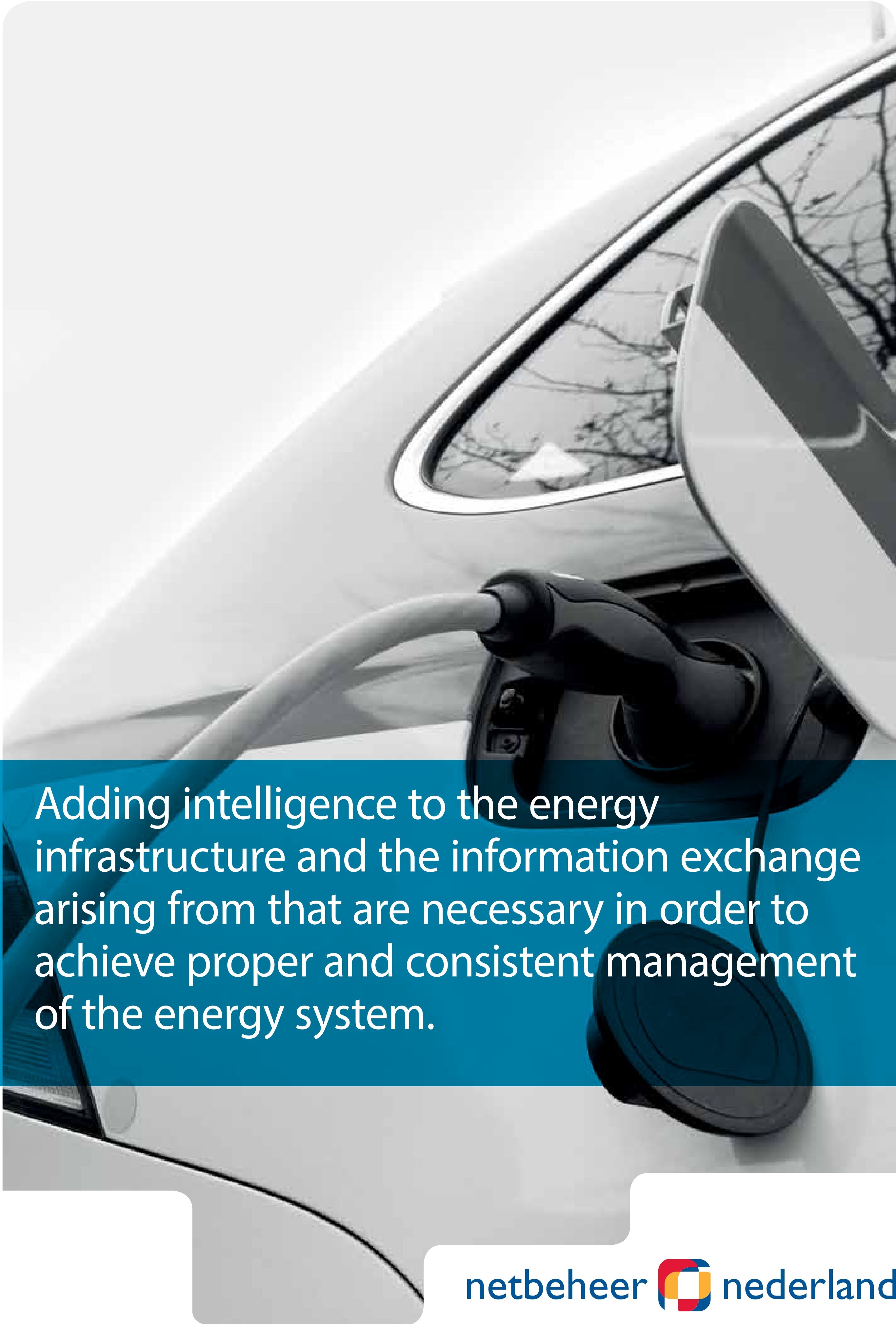

Adding intelligence to the energy infrastructure and the information exchange arising from that are necessary in order to achieve proper and consistent management of the energy system.

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1 Introduction

1.1 Context

The increasing demand for energy, the exhausting of fossil fuels and push towards meeting climate targets shall, in the next decades, form the most significant stimuli for the transition to another energy system, one with a strong focus on conservation.

European legislation is also steering society in this direction.

The aim is to encourage conservation through:

- Large-scale use of sustainable sources (for example solar energy and wind energy),
- Promoting energy efficiency
- Making the energy market more accessible so that it becomes more competitive and more reliable.

These developments will result in significant changes to the current configuration of the energy system. By implementing an intelligent energy infrastructure (smart meter and smart grids) the network operators shall have to contribute towards achieving the aforementioned energy transition targets.

Many decentralised and intelligent objects, such as smart meters for small business/domestic consumers and large business consumers, transformer and MS stations, public lighting and electric cars shall have to start and exchange information with operation centres in order to maintain energy flows at local level and infrastructure. This intelligent energy infrastructure will also supply information that is required for a properly operating, open (inter)national energy market (market facilitation).

Adding intelligence to the energy infrastructure and the information exchange arising from that are necessary in order to achieve proper and consistent management of the energy system. This requires data communication that operates faultlessly. This data communication has to be incorporated into the intelligent energy infrastructure in such a way that it is future-proof. In addition, it has to offer continuity and scalability.

The data communication has to be reliable, available and secure and it has to have limited costs and acceptable risks. Incidentally, infrastructure also includes the IT systems that are required for directing and managing the energy flows.

This Position Paper describes the issues surrounding the development and introduction of a system for data communication that meets all of the requirements.
It offers an initial joint vision and strategy that have been developed for the coming years by the regional DSOs Alliander, Enexis, Stedin, Delta Netwerkbedrijf, Endinet, Cogas, Westland Infra and Rendo, as well as TSO TenneT.

The Position Paper therefore forms the basis for the further interpretation of the previously expressed intention to collaborate in the coming years in the field of data communication and Information Management (IM).

1.2 Aim and target group

The aim of this paper is to set out a shared vision and strategy that can form the basis for future collaboration initiatives.

The Position Paper therefore forms the basis for:
A platform for the exchange of knowledge and experience.

1. Collaboration means that the (financial) burdens can be spread across the various parties, resulting in lower social costs. External influence (for example policy changes) also have a greater chance of success if exercised together;
2. A shared vision of and strategy for data communication and IM, aimed at a common approach (synergy). The vision and strategy shall be further developed in the coming years;
3. Initiation of a plan for the future (rough outline of the targets set);
4. The focus for the activities of the Netbeheer Nederland (NBNL) Telecom Project Group that was founded in January 2012.

This paper focuses on achieving the synergy advantage through collaboration and is geared towards the decision-preparation and decision-making bodies, namely Netbeheer Nederland and the Boards of the network operators.

Decision-making takes place within the network operators (individually) and within the members Board of NBNL (collectively).

The decision-preparation at collective level in respect of numerous topics surrounding the development of smart meters and smart grids is undertaken within NBNL context. The Telecom Project Group will communicate intensively (prior consultation and subsequent information) with the NBNL and NEDU working groups/ bodies in order to achieve broad support for the vision & strategy in respect of data communication and in order to avoid 'suboptimum solutions' that are not appropriate in the broader context.

1.3 Scope

The scope of the area for which a shared vision, strategy and collaboration initiatives are being developed includes:

- Data communication services and infrastructure, for example for information exchange between decentralised locations (customer location, the meter box, public connection points, LV, MV & HV stations) and centralised locations (data centres and operational locations), mutually between the decentralised locations and mutually between the centralised locations;
- Wireless and wired solutions and solutions consisting of multi-communication technologies;
- Technical, legal, legislative and organisational dimensions.

The scope of this paper is limited to the data communication services and IM that will be required for supporting the operation of energy infrastructures (the process), such as that which is required for being able to offer market-facilitating and customer-facilitating services. In our vision there are sufficient solutions available that provide for the office automation needs and there is currently no requirement to develop a separate strategy for this. We can, however, learn lessons from the implementation of data communication in those functions.

