European Smart Grids Task Force
Expert Group 1 – Standards and Interoperability
Working Group on Data Format & Procedures

First Interim Report on Electricity and Gas Data Format and Procedures

December 2017

Acknowledgments

This report has been prepared by the Working Group on Data Format and Procedures under the Expert Group 1 (EG1, 'Standards and Interoperability for Smart Grids Deployment') of the European Smart Grids Task Force and is a product of intensive work and discussions during 2017 amongst EG1 stakeholders. Special thanks are due to all the experts (see Annex A), who contributed in the course of this work and especially to the Editorial Team.

First Interim Report

of the Working Group's findings on

Electricity and Gas Data Format and Procedures

Smart Grids Task Force

Expert Group 1 – Standards and Interoperability

Working Group on Data Format & Procedures

Date: 19 January 2018

Content

Executive Summary

The Steering Committee of the Smart Grids Task Force decided, at its meeting of 17/02/2017, to establish a Working Group on Electricity and Gas Data Format and Procedures (hereafter "the Group"). That was to help the Commission prepare the ground for potential secondary legislation, in the context of the Clean Energy Package[1], regarding converging arrangements within the EU for data access and exchange and with the objective of ensuring interoperability of energy related services within the European Union.

The Group was asked to map national practices for data access and exchange, consider available options for making them interoperable, and finally frame its recommendations to advise the Commission what to consider or not under further secondary legislation. The Group realizes that it will be important to establish the optimum balance between realising the benefits of convergence and flexibility whilst continuing to accommodate specific requirements of individual Member States.

This interim report presents key developments over the first phase (May 2017 – December 2017) of the Group's mandate, and its progress so far with the task at hand, as well as its reflection on how best to proceed and accordingly plan the course of action and next steps of this investigation.

The work so far has concentrated on (i) the reflection on the issue of interoperability and respective requirements and (ii) the steps for the final description of three main processes – namely switching of supplier, billing, and emerging energy services. The latter activity involved the mapping of two use cases (in Austria and France) and preliminary work on a common template in an attempt to 'normalise' these descriptions and facilitate their comparison in terms of procedures, format, and role models. The ultimate aim is to identify, after having completed the mapping of relevant national practices, commonalities, differences, and scope for convergence.

The Group in its reflections concluded that working towards interoperable procedures could well mean defining a target model and identifying possible transition approaches. Moreover, a number of already available data/information management models or ontologies, such as CIM, ebIX, SAREF, etc. could be considered in this investigation but whatever target model is to be proposed should be inclusive, technology-neutral and should not favour a specific ICT solution. Furthermore, lessons learnt from relevant exercises, such as that of the Nordics who have been investigating how to harmonise their customer processes, should be properly explored.

Based on these reflections and their first findings, and in appreciation of the complexity of the task, the Group has decided to proceed as follows for the first quarter in 2018:

i. work in parallel the description of the different processes for both electricity and gas, and continue the reflection on interoperability;
ii. build on this basis (see (i)) a simple, but detailed-enough, template, based on a national practice, and potentially using an available standard, and then run it for few countries (for which comprehensive descriptions exist) as to get a first indication of commonalities, divergences, and how to address them or potentially bridge them;
iii. then, in the light of the above, agree the following steps at the next Group meeting.

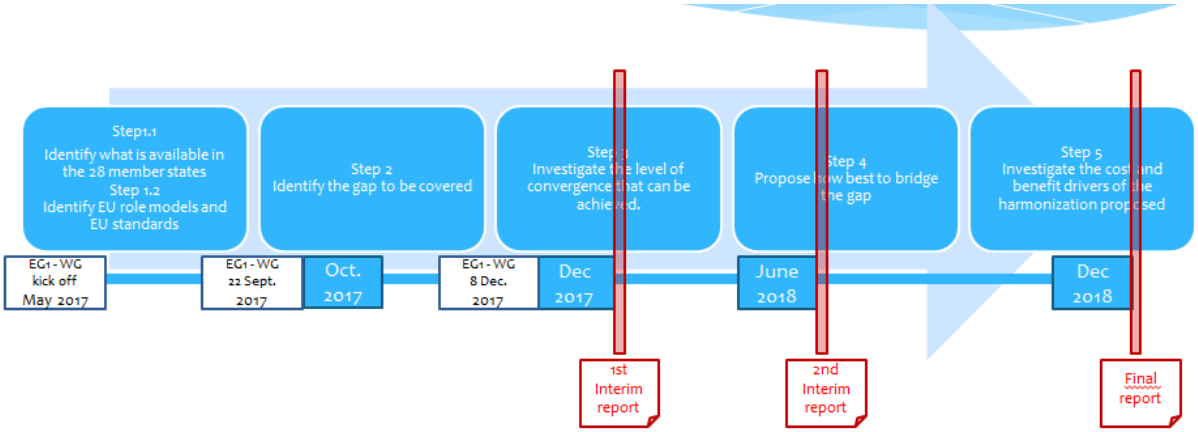
[1] Clean Energy Package: https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition ; most relevant to this work is the recast Electricity Directive COM/2016/0864/final/2 and its Articles 23 and 24.

Administrative Part

1. Terms of Reference & Roadmap

The Group's Terms of Reference (ToR), defining amongst others the scope and structure of its work, were timely drafted, submitted (the 30/06/2017), and finally validated by the Steering Committee. This final, approved version has been made available online on the dedicated web site of the Smart Grids Task Force[2]. Moreover, the Group developed a roadmap, as one of its first outputs, with key milestones and deliverables foreseen throughout its mandate.