The need for data communication in the short term is reasonably clear but the medium and long-term need is still unclear.

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2 The issue

Communication in and between energy grids raises various issues. Central to this are the questions relating to the current communication need and the systems currently in use (for example relating to the phasing out of the current copper communication infrastructure), however, the needs that will come into play in the medium or long term (for example the communication needs in the context of Smart Grids) also have to be included in the communication issue.

The issue is therefore as follows:
What should the communication infrastructure in the energy grids look like now and in the future, and how are the responsible parties going to organise that infrastructure?

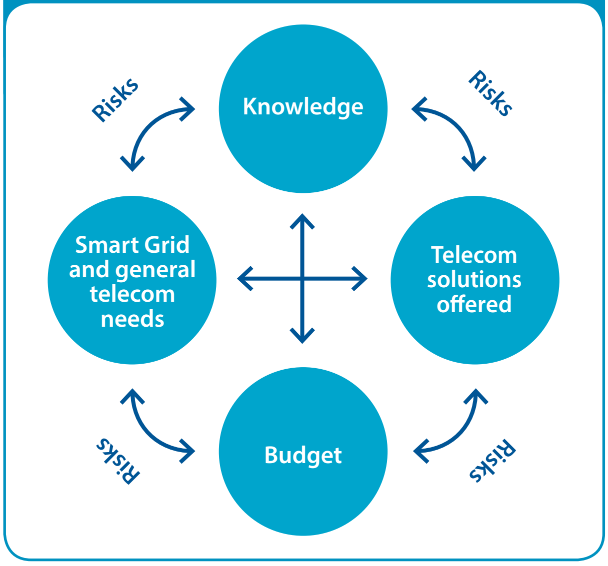
When answering this question there are four central aspects, namely:

- Knowledge of communication techniques,
- The development of the need for communication (now and in the future (Smart Grids));
- The communication solutions offered;
- The budget available.

Knowledge and expertise of and experience with telecommunications are present to a limited degree within the energy sector and should therefore be developed further. The need for communication in the short term ("replacing copper with fibre optics") is reasonably clear but the need in the medium and long term (partly dependent on the direction and speed of development of the Smart Grid) is still unclear. It can however be stated that the long-term development of Smart Grids will create an increasing demand for information. The standard telecom products and services that are on offer often fail to match the wishes, requirements and needs of the network operators. These products are often developed primarily for other target groups with other wishes. In addition, there is a major difference between the short lifecycle of commercial services and products and the longer term reliability that is required by the network operators. Finally, it also needs to be pointed out that the necessary investments in communication are considerable. Wrong choices can, as a consequence of the large numbers (of smart meters for example), be expensive.

The aforementioned aspects knowledge (Smart Grid) requirements, the telecom solutions offered and the budget involve uncertainties and risks. In addition, there is often a 'mismatch' between the various sub-issues, as a result of which the risk increases. The nature of these risks is diverse. For example, the risks can relate to quality and security of supply, risks relating to safety, financial risks and risks for the reputation of the company.

Figure 1



As a result of the increasing importance of communication the need for the network operators to have greater 'control and management' will increase. It is only in this way that the network operator will be able to provide proper autonomous fulfilment of the public duty bestowed upon it, namely managing the energy infrastructures in an optimum and efficient manner and market facilitation.

2.1 Current situation

The present fulfilment of the data communication need does not meet the current wishes and requirements and certainly not those of the future. The current data communication solutions used by the various network operators are often determined historically and have developed individually. As a result of this they have little operational synergy. This results in inefficiency and has the effect of increasing costs.

The way in which the current data communication need is fulfilled is determined on the one hand by the various technical solutions for operating the grids and on the other hand by the solutions surrounding office automation and the smart meter. The new roles of the network operator, namely market facilitation and the development of Smart Grids, have not yet been taken into account. Because each functional area is approached individually the national data communication landscape shows very little coherence.

The current telecom solutions also offer no outcome for the future needs that we currently foresee. Aspects that are not or are not adequately supported are:

- The 'Smart Grid'; (without data communication there is no effective and active management of the grids).
- The need to be able to control energy flows and the network in an integrated manner and to properly dimension the grids on the basis of effective measurements.
- The need to facilitate the market in the future as well in accordance with the legal frameworks.
- The volume of the anticipated need for data exchange.
- The increasing need for availability and security of the communication infrastructure (for example for guaranteeing the integrity and the confidentiality of data in the smart meter chain).

Organisational changes in the sector also demand an integral review of the current telecom and data communication concepts being used.

An example of this is that since the Dutch Independent Network Management Act (Wet onafhankelijk netbeheer, WON) came into effect in 2007, TenneT has been assigned management responsibility for electricity grids of 110kV and above.

Approximately 270 110-380kV switching stations have also been transferred to TenneT from the regional network operators. As a result of this, the national network operator TenneT has been confronted with different telecommunication concepts that have been inherited from the various former operators.

The current developments, as outlined above, mean that data communication shall form a substantial cost item for the next decade or thereabouts. Within the instruction to the network operators to fulfil their public duty in the most optimum and efficient way it is therefore necessary, if not self-evident, that the data communication issue has to receive the right attention at Board level. An integrated and uniform strategy and solution within the sector seems to be an initial requirement.

2.2 Market solutions

The wishes and requirements that will be imposed on the operators in the future in respect of the data communication surrounding energy grids are far away from being met by the existing solutions available in the market. The question is how the sector is going to deal with this.
In recent years the telecommunication sector has lost its focus on telemetry applications, placing it instead on the rapid rise of the broadband market and content; high amount of bandwidth for low costs. The earnings model of that sector is focussed on offering bandwidth.

As a result of this the current services / products portfolio of the telecommunication industry does not align well with the needs of the network operators. Those network operators specifically need a limited bandwidth (telemetry) with very good and, in a number of cases, even extreme availability requirements.

In addition, the broadband market has a short cyclic product focus, while the energy infrastructures and the data communication solutions used specifically require a long-term focus.

The combination of possibilities from the broadband market on the one hand and the requirements of the energy sector on the other hand, are difficult to translate into a "one size fits all" infrastructure and services. A proper fulfilment of the needs of the energy sector within the current earnings model of the telecom sector can be difficult. Therefore a bespoke solution is necessary, together with a predictable risk of higher costs.

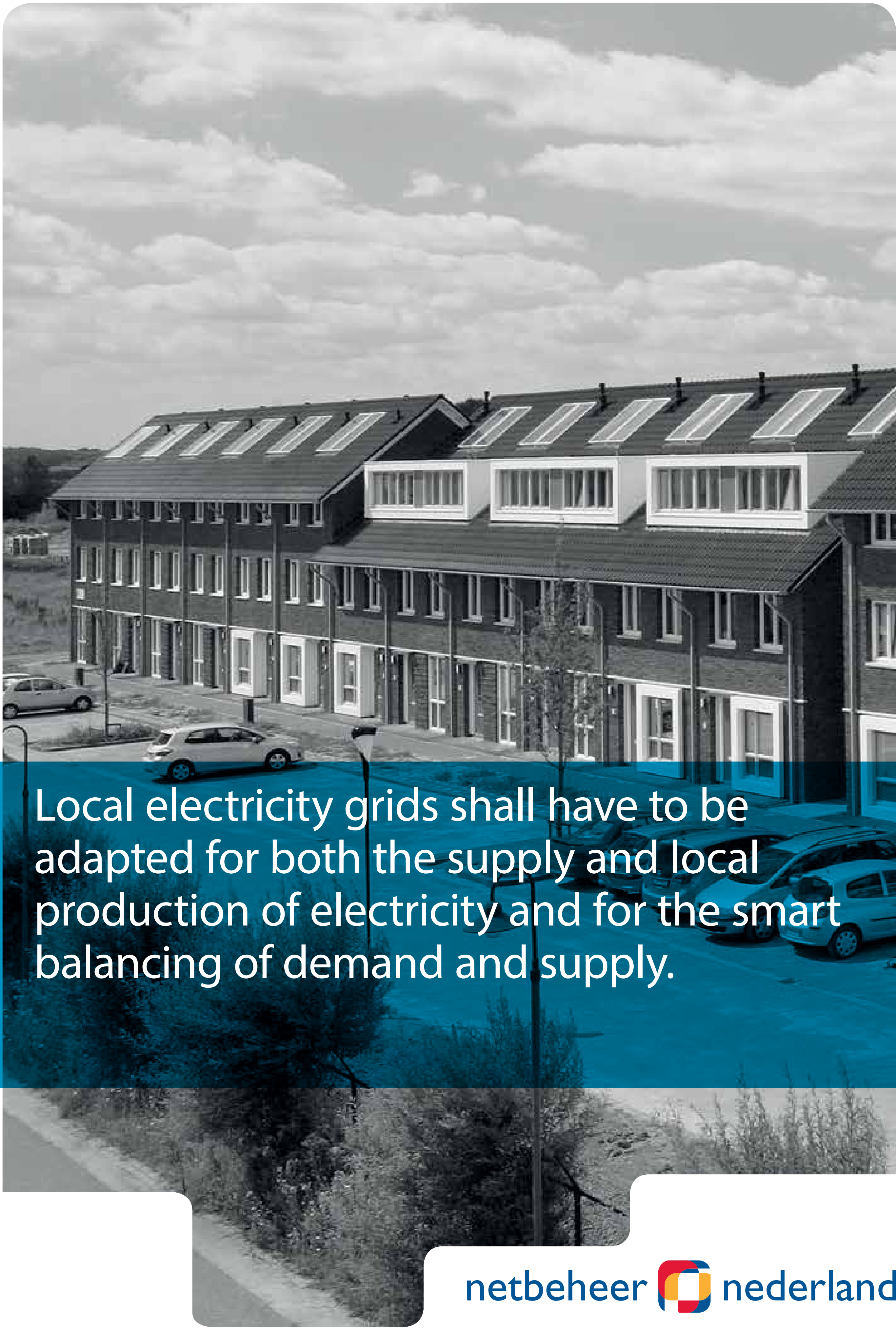
Unaltered continuation of the current situation, whereby network operators use existing commercial suppliers of telecommunication services, can result in a number of undesirable situations. Examples of these are:

The creation of a "vendor lock-in" situation, in which the dependency on current commercial data communication providers becomes too great and managing on the basis of the best price/performance ratio becomes hindered or impossible:

- For example, when using an existing GPRS service for the large-scale roll-out of smart meters, switching to a different operator becomes seriously hindered because this requires a physical SIM card change (operator lock-in) for millions of connections.
- Access to different telecom networks (operator independency) and the conclusion of various wholesale contracts is not possible because a retail proposition is used.
- The parallel deployment of multiple types of data communication solutions (multi com) cannot (yet) be achieved (technology lock-in).
- Within the current "one size fits all" infrastructure and service portfolio the network operators:
  - are only one of the (smaller) customers.
  - are a customer group that is unable to and will not participate in technology developments for a long period of time (15 years) due to the high costs of switching.
  - are a customer group that the telecom provider can more easily say goodbye to (by invoking the penalty clause) rather than adapt to. As a result of which Service Level Agreements (SLAs) are inadequate.

In the future smart energy infrastructure the importance of reliable data communication shall increase considerably. There will even be an increased level of dependency on data communication as a result of which, in due course, there could no longer be a situation of secure energy transport (and security of supply).

Assuming the principle that network operators will not become telecom operators, this will result in a different vision and fulfilment of public private partnership between the energy sector and the telecom sector, which is something that has since been recognised at European level (by the European Commission in Brussels).



Local electricity grids shall have to be adapted for both the supply and local production of electricity and for the smart balancing of demand and supply.

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3 Smart grids and data communication: the need

As stated in the introduction, the energy sector is facing the challenge of shaping the transition towards a sustainable energy system. Various reports, studies and working groups have investigated the consequences of this transition for society in general and the energy grids in particular.

In the Netbeheer Nederland report "En route towards a sustainable and efficient energy supply – Roadmap Smart Grids" it states that smart grids are essential in order to shape the energy transition.
According to the report, the addition of 'intelligence' to the grids will take place by adding information and communication technologies (ICT) to grid users and into the actual grid[2].

The report "The future grid – an exploration"[3], also produced by Netbeheer Nederland, describes the consequences of the energy transition for the energy infrastructure on the basis of three scenarios. The assumption in that is achieving the EU target of a 90% CO_2 emission reduction by 2050 (compared to 1990).

On the basis of the three scenarios, each with a different combination of energy demand, level of decentralised energy generation and composition of centralised energy sources, a description is provided of the consequences for the energy infrastructure.

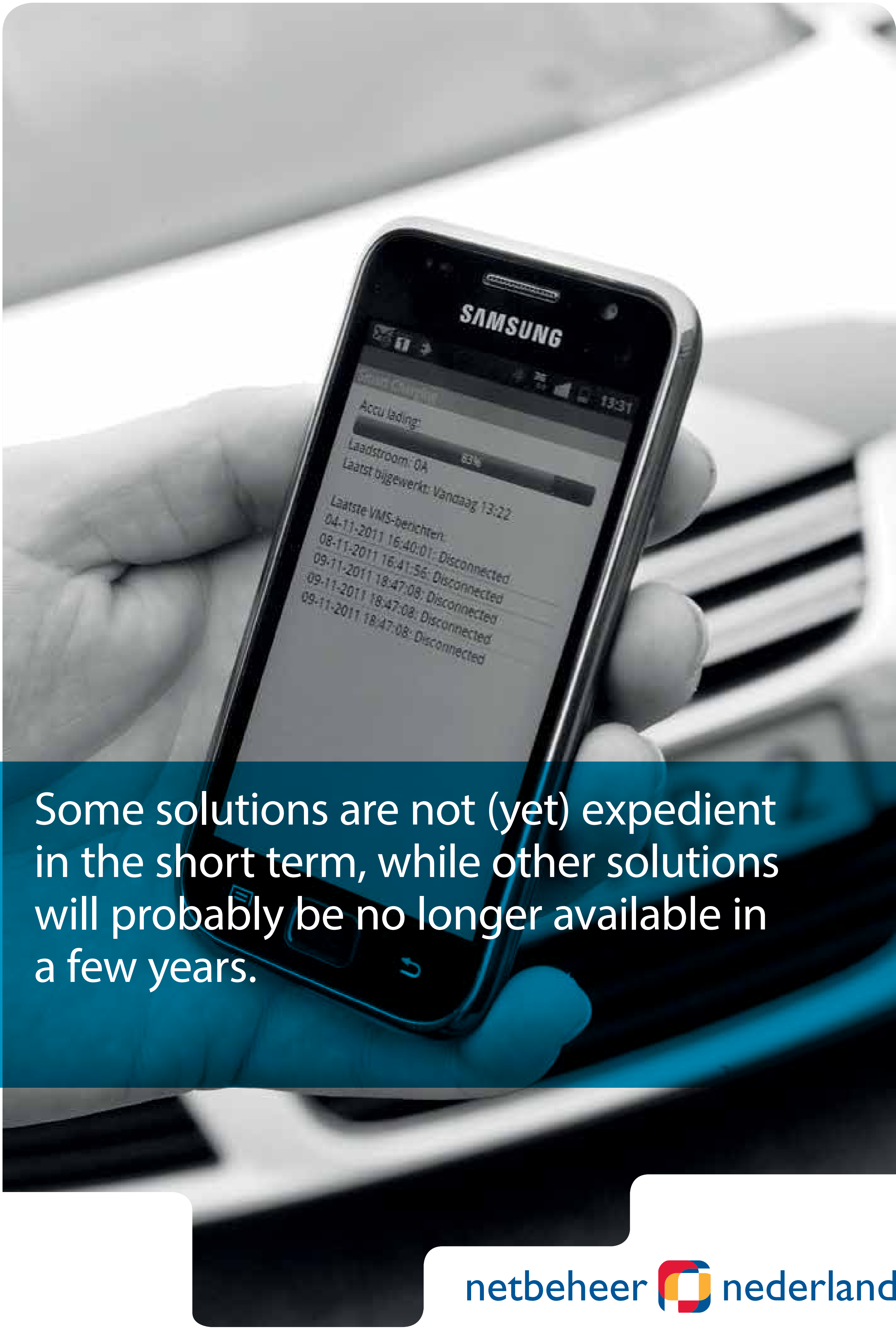
In addition to the general reinforcement of the infrastructures that is considered necessary, there are also conclusions that are applicable for each scenario. For example, the local electricity grids shall have to be adapted for both the supply and local production of electricity and for the smart balancing of demand and supply.
The reinforcement of the grids that is considered necessary can be limited if the balancing of the demand and supply is regulated in a smart way[4].