Figure 1 – Roadmap for this Working Group



2. Progress so far

Despite a rather slow start, given the initial low involvement in the tasks by the Group members, the work has progressed, largely thanks to the Editorial Team and few key contributors, nevertheless, not at the speed originally foreseen. This is also due to the complexity of the task; as a result, the work under the first two steps (see roadmap in Figure 1) is still on-going. To gain ground, the Group is thinking strategically, and has decided to speed up and better guide the remaining work by developing a common template, and running it in a few use cases, instead of launching a full mapping exercise at this stage.

The Group is actually now gaining momentum, as also evidenced by the active engagement of more of its members in the discussions at the last meeting, and their renewed commitment to follow-up actions, as well as in their constructive feedback on related issues for an on-going external study[3] launched by the Commission.

[2] Terms of Reference of the Working Group on Data Format and Procedures - https://ec.europa.eu/energy/sites/ener/files/documents/tor_eg1_wg_on_data_format_procedures.pdf

[3] ASSET study on data format and procedures in the EU-28; contractor Tractebel (ENGIE); launched by Commission – DG ENER in 2017.

During this reporting period there were only three items scheduled for delivery and they have been successfully completed: namely, the Terms of Reference, the Roadmap and this first interim Report.

3. Group membership

The current list of the external experts– main representatives and their alternates – who are members of this Group and their affiliation, can be seen in Annex A. Changes in the original composition notified to the Steering Committee with the ToR are also indicated.

The listed members in this Group have been nominated by the organisations participating in the Smart Grids Task Force Steering Committee, and undertake their work by means of their own resources.

4. Working methods

The Group, as already agreed in its ToR, has proceeded with the work as well as with its specific deliverables based on consensus among all actors involved. It also intends to report on its progress, further to this interim report, at the next Smart Grids Task Force Steering Committee meeting scheduled for February 2018.

The work and the drafting of the respective deliverables with inputs from Group members is coordinated, since its establishment, by an Editorial Team (ET) of five. This Team was set up at the kick off meeting, in line with the agreed ToR, and consists of members from the following organisations: CEER, Eurelectric, ENTSO-E, ESMIG and ebIX (see Annex A).

5. Meetings

Since the establishment of the Group, and its kick off meeting the 24/05/2017, two more physical meetings with the whole assembly were held in Brussels, chaired, and organised by the European Commission, at its premises, the 22/09/2017 and the 07/12/2017, while the ET was engaged in regular, and lately weekly, teleconferences to progress with the work and coordinate actions. Furthermore, members of the ET participated, on Commission's request, in the progress meeting of a related external study on data that the Commission has previously launched and findings of which could potentially be of interest to this Group.

The next Working Group meeting is scheduled for the 19/03/2018.

Technical Part – Description of Work

1. Introduction

Consumers are entitled, in line with the current legislation[4], to receive free of charge their consumption data from electricity and gas undertakings, and allow access to it to a third party of their choice. It is the task of the national regulatory authority to facilitate this through an easily understandable and harmonised framework for the respective data[5]. These provisions are meant to ease consumers' access and understanding of their own consumption, and use of this information to compare offers from energy suppliers or other service providers. Moreover, the introduction of smart meters, further enriches this data[6] and could be used to create and offer to consumers broader value propositions beyond energy supply.

To facilitate this, and ensure that the required access and data exchanges among eligible parties happen via trusted mechanisms, in a transparent and non-discriminatory manner, standardised national arrangements need to be in place. These should cover a semantic model of the data to be exchanged, the content of data, the format in which data is provided to parties, and the systems and procedures used for control, access and the exchange of this data, in line with the EU General Data Protection Regulation[7]. Harmonising such arrangements within the EU, or somehow making them converge, could facilitate the interoperability of cross-border services and products, serving the interests of the internal energy market and of its consumers.

This Working Group is expected to investigate how best to move forward towards such a common framework and converging of national practices in the EU regarding data access and exchange, for both electricity and gas.

The outcome of the work could be a set of recommendations, framed following consensus amongst its members, on the scope and coverage of a potentially specific secondary EU legislation that will set up such common arrangements and facilitate the interoperability of cross-border energy services within the EU.

2. Approach

The Group, agreed when drawing its terms of reference that during its first phase of activities, it will map national practices in the EU, which should be common within each country's territory (in accordance with existing legislation) regarding data access and exchange, and then identify commonalities, differences and room for convergence, and consequently how to bridge the gaps focusing on reaching and maintaining interoperability (see roadmap). This work should also include an investigation of cost and benefit drivers for such an operation, and recommendations on advantages and disadvantages of a possible action.

[4] Directive 2009/72/EC and Directive 2009/73/EC; point Annex I.1(h)
[5] Article 37(p) of the Electricity Directive, Article 41(q) of the Gas Directive.
[6] Cf. also Articles 9(2) and 10(2) of Directive 2012/27/EU (the Energy Efficiency Directive)
[7] General Data Protection Regulation (EU) 2016/679

The work proceeded in line with this agreement during the reporting period. Furthermore, the Group reached consensus on the detailed strategy to follow as to speed up the progress and tackle this complex task. In detail, in this investigation of data access and exchange it was agreed to:

i. Consider both traditional and emerging processes[8], for electricity and gas, and launch parallel working streams to address them, to allow ample time to deal with difficulties/obstacles in collecting and analysing data and incorporate an alignment mechanism to refine investigation based on best practices
    - Traditional processes: *switching*, *billing* (potentially starting with *switching*);
    - Emerging services: (i) *"Download my consumption data"; (ii) "Giving access to my (consumption) data to third parties (historical data)"; (iii) "Giving access to my (consumption) data to third parties (near-real time data)".*

ii. For each one of these processes, identify:
    - roles and procedures (e.g. role model).
    - type of information exchanged (semantic model, identifiers, etc.).
    - data formats used (XML, CSV, …)
    - data exchange technology used (HTTP, FTP, Platforms, security, data privacy, performance, validation, authentication, non-repudiation, …)

iii. Draft a common, basic, template to be used for the description of processes and ease benchmarking
    - run it at first instance for few countries (those where members have better access to information) to get initial indications for common features and differences, and in the light of the above decide next steps.