In the transition period to the 2050 situation too, "the capacity of the electricity grids will start to become squeezed[5]". At local level this will mean that "work will have to be undertaken dynamically to make the grid smarter". With regard to the required investments it is noted that "Smart Grids can ensure that investments in reinforcing the grid become lower"[6].

The final document[7] from the Smart Grids Taskforce[8] endorses the necessity of smart grids and energy systems. Considering the fact that "more information has to be exchanged by more components"[9] there shall have to be an ICT infrastructure for smart grids whereby security and privacy aspects also require sufficient attention.

On the basis of the reports referred to above, but also from other sources, it appears that data communication is an essential element in the transition towards Smart Grids and is vital for a sustainable energy supply. It is therefore of essential importance, with facilitating this transition in mind, that network operators pay attention to the organisation and fulfilment of data communication in their grids.

1. *Report "op weg naar een duurzame en efficiënte energievoorziening – roadmap Smart Grids", version 26 August 2010, Netbeheer Nederland.*
2. *Ditto, page 4.*
3. *Report "Net voor de toekomst – een verkenning", February 2011, Netbeheer Nederland.*
4. *Ditto, page 25.*
5. *Ditto, page 31.*
6. *Ditto, page 39.*
7. *"Op weg naar intelligente netten in Nederland", Final document of the Smart Grids Taskforce, May 2011.*
8. *The Smart Grids Taskforce was set up by the Ministry of Economic Affairs.*
9. *Ditto, page 32 (Annex 6).*



Some solutions are not (yet) expedient in the short term, while other solutions will probably be no longer available in a few years.

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4 Solution directions

The diverse needs for data communication can be met in a variety of ways in the short term and in the long term. With regard to this it has to be noted that these needs change over time and also that the availability of solutions is time limited. Some solutions are not (yet) expedient in the short term, while other solutions will probably be no longer available in a few years (Figure 2 shows an estimate of the availability of various technologies over the course of time).

4.1 Elements of the selection process qualified

A rich chequered palette of solutions is available when responding to the existing data communication needs. As a result of this it will be necessary to run through a selection process in which questions such as these arise:

Standardisation, degree of "openness"
Can a standard be followed or are specific components required?

Communication functionality
What communication functionalities does the application contain? Examples are Peer2Peer communication or the cell-broadcast functionality.

Lifecycle & Roadmap
How future-proof is the solution, what are the lifecycle expectations?

Range & Penetration
What is the range of the radio solution (or the cover of a wired solution) and how well can the signal penetrate a home or building?

Proven Technology
The question as to whether the application is mature and can be deployed in the short term.

Intellectual Property
What intellectual property rights are attached to the components of the technical solution?

Security & Privacy
How are the security and confidentiality of the components guaranteed?

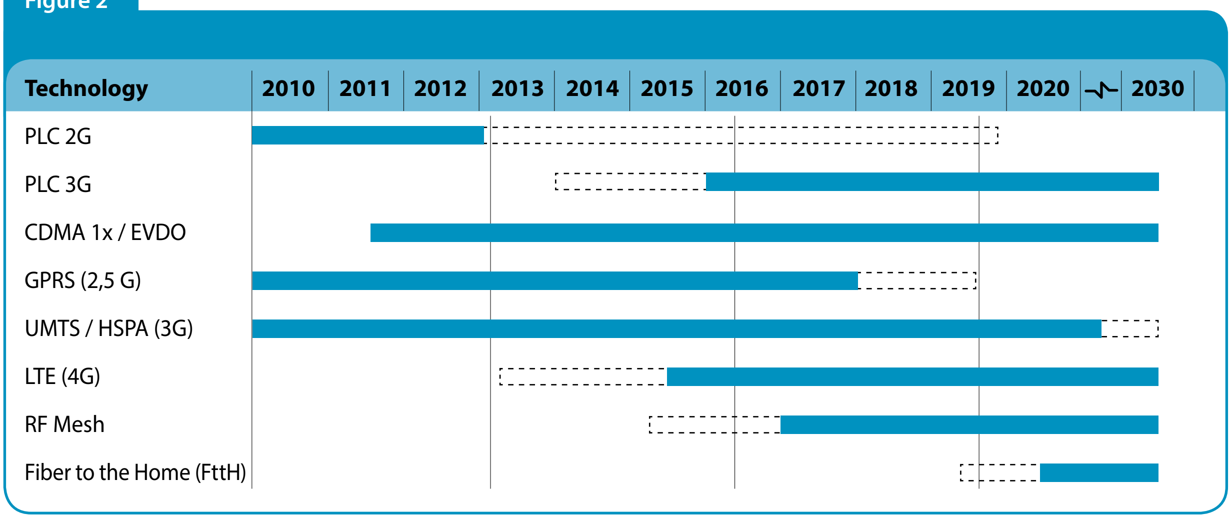
Ecosystem / vendor and/or technology lock-in
What does the market look like and is there a risk of vendor and/or technology lock-in? (applicable to all components of the solution: the chipset, the module, the radio network, the transport network, the supplier, the operator, etc.).

How future proof
How long can the solution still be used?

Implementation, management and scalability
Is it easy to add extra assets and other types of assets? (including influencing the cover, the capacity, the speed, the performance, the expandability, etc.).

Costs
What will the solution cost?

Figure 2



More systematically, the questions run through the following four domains:

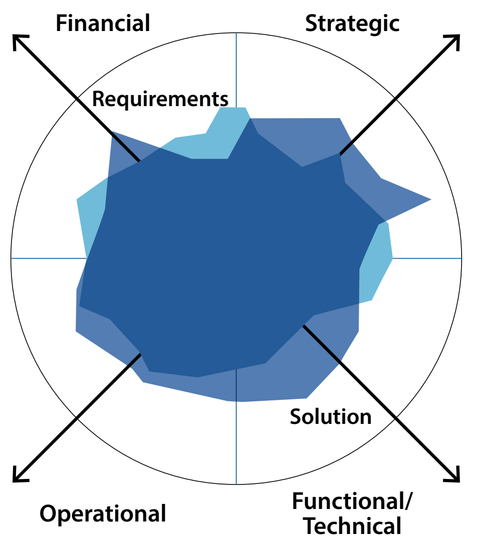
- Strategy,
- Functional/technical,
- Operational,
- Financial.