At the same time, the Group agreed to comment, and give feedback to on an external study launched by the Commission on national practices for electricity and gas data access and exchange. The findings of this study, regarding particularly elements on data management arrangements and role models for these processes, could also provide some input to the Group's work during the coming period. This study is to be completed by the end of January 2018.

3. Harmonization of semantics for data

3.1 Introduction

The interoperability we want to achieve is needed because we decided that the energy market can only be made operational if we exchange information for short-cycle repetitive processes. Moreover, this information must be electronic, and the exchange processes must be automated. In other words: "… complex ICT systems must communicate and interwork on all levels.[9]"

[8] For the purpose of this document processes are understood to be implemented via procedures.
[9] ETSI web-site; http://www.etsi.org/standards/why-we-need-standards/interoperability

This implies that: (i) first the market roles (functions and responsibilities) need to be harmonized (ii) these processes must be harmonized all over the market area; and (iii) the significance (meaning) of the information that is exchanged between participants in these processes must be harmonized.

Since Europe is moving from a situation with many national markets towards a situation with more common European market and with less national market, the harmonization of data and processes is required at a European level. But this harmonization will be complex and cumbersome, since it must be done within an environment that is partly European and partly nationally defined.

Therefore, it is assumed, that the harmonization process must be executed step by step and must allow for a period with nationally defined tailoring of a jointly defined harmonized core for these data and processes.

As the priority for the first step the expert Group has chosen to focus on:

- How to best harmonize market roles (including functions and responsibilities);
- How to best define a way to harmonize the semantics (meaning) of the information that is exchanged
- For the processes:
    - Change of supplier, and later on billing;
    - Emerging services such as “My Energy Data”

The main relevance of the process description at this stage is in the fact that the process constitutes the context in which the data is defined.

3.2 Categories of processes

The processes for information exchange within a business sector can broadly be categorized as:

- Information exchange regarding master data for an object included in such transactions;
- Information exchange with a transactional nature

In the energy sector, the Connection Point is an all-important object. Master data for such a Connection Point define among others who is Supplier for that Connection Point. In a liberalized market, a customer has a free choice regarding an energy supplier. Consequently, a process is required in which a customer’s wish for change of supplier can be executed. Such a process is by nature part of (maintenance of) master data.

Some examples of processes with information exchange with a transactional nature: orders, bids, invoices, measured data or planning information such as schedules. Note that in all of these exchanges of transactional information, where an identifier refers to an object, the characteristics of this object must be described in a set of master data, which in turn has to be exchanged between participants in the sector

in order to align their knowledge of this object[10]. An alignment is essential for the proper understanding and execution of the transaction.

3.3 Harmonized Role Model

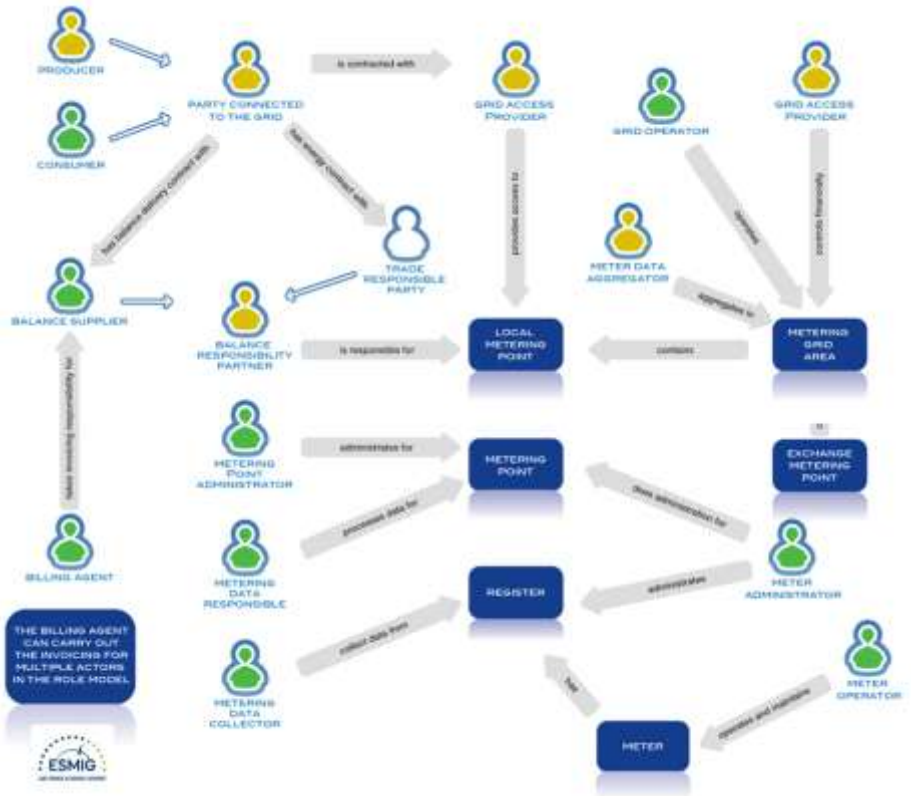
A common role model with functions and responsibilities is the most important basis for harmonizing.

ENTSO-E, EFET and ebIX have developed the Harmonized Electricity Market Role Model [11]. The last update of this role model has been made end of 2017.

The aim is to facilitate the dialogue between the market participants from different countries through the designation of a single name for each role and domain that are prevalent within the electricity market. Its focus is essentially to enable a common terminology for IT development

This can provide the necessary flexibility for national variations in implementations, while preserving the harmonized core for these processes.

Figure 2 – Schematic of a role model [12]



[10] It is not always necessary to exchange the full set of master data. For specific processes specific subsets of master data may be defined.

[11] Harmonized Electricity Market Role Mode: https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/Pages/default.aspx

[12] Metering point should be taken as equivalent to a connection point mentioned in this document.

3.4 Templates developed to describe the processes

To facilitate the collection of national examples of present definitions used for information that is exchanged, the Editorial Team has tried to create a template that can be used to do so.

Unfortunately, the first trials to use the defined template showed that the template might be too rigid to support this data collection. An initial conclusion has been to allow for some flexibility in delivering definitions of information that is exchanged and for the specification of the process in which the information exchange takes place. For example, to allow for:

- either textual / spreadsheet version of a UseCase description incl. the data, or (when available)
- an UML specification of a UseCase, incl. its Activity (activity diagram) and Data (Class diagram). Take UN/CEFACT UMM 2.0 as basis for such a specification.

Both the initial template that has been defined and the information that has been collected so far are included in annexes to this interim report.

The efforts to define templates for the data collection will continue, as will the data collection. We are looking for templates that on the one hand best meet the understanding of the parties we ask to provide examples, and on the other limit the work to be done by the Working Group to process the collected information and derive conclusions from it.

The intended result of this data collection will still be to find a way to combine a semantically harmonized core process that will allow for national customization where required, based on a harmonized market role model.

4. Two examples – for emerging services and supplier switching [13]

4.1 Example for emerging services process in France

With smart meter data, new ideas of services are emerging from third parties: advice about supplier switch, energy diagnosis, 'gamification', advanced comparison, 'chatbots', etc. Since 2017, Enedis has been experimenting In France a way to provide those third parties with data necessary to their services, while ensuring that the customer gives his consent to share data.

Description

This use case describes how an Energy Service Company (ESCO) can be provided with smart meters data from the Smart Meter Data Manager (SMDM) through a Connect Service so that they can offer an Energy Service to customers, with the consent of the customer. More details on this can be found below and in Annex B.

Conditions

- The customer has a smart meter and an online account with the SMDM

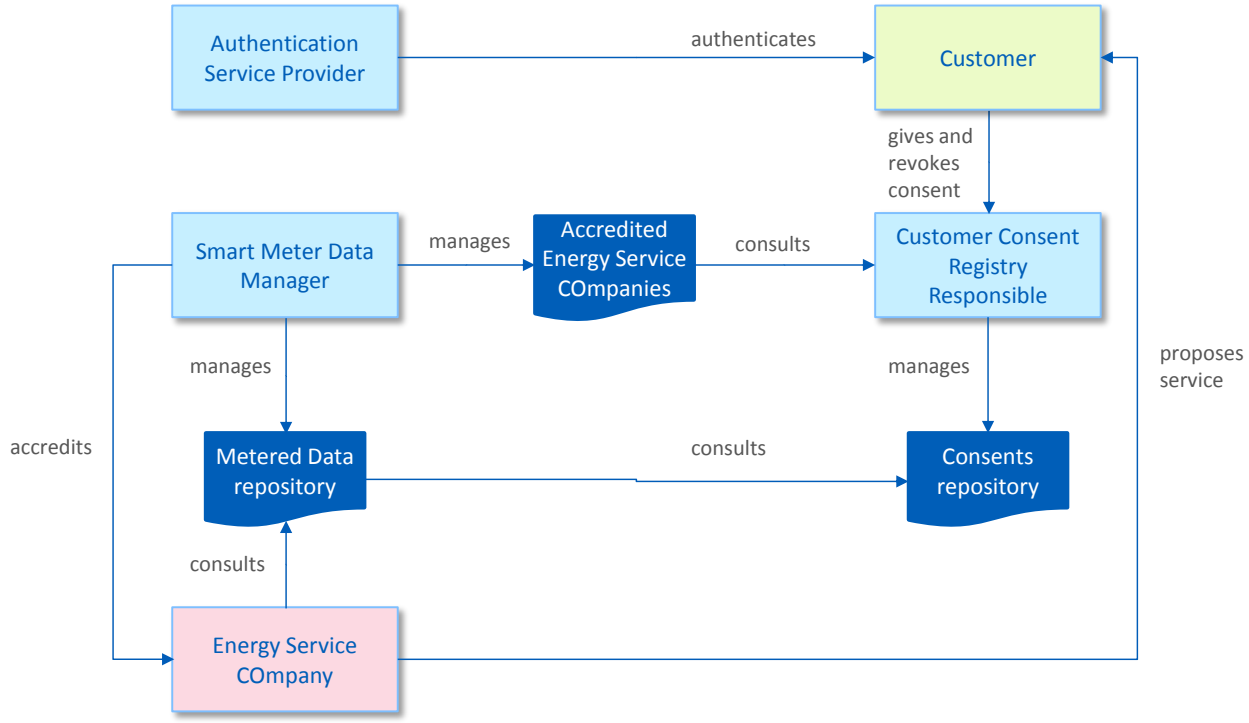
[13] In this first preliminary report only two markets have been considered. Others will be taken into account as the work progresses.

- The ESCO is accredited with the SMDM, developed a service, and the interface has been validated by the SMDM

Role model and interactions between roles

In this experimentation, Enedis as a DSO plays following roles (blue pale colour): Authentication Services Provider, Smart Meter Data Manager, Customer Consent Registry Responsible.