This can be shown as follows.:

Figure 3

Most important Requirements (not exhaustive)	
Strategic	• Maturity / Field proven • Ecosystem: network and modem / chipset vendors • Possible roles: Spectrum licence owner / WO / MVNO / operator / user • Availability • Exit scenario, possibility to switch after contract / licence termination (i.e. to a different frequency or WO operator) • Assistance / commitment from other DSOs • Possible standard or IPR limitations
Functional/ Technical	• Suitability for DSO service (core task: smart meters, etc., and comm. services) • Possibility of improving robustness / security during life cycle
Operational	• Can the network be split up? • Is SLA monitoring possible across parts of the network? • Level of in-house required knowledge and capabilities?
Financial	• TCO/Asset (comm. part) • OPEX + CAPEX network parts • Trends and developments

Solution evaluation



These four domains can differ for each element of the network of the relevant DSO. For example, there are other latency requirements for the smart meter compared to the station automation. In addition, the domains are not static for each element of the network. Over time they will be subject to change as a result of changing views, technological advancement and through the use of the network. This is explained in the following paragraphs.

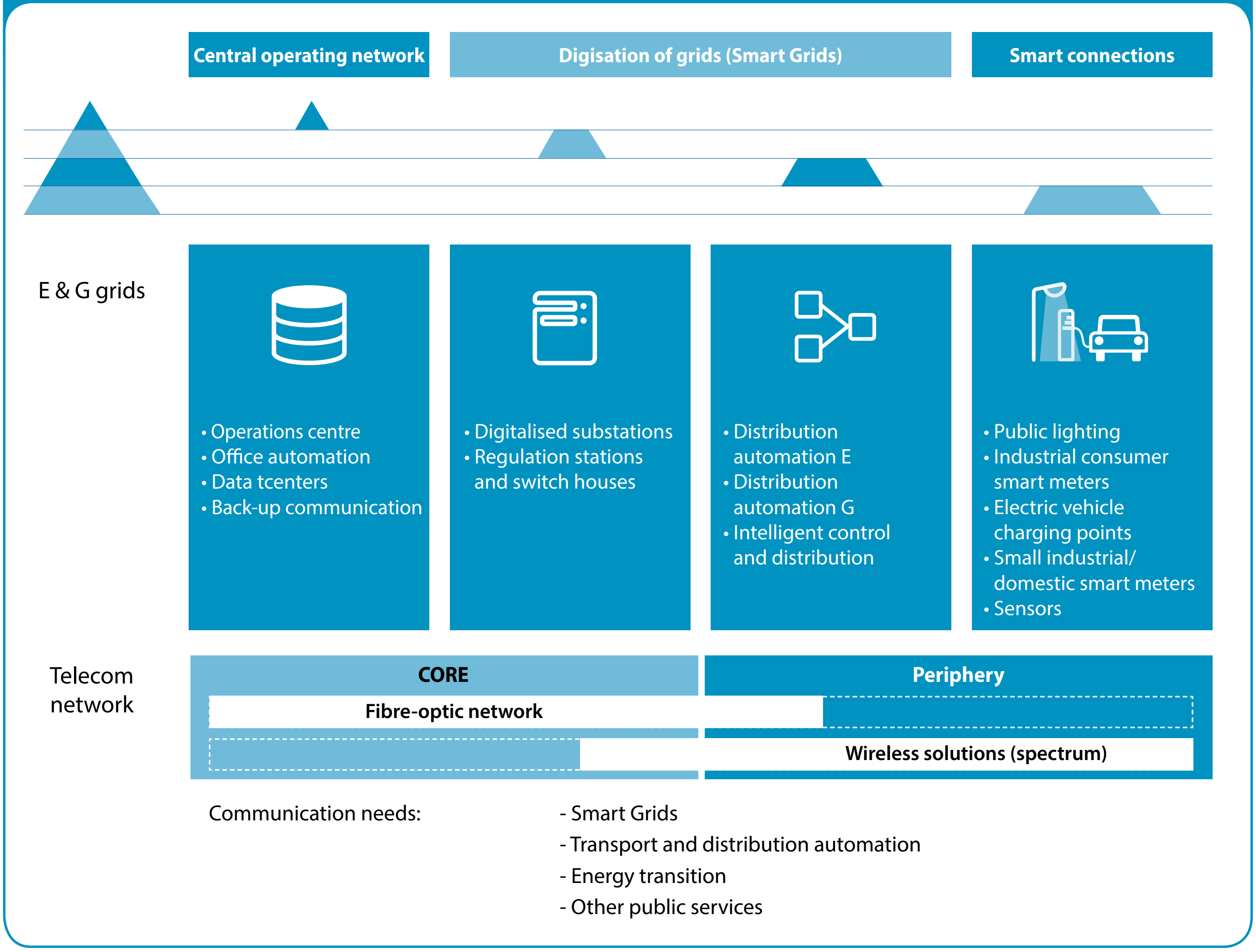
4.2 The network split into two

The telecom network that is required for connecting all of the applications can be divided into a core (backbone) network and a periphery network.

The core network connects, amongst other things, the substations and regulating stations that are located in the higher sections (voltage and gas pressure) of the Electricity & Gas (E&G) grids. This concerns a relatively limited number of units. The communication in this core network is of vital and critical importance. The availability and reliability of the core network therefore has to be very high. High requirements are also set for the capacity and speed of the communication links. From a relative point of view the number of connections is limited.

The periphery network connects, amongst other things, the smart meters, the public lighting, the charging points for electric vehicles and the medium voltage rooms that are located in the lower sections of the E&G grids. This concerns large numbers of connections. There are a large number of applications and these are spread over the network operator’s entire supply area. The requirements for accessibility, reliability, capacity and speed are not as high as for the core network. The figure below provides a graphic representation of how the core and the periphery network relate to the E&G grids.

Figure 4



The applications as defined by the network operator and which are described in paragraph 4.3, set requirements for the core and/or periphery network. Also see the figure above with regard to this. This is continually about an integrated and efficient solution for the entire network. The issues surrounding the telecom need that are relevant in the short term, concern the fulfilment of the core network and the communication required for the smart meter. In the long term, the less specifically-detailed needs relating to Smart Grids and the control of public lighting are relevant.

4.3 Activities within the network

4.3.1 Network management automation

Within the network defined above it is the statutory duty of the TSO and all DSOs to configure and maintain the network in the most efficient way possible. The TSO and the DSOs work daily on the configuration and 'smartening' of the network. In this way they are making the management of the network more and more efficient.

For the benefit of this, the distribution networks for electricity should provide for a broad business demand for data communication. Examples of this are the remote detection and isolation of faults and the remote switching in automated stations in these distribution grids. Security functions also need to be supported (telemetry), as well as the communication with employees in the field (audio, text and vision). In the distribution networks for gas there is a need for remote insight into and measuring of the grid performance, which will result in grid optimisation. In addition, there is a need within the context of market facilitation and the measuring of gas quality, in the event of biogas feed-in by third parties.

All of this is an 'ongoing process' for every network operator which has been running for many years but that needs to be kept up-to-date with the new communication infrastructure.

4.3.2 Energy transition

Alongside this, the approaching energy transition has a major influence on the data communication requirements. Combining market facilitation (D/R management) and managing on the basis of network utilisation offer opportunities in electricity distribution for optimising the efficiency of the network.

As a result of this, the real time communication need shall have to be provided for in order to be able to control the consumption and the energy flows in the grids in a dynamic and smart manner (DSO/TSO balancing, load balancing, peak-shaving & congestion management). This is to prevent an imbalance or overload.

The monitoring and switching of DER decentralised generation (Distributed Energy Resources such as combined heat and power co-generation units, heat pumps, etc.) at customer locations ("prosumers") also forms part of this.

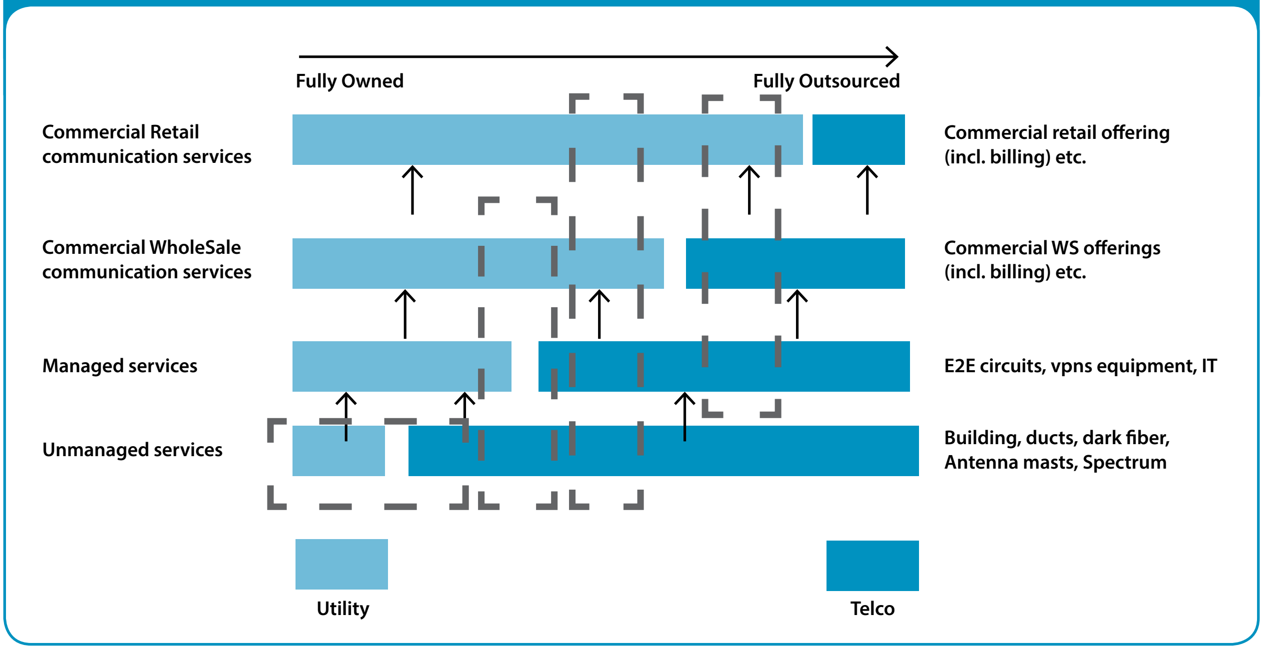
To facilitate electric transport and 'public charging' the public decentralised E(lectricity) charging points shall have to be managed remotely (including by means of authentication). The transaction information arising from that also needs to be supplied directly (in real time) to market players.

Within the 'energy transition' cluster the introduction of what is known as the smart meter plays a major role. This has the functionality for reliably reading meters, controlling (switching) and implementing software updates remotely. It must also be possible to forward smart meter 'event messages' in 'near real time'. It is also necessary to provide the possibility of switching between day and night tariff for conventional meters (Beheer TF tariff). For smart meters the requirements are set forth in European directives and national legislation. The same also applies for the statutory market facilitating requirements.

4.4 Sourcing Strategy: in-house or subcontracted

As stated, telecommunication will play a mission-critical role in the smart electricity and gas grids of the near future (Smart Grid development). This is the reason why network operators wish to have maximum control and management of the communication infrastructure. This is directly linked to guaranteed transport and security of supply.

Figure 5



Source: EU Taskforce Smart Grids EG4 (Peter Hermans)

Maximum control and management over the communication infrastructure and the solution does not automatically mean that everything has to be implemented and managed by the network operator. There is a sliding scale. On the one hand the entire telecom solution and infrastructure is wholly owned by and implemented under the full management of the network operator and on the other hand there is procurement of a standard product from the market.

The 'natural preference' of the majority of network operators can be described as follows. For connections that are of vital importance for the E&G grids there is a preference to manage these directly, while for connections that are less vital the network operator has a greater tendency to procure these from the market.

As already stated above, there is a sliding scale; many variants are possible. Figure 5 provides a graphic representation in which other (interim) variants are also possible depending on the types of telecom solutions discussed.

4.5 Technology choices

For the core communication network operating in the higher level of the E&G grids the network operators have in the past opted for copper connections. The majority of network operators are busy replacing these copper connections with a fibre-optic network. After all, fibre optic offers high capacity and speed. In addition, the method of installation and management can meet the critical requirements for reliability and availability.

The preference of the network operators for the periphery communication network appears in the coming years to be for a wireless (cellular) network due to its availability and its ability to be immediately deployed. In the short term, solutions such as Fibre to the Home (FttH), Coax cable and Powerline Communication (PLC) do not offer the required integrated solutions at acceptable costs for all applications that have to use the periphery network, however, they may do so in due course.

Various technology assessments have been undertaken within the network management sector over the last two years. Extensive documentation is available for this within the sector and will not be repeated here.

At the beginning of this section we already covered the choice of the network operator for fixed connections for the core network and, for the time being, wireless connections for the periphery network. The following technologies (both wired and wireless) will be considered further in the near future:

- Backbone: Copper (VDSL) and Fibre Optic, both IP-based;
- Periphery: GPRS (via MVNO construction), CDMA (1x and EVDO). Alternatives that may offer possibilities in the future, and which are already being considered, are: PLC (3rd generation), RF mesh and FttH.

The scale of investments is so large that the network operators will have to and want to run through the selection process with great care.

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5 Finance & Legal

5.1 Finance

In the coming years the network operators will be facing the need to make major investments in data communication in order to be able to obtain insight into the operation and dimensioning of the electricity and gas network. This concerns the expenditure to replace the existing (copper) network, the expenditure for the expansions that are necessary for the further automation of the E&G network and the expenditure for communication with the smart meter. The scale of investments is so large that the network operators will have to and want to run through the selection process with great care.

The investments just required for reading the smart meters will require a very major financial input during the next 15 years. On the basis of the assumption that 7.5 million meters will be fitted with data communication, and that the costs for reading are in the band between € 3 and € 15 per meter per year, reading the smart meters during the coming 15 years will amount to between € 337 million and € 1.68 billion. These amounts are only for the smart meter. If the fibre optics for the network and the connection of all kinds of smart assets is included this requires an additional, estimated investment of a half to one billion euro. This requires careful decision-making, whereby the financial component in the decision-making in respect of the data communication connection to be selected will be assigned an increasingly significant role.

On the other side of the coin there are also savings. For example, the use of sensors in the network provides much greater insight into how the network is in fact working, how it has to be dimensioned and what investments are required for replacements. In the future this can result in a substantial saving or the avoidance of substantial costs. This can also shape the actual energy transition and on the basis of the available data consumers will be in a much better position to themselves decide about the price and the amount of energy consumed.

The selection process regarding the data communication within the sector is not only a choice between one technology and another. Completely different dimensions also play a role in this. For example, Capex versus Opex, in-house or bought in, only for a network operator or also for other buyers, keeping control or a free market, new or existing technologies, bespoke or the largest common denominator, one solution for all types of assets or customised to each situation, etc. In brief, the selection process is complex, plays out in different dimensions and will not result in a single solution.

Whatever the outcome of this process it is important to understand that data communication will be taking an increasingly prominent place on the decision-making agenda and that it will require substantial investments in people, resources, knowledge and expertise – whereby not one solution is the only correct solution and whereby network operators can save substantially on their expenditure and risks by collaborating and sharing and exchanging information and experience. Considering the extent of the anticipated investments/costs it is also likely that this will become a relevant agenda point in the sector's consultation with the Ministry of Economic Affairs.

5.2 Legal

The Electricity Act contains no provisions that oblige or prohibit telecommunication activities. The Electricity Act does however impose obligations with regard to the management, reliability and the safety of grids and the Act stipulates that this has to be done in an efficient manner. These obligations therefore imply the need to have modern communication facilities available. The need to implement data security measures can also be clustered under these obligations. The announced change to the Electricity Act[10] will also increase the need to take measures surrounding data security.