Figure 3 – Schematic of a role model for emerging services (a French use case)



Data access Procedure

Following procedure steps, tagged hereunder as 'NS#', are described more precisely in annex D.

[Steps NS01, NS02, NS03] ESCO Presentation of the exposed service, the sharing process and an action button designed by the SMDM.

[Steps NS04, NS05] The customer gets the authentication page and encodes his credentials

[Step NS06]: The customer provides his credential and is authenticated with the SMDM

[Steps NS07, NS08, NS09, NS10] The SMDM presents a consent form, which the customer can accept or decline

[Step NS11]: The consent is recorded in the consent manager

[Step NS12]: The customer gets a receipt

[Step NS13]: The SMDM grants access to the ESCO

[Step NS14]: The ESCO confirms the consent is delivered and can offer their service

[Steps NS15, NS16, NS17] The ESCO requests data to the SMDM, which checks if the consent is still valid and then returns data to the ESCO.

Data format

Enedis metering data format for this new service is semantically based on the international standard IEC TC57 Common Information Model and inspires from EU-MED Data Format specification, which has been defined in the EU funded Flexiciency Project. The specification document is published and freely accessible through Flexiciency's internet website [14]. An illustration of the data structure, exported in a JSON file type, is provided below.

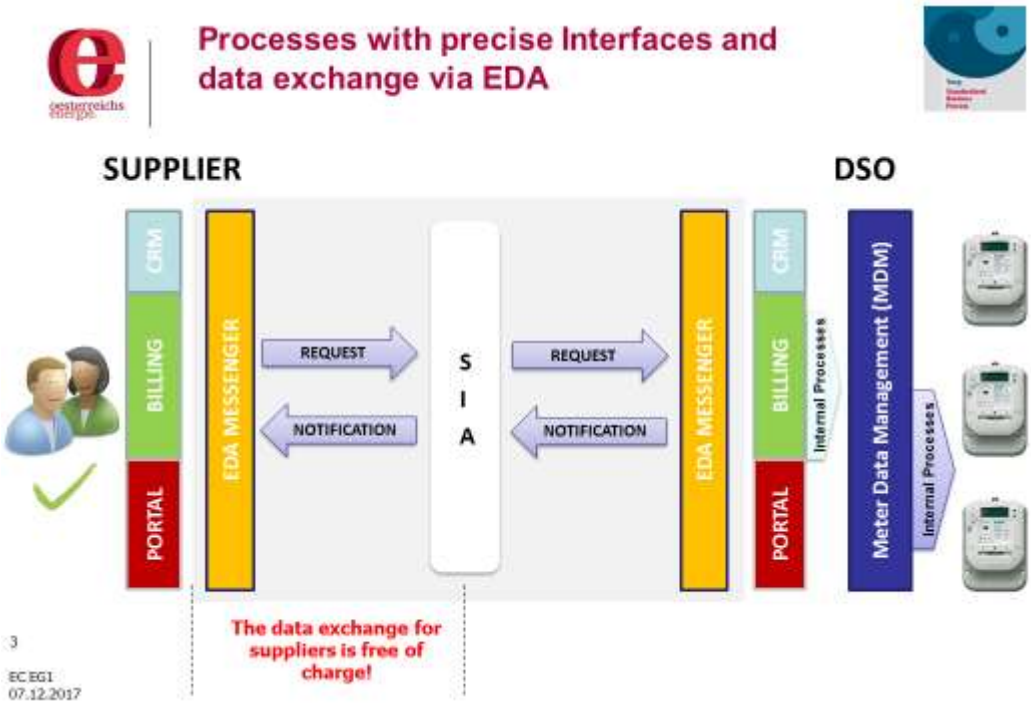

```
{
"usage_point" : {
      "usage_point_id" : "3546387321341",
      "meter_reading" : {
            "reading_type" : {
                  "measurement_kind" : "power",
                  "start" : "2017-11-01",
                  "end" : "2017-11-06",
                  "interval_length" : "1800" ,
                  "time_attribute" : "thirtyMinutes",
                  "unit" : "W",
                  "flow_direction" : "forward"
                  "agregate" : "average"
            },
            "interval_reading" : {
                  "value" : "94",
                  "reading_number" : "1"
                  "reading_quality" : "raw"
            },{
                  "value" : "98",
                  "reading_number" : "2"
                  "reading_quality" : "raw"
```


[14] EU MED format is available on Flexiciency project website. Direct access to : http://www.flexiciency-h2020.eu/images/Deliverables/FLEXICIENCY_D6_0_B2B_EUMED_CIM_V1_1.pdf