10. *The STROOM 1 bill contains a proposal to supplement Article 16 of the Electricity Act, whereby the network operator is instructed "to protect his grids against potential external influences".*

The current situation complies with the statutory requirements. All network operators (partly) manage their own communication networks for their own operations. Because these networks are for own use they are excluded from monitoring by the Telecommunications Act (Telecommunicatiewet, Tw) regulator, OPTA.
The increasing need for communication could result in the network operator further developing telecommunication activities itself. So long as these activities are only for own use and for managing one's own network this will most likely not cause any problems. However, if these networks are also offered to third parties and revenue is generated from that the legal situation will change. For example, the Electricity Act states that a network operator "[is] not permitted to supply goods or services which cause them to be in competition"[11]. In that case, OPTA will most likely begin to act and impose obligations that are already applicable to other providers of electronic communication services.

Collaboration between network operators in the field of data communication can raise questions under competition law. The ultimate interpretation given to the collaboration shall have an impact on the definitive assessment by the NMa (Dutch competition authority) as to whether the collaboration can withstand the competition test. However, for the time being it is estimated, on the basis of, amongst other things, the existing joint ventures in areas such as the procurement of meters, that competition law will not throw up any barriers.

There is also a growing interest from Europe for the telecom activities of energy (network) companies. DG Connect (Digital agenda and telecom policy) and DG Energy (Smart Grids) have the view that collaboration between Utilities and the telecom sector can contribute towards the Smart grid and Digital Agenda targets.
In this, adequate ICT data communication for the energy sector is viewed by the Commission, amongst other things, as being under the auspices of market facilitation, whereby the discussion focuses on the question as to who (or which combination of parties) will fulfil the market facilitating role and, more implicitly, the communication infrastructure belonging to that. The collection, aggregation and distribution of information play a central role in this, whereby a great deal of attention is specifically being paid to information that is generated by the smart meter. This prominent role of the smart meter in the discussion about the fulfilment of the market facilitation has resulted in a great deal of attention being paid to the configuration of and responsibility for communication with the smart meter.

In contacts with the Commission it has also been stated that there can be support for the Commission's ambitions (both for Broadband and for the Smart Grid) by the DSOs' activities. However, at the same time these DSO activities are restricted by the energy framework and definitively by the telecom framework too. Although both of these frameworks are European it appears that their implementation varies in the different member states.
In some member states energy companies run many telecom activities, while the implementation in other member states has specifically resulted in very restricted telecom activities, hence the reason why clarification about the relationship between the two frameworks is being pressed for.

5.3 European developments

The focus by the European Commission on market models and market facilitation threatens to overlook the broader communication need, which covers more than just communication for smart meters. That can result in synergy benefits that are present not being utilised.
The initial initiatives, which are only focussed on the smart meter and which overlook the other communication needs of the network operators, are already visible.
For example, in the United Kingdom the government has commenced a tendering process for the configuration of such an organisation, the Data and Communications Company (DCC). That will become a national provider of communication services from and to gas and electricity smart meters. Smart metering in the UK would be obliged to use the services of this company.

It is also important to view the future initiatives in the Netherlands in this light. A proactive attitude and

11. *Article 17.1 of the Electricity Act*

collaboration from the network operator sector can become significant in taking the wind out of the sails of Brussels' initiatives to assign a prominent role in this to telcos. This can be done by making the interests and the specific role of the network operators clear in a timely manner. This means that the network operators will remain in control.

5.4 Risks

As outlined above, the selection of and the investment in a data/telecom solution involve risks. As regards the timing, we note that for the large-scale roll-out of smart meters in the Netherlands there is a need for an adequate data communication solution, while for the smart grids it is still not clear which solution will turn out to be the correct solution.

This demands a 'no regret' approach: select, retain the maximum amount of flexibility and, in addition, mitigate the risks that are known in advance. We can achieve the latter by sharing a lot of knowledge and experience. This will prevent the continued existence of blind spots for possibilities and bottlenecks in the telecom market. In a follow-up phase we can be a stronger, developing partner if we act together. We will also be able to create a strong lobby towards the legislator if we work together on solutions for the energy transition.

Perhaps we will succeed in achieving more freedom in the regulated domain. In the short term it is very important to make a telecom choice that is the most suitable for the large-scale offering of the smart meter without this choice restricting us in the development of the smart grids. That mainly means looking at the contract duration and the exit possibilities for the services.

Through intensive collaboration the network operators can reduce and manage these uncertainties and risks.

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6 Collaboration, timelines & decision-making

6.1 Business strategy and collaboration

The essence of the previous sections is that reliable facilities for data communication are not just important for the execution of the existing statutory duties but that they are definitely also a vital and even mission-critical element of smart grids. Major advances shall have to be made in order to be able to actually implement the data communication facilities in the coming years.

When selecting data communication solutions the network operators will be faced with a range of questions:

- Technology choices (with associated vendor and/ or technology lock-in issues). The dilemma here is that developments in the field of telecommunication are currently taking place faster than developments traditionally take place within the utilities sector (where solutions are often selected for a longer period of time);
- Use of these technologies in the network operators' grids and operating processes;
- Substantial financial considerations which, due to the rapidly advancing technological developments in the field of telecommunication, are less stable than the sector is accustomed to;
- Legislation issues that can be expected in relation to smart grids and smart meters. In the area of data communication these mainly concern market model developments and convergence/collaboration between the telecommunication sector and the utilities sector.

The questions above contain numerous uncertainties and risks. Through intensive collaboration the network operators can reduce and manage these uncertainties and risks. Collaboration offers the possibility of learning from each other's vision and choices[12]. The benefit of and the need for that collaboration mainly lie in the combined execution of the work surrounding the selection processes we are facing. This vision is endorsed by the Sustainable Innovation Taskforce (TDI) within Netbeheer Nederland.

Three ambition levels or phases of collaboration have been identified:

1. Building and sharing knowledge (6.1.1.)
2. Building relationships and strategy (6.1.2)
3. Moving forward together (6.1.3)

6.1.1 Building and sharing knowledge:

Dialogue between the RNBs (Regional Network Operators) provides the participants with a platform for building and sharing knowledge. The dialogue covers the following points:

- Mutual exchange of information and knowledge sharing about positions, views, visions, strategies and policies about telecommunication;
- (Potential) development of joint (sector-wide) positions, views, visions, strategies and policies about telecommunication issues;
- Joint selection and (potential) development of technical solutions for telecommunication needs;
- Exchange of knowledge and information about trends, technological possibilities and social developments;
- Monitoring and influencing developments in the field of legislation and standards, both nationally and internationally, with synergy benefits being achieved from collaboration.
- Functioning as a platform for (inter)national committees and/or consultations (both EU and nationally).

6.1.2 Building relationships and strategy:

Building relationships is necessary in order to achieve optimum knowledge sharing between the various persons and RNB organisations. The following points are important for this:

- The creation of organisation focus (of the relevant departments) and the establishment of contacts between direct colleagues in the RNB organisations in the field of data communication ('peers');

12. *Also see the 'nut en noodzaak' ['benefit and need'] document from the NBNL Telecom Working Group*

- The building of personal relationships (at several levels), so that a virtual/network organisation is created, within which, on the basis of mutual understanding, information relating to strategic choices and solution directions can be exchanged.

6.1.3 Moving forward together:
The collaboration can result in everyone moving forward together. Examples of this include:

- The formulation and establishment of common aims, programmes, projects and/or organisation entities to be achieved;
- The making of effective governance agreements that are required for managing the shared activities;
- The actual joint effort of implementing these.

Since the establishment of the Telecom Project Group in the context of Netbeheer Nederland in December 2011 and the activities undertaken since then within this working group, major advances have been made in the joint building and sharing of knowledge.