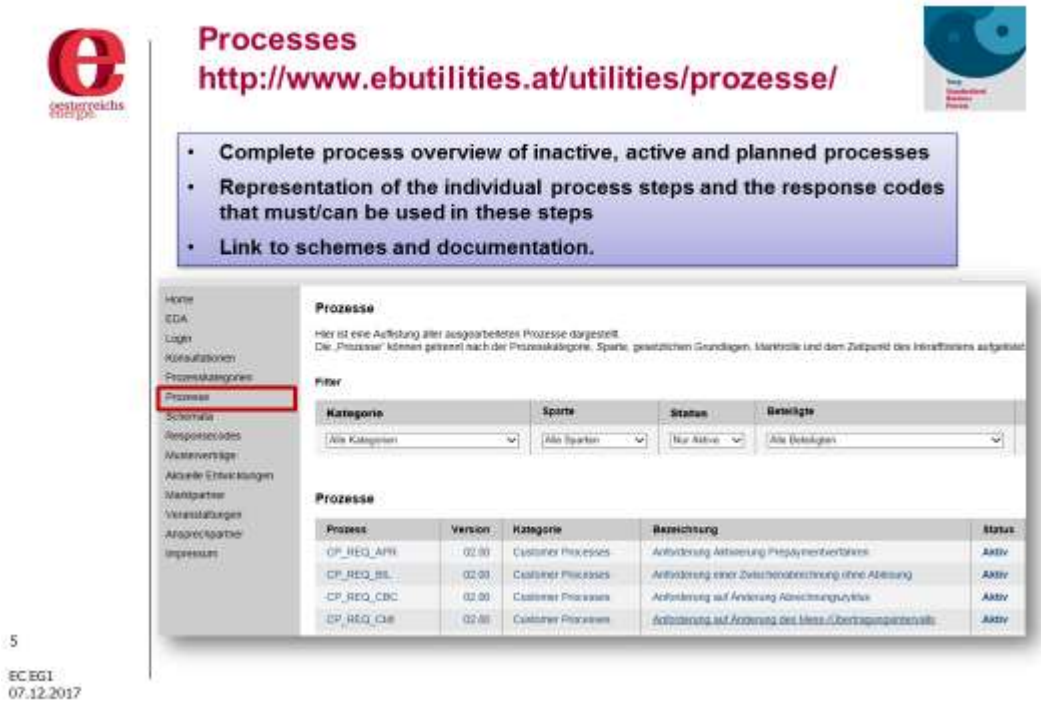
4.2 Example for the switching process in Austria

General

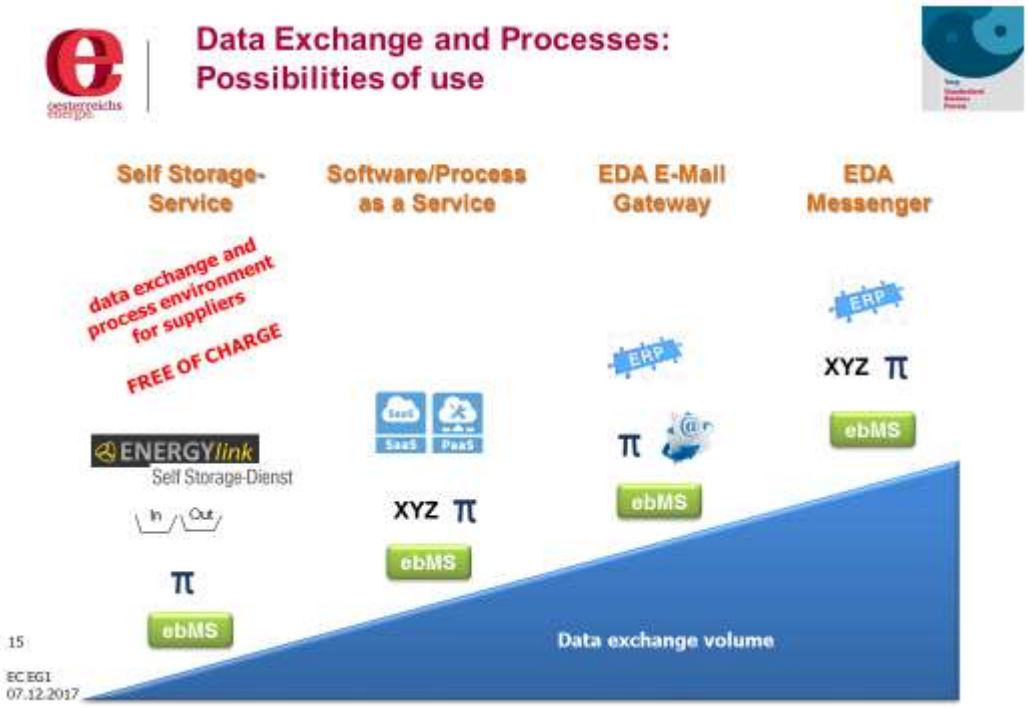
The market processes in Austrian are all well documented. The documentation is available for market participants as well as software providers and other service providers at www.ebutilities.at.



Processes

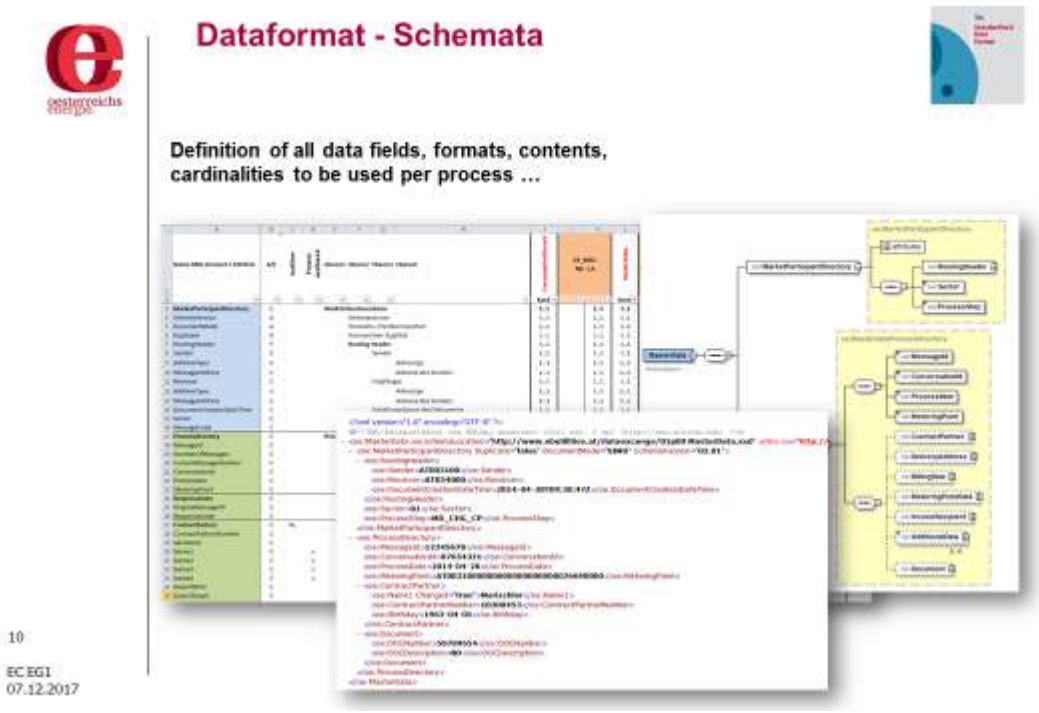


“Small” suppliers can use a process environment – free of charge:



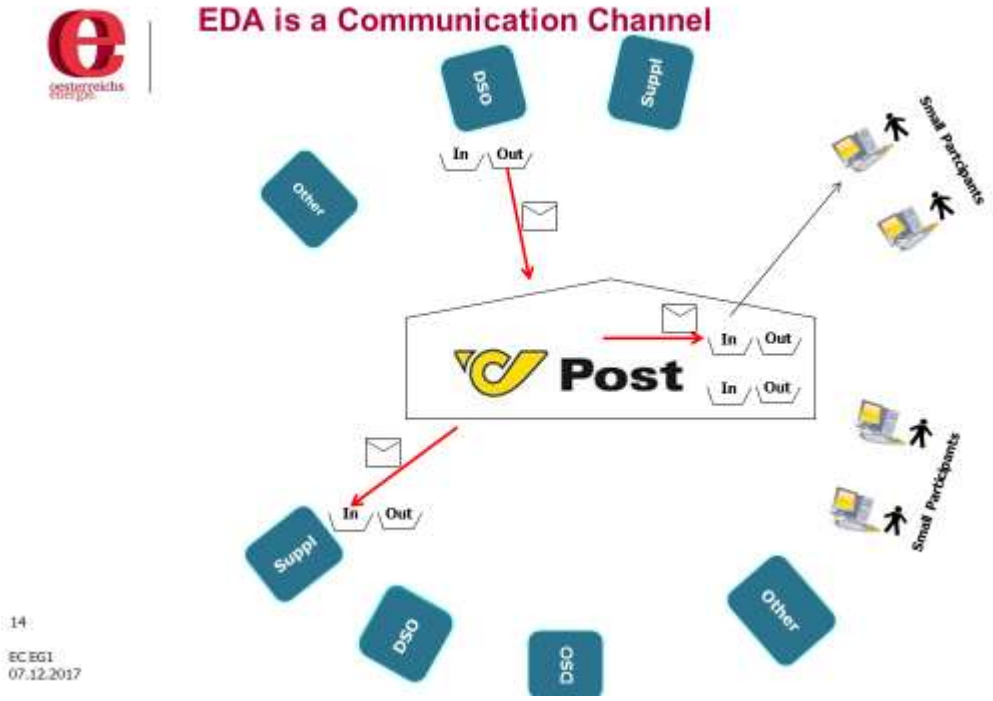
Data Format

All data formats for data exchange are defined by the association “Österreichs Energie” and implemented as XML formats.



Data Exchange

The data exchange takes place in Austria generally via EDA. This is an ebMS-based messenger environment, which is made available to all suppliers by network operators free of charge.



Unfortunately the entire documentation for the processes, data formats and data exchange is only available in German. So the relevant documents had to be translated into English for this report.

More details on this national process can be found in Annex C.

5. Required Interoperability

This Group intends to undertake an investigation on the path towards a common energy data framework for access and exchange, in the spirit of achieving and maintaining interoperability. In its Terms of Reference it is several times noted that “Interoperability has to be ensured”. But, what is “interoperability”, why is it required and what does it refers to?

5.1 Added value of interoperability

In the technical world of ICT and digital markets, specifications, as defined in standards outlining the agreed properties for a particular product, service, or procedure, are primarily used to maximise interoperability– the ability for devices, systems and services to connect and work together. They are essential to ensure that markets remain open and competitive, allow consumers to have the widest

choice of products possible and give manufacturers the benefit of economies of scale. That is why interoperability is a cornerstone of the Digital Single Market[15] .

5.2 Definition of interoperability & requirements[16]

Interoperability can be understood in many different ways and levels and for this reason it is important to establish from the beginning what we want to mean when we say “ensure interoperability”.

There is no single definition of interoperability. Interoperability is addressed as a concept, and consequently defined, in different areas, ranging from administrative[17] to technical functions and therefore it must be understood and discussed in the context of the processes that is meant to govern each time.

In the case under investigation, the focus should lie on the relevant technical definitions provided by the standardisation community [see standards for smart grids (CEN-CLC-ETSI M/490[18] , and definition by ETSI on ICT systems[19])], when discussing the ability of two or more systems or components to interoperate given that "in a world of converging yet diverse technologies, complex ICT systems must communicate and interwork on all levels"[20] .

Within the European Smart Grids standardization world, the most accepted definition of basic interoperability is “the ability of two or more devices to exchange information and use that information for correct cooperation to perform the required functions [IEC61850-2010] ”[21] .

In other words, two or more systems (devices or components) are interoperable, if they are able to perform cooperatively a specific function by using information which is exchanged. This concept is illustrated in Figure 4.