Since its establishment, the project group has been meeting monthly and outside of those meetings the contacts between the parties involved has been significantly intensified as a result of all current investigations in the field of CDMA, GPRS, MVNO and PLC.

6.2 Planning, timelines and decision-making

The previously outlined market developments have an impact on the requirements being set for the data communication facilities and the configuration of the data communication networks. This concerns the following developments:

- Replacement of the current data communication facilities relating to operations (2012-2014);
- Implementation of smart meters: 2014-2020 (80%);
- Implementation of grid automation / smart grids: 2012-2025;
- Energy transition (PV, EV, etc.): 2016-2030.

As a result of the current developments surrounding technology and costs, the regional network operators are presently investigating the various alternatives for data communication in order to gain as much knowledge as possible. The power of collaboration in this phase lies in keeping each other up to date about each other's developments, experiments and Proof Of Concepts (POCs). In addition, collaboration has already taken place in respect of a number of technology selections.

The business strategies in the field of data communication have to be agreed at Board level. The project group can then shape these further. The aim is to arrive at a joint programme for the desired configuration of data communication (technology and organisation) in the utility sector.

Following on from the data communication infrastructure phase the strategy within the IM domain can be agreed within the project group. This will involve aspects such as organic structure, security, data integrity and availability of the systems.

The following timeline is envisaged in order to be able to respond effectively from the RNBs and to facilitate the market:

- Short term:
  - Drawing up of 'technology roadmaps' by the individual RNBs and agreeing these within the 'NBNL Telecom Project Group';
  - Agreeing business strategies at Board level;
- Medium term:
  - Preparation of joint solutions and approach within the project group;
  - Roll-out of solutions;
  - Interpretation of further collaboration in the field of IM.

Sector collaboration is important and necessary in order to limit risks such as vendor and technology lock-in.

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7 Conclusions, decision points, next steps

(jointly prepared in the NBNL Telecom Project Group on 5-10-'12)

7.1 Conclusions

The energy transition will result in a fundamental change in the energy system. This will impose new and more stringent requirements on the use of data communication in Smart Grids. Data communication will become mission critical for network operators. The importance of effective telecom/data communication facilities for network operators is recognised in this.

Various technologies are possible. For the backbone segment (the core network) the strategy is focussed on using wired solutions (mainly fibre optics); for the periphery network the preference is currently for multiple wireless solutions.

Sector collaboration is important and necessary in order to limit risks such as vendor and technology lock-in. This will avoid different network operators from being played off against each other and the strength will increase.

National legislation is currently forcing the sector to act, however, it also imposes some restrictions. From the social duty for network operators to operate as efficiently as possible it is necessary, also through mutual collaboration, to influence the policymakers and decision-makers (Ministry of Economic Affairs, Agriculture & Innovation and the Boards of the network operators), partly in view of the considerable investments expected in data communication over the coming years.

7.2 Decision points

In the coming years we shall be proceeding with the large-scale modernisation of the data communication facilities, thus meeting the requirements demanded for smart grids and smart meters (over and above replacing outdated infrastructures). We shall make the financial resources required for this clearly visible in the long-term network operator forecasts. The need for greater control and management of the data communication is broadly endorsed. It is also necessary to steer towards this. The level of control and management of this is dependent on the selected applications and can, if necessary, extend to full ownership of the communication infrastructure and the management thereof.

In the Telecom Dossier from the NBNL Telecom Project Group there is intensive collaboration, with a 'together and open with each other' mentality and a scope that covers the entire spectrum (backbone & periphery). Information is being shared and a united front is being presented to the external stakeholders. In principle, the permits that are obtained can be used across the sector.

Considering the technical and price developments a diversity of technologies is being accepted. This diversity shall contribute towards a broad understanding of these technologies so that we can make optimum use of each other's insights and knowledge when selecting (part) solutions. For the time being we are focussing on "the basket of 4": 3g-PLC, GPRS/MVNO, CDMA and fibre optics (FttH). However, the network operators are free to already make choices with regard to communication technologies (see Table 2).

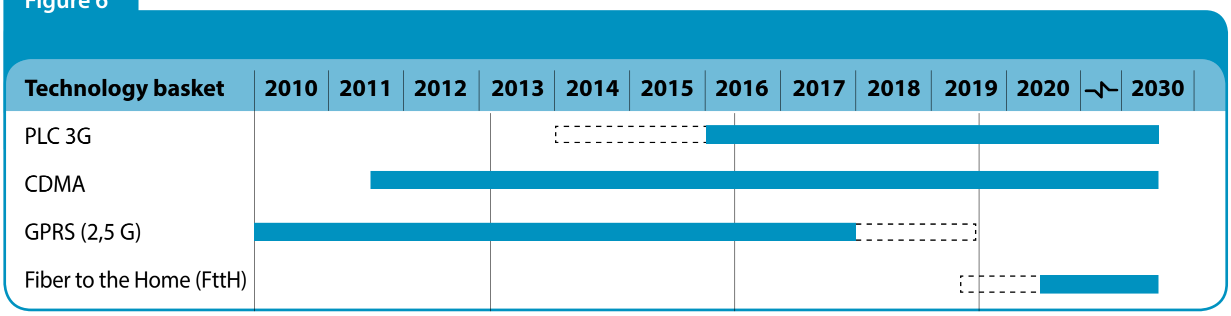
7.3 Next steps

All members of the NBNL Telecom Project Group are working towards achieving support and commitment from their own Boards and NBNL, using the content of this Position Paper as the point of departure.

The NBNL Telecom Project Group is focussed on the further crystallisation of the collaboration plans for 2013 and beyond.

Actions towards the legislator are being crystallised from the NBNL Telecom Project Group which are aimed at achieving greater awareness and changes in the law that are necessary for network operators.

Figure 6



Annexes

Annex 1 – Members of the Telecom Project Group

Peter van den Akker, Westland Infra
Frank Bodewes, Enexis
Ton Brugmans, Stedin Meetbedrijf
Menno van Dijk, Cogas
Alexander Groot, Stedin Meetbedrijf
Co den Hartog, Alliander (Chairman)
Peter Hermans, Stedin
Paulus Karremans, Endinet
Jan Knuistingh Neven, Stedin
Lhoussain Lhassani, Stedin
Amadou Louh, Stedin
Erik Moll, Alliander
Johan Morren, Enexis
Jurgen Mutsaers, Enexis
Erik Schenkel, TenneT
Wil Scholten, Netbeheer Nederland
Wilbert Stikkelbroeck, Alliander
Dick ter Veld, Rendo
Eric Verbrugge, DNWB

Annex 2 - List of abbreviations

NBNL	Netbeheer Nederland
DSO	Distribution System Operator
TSO	Transport System Operator
KV	Small industrial/domestic consumers
GV	Large industrial consumers
MV	Medium Voltage (10 -50kV)
LV	Low Voltage
HV	High Voltage
GPRS	General Packet Radio Service
SLA	Service level agreement (service contract)
ICT	Information and Communication Technology
EU	European Union
PLC	Power Line Communication
CDMA	Code Division Multiple Access
UMTS	Universal Mobile Telecommunications System
LTE	Long Term Evolution
MVNO	Mobile Virtual Network Operator
OPEX	Operational expences
CAPEX	Capital expences (investment costs)
E&G grids	Electricity & Gas grids
CCHP	Combined Cooling, Heating and Power
TF	Tone Frequency
FttH	Fibre to the Home
DG Connect	European working group? Digital agenda and telecom policy
DG energy	European working group? Smart Grid
DCC	Data and Communications Company
Telco	Telecommunication operator
RNB	Regional network operator

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Anna van Buerenplein 43 – NL - 2595 DA Den Haag
Postbus 90608 – NL - 2509 LP Den Haag

Telephone +31 (0)70-205 50 00
secretariaat@netbeheernederland.nl
www.netbeheernederland.nl