---

[15] ICT standards and the Digital Single Market; https://ec.europa.eu/digital-single-market/en/policies/shaping-digital-single-market

[16] Interoperability has already been addressed by EG1 in its earlier work, and most recently with regard to the smart metering systems being rolled out in the EU (reference: *Smart Grids Task Force: Expert Group 1 Report on a survey regarding "Interoperability, Standards and Functionalities applied in the large scale roll out of smart metering in EU Member States", 2015)*. It was then clarified that both technical and functional interoperability must be sought; in other words, the smart meters must be inter-exchangeable but also able to support via standardized interfaces the inter-operation of the (smart) metering infrastructure with consumers' energy management systems and services' platforms in the energy market. To this respect, a follow-up report gave guidance on the appropriate steps, based on the process established in standards, to reach and maintain interoperability (reference: *Smart Grids Task Force: Expert Group 1 "Interoperability of the H1/H2 interfaces of the flexible demand architecture applied in the large scale roll out of smart metering systems in EU Member States", 2016*). Both reports are available here: https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force

[17] For instance, the European Interoperability Framework (COM(2017) 134 final; https://ec.europa.eu/isa2/eif_en; Annex 2] giving specific guidance on how to set-up interoperable digital public services, defines *interoperability* as *"the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems".*

[18] CEN-CLC-ETSI Smart Grid Coordination Group M/490: " Smart Grid Reference Architecture" (e.g Fig 4, 6); ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/Reference_Architecture_final.pdf.

[19] ETSI White Paper No. 3, "Achieving Technical Interoperability -the ETSI Approach", April 2008; http://www.etsi.org/images/files/ETSIWhitePapers/IOP%20whitepaper%20Edition%203%20final.pdf.

[20] ETSI web-site; http://www.etsi.org/standards/why-we-need-standards/interoperability

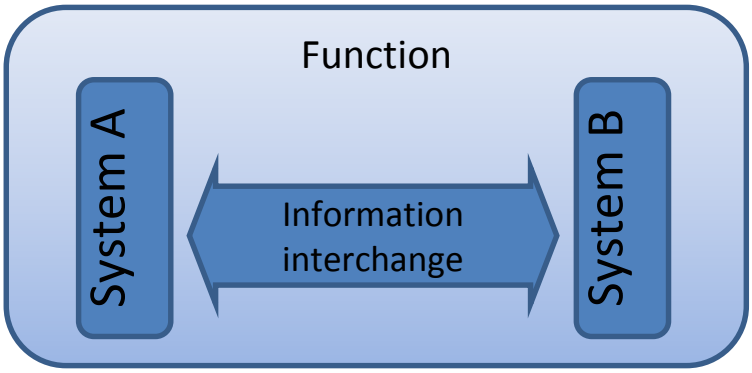
[21] [IEC61850-2010]: IEC 61850, Communication networks and systems for power utility automation, 2010.

To reach and maintain "full" interoperability that allows different systems to perform a function by interchanging information, all different levels of interoperability must be fulfilled.

The GridWise Architecture Council [GWAC2008][22] represent a widely accepted methodology to describe requirements to achieve interoperability between systems or components (Figure 5), considering three drivers, namely, technical, informational and organisational. To realise a fully interoperable function, all these three clusters, and their respective sub-categories as seen in Figure 5, have to be covered, by means of standards or specifications.

A rather more inclusive definition of interoperability is given in the latest report[23] by the CEN-CLC Coordination Group on Smart Energy Grids (CG-SEG)[24] that continues the work performed (by the CG-Smart Grids) under the smart grids mandate M/490. There interoperability is understood as "the ability of two or more networks, systems, devices, applications, or components to interwork, to exchange and use information in order to perform required functions". Moreover, and based on the GWAC work, as further elaborated by the CG-SG in its Smart Grids Architecture Model (SGAM[25]), interoperability is considered as "exchange of meaningful information, a shared understanding of the exchanged information, a consistent behaviour complying with system rules, and a requisite quality of service: reliability, time performance, privacy, and security".

Figure 4 – Definition of interoperability – interoperable systems performing a function



[22] [GWAC2008]: GridWise Interoperability Context-Setting Framework (March 2008), GridWise Architecture Council, online: www.gridwiseac.org/pdfs/.

[23] CEN-CENELEC-ETSI Coordination Group on Smart Energy Grids (CG-SEG) Report on Smart Grid Set of Standards Version 4.1, January 2017, ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/EnergySustainability/SmartGrid/CGSEG_Sec_0042.pdf

[24] CEN-CLC website on smart grids standardisation and follow-up work: https://www.cencenelec.eu/standards/Sectors/SustainableEnergy/SmartGrids/Pages/default.aspx

[25] The Smart Grid Architecture Model (SGAM) was developed under the smart grid M/490 standarisation mandate. Its five layers represent an abstract and condensed version of the GWAC interoperability categories. The SGAM framework can be found (see Figure 8) here: ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/Reference_Architecture_final.pdf

Figure 5 – Interoperability categories as defined by GWAC [GWAC2008]

Bearing in mind the above, the Group will give recommendations about formats and procedures that will allow "syntactic[26]" and "semantic[27]" interoperability, i.e., so as to not only to be able to interchange packets of information[28] , but also understand the information contained in those packets[29].

More details on the semantic and syntactic interoperability can be found in Annex D. The Group intends to further discuss examples of existing information models or ontologies (including EDIFACT[30], SAREF[31], CIM[32], DLMS/COSEM[33], etc.) in the coming period.

[26] Syntactic interoperability – understanding of data structure in message exchanged between systems
[27] Semantic interoperability - understanding of the concepts contained in the message data structures
[28] This relates to the so-called "communication layer" of interoperability that links to protocols and specific mechanisms for exchange of information in the context of the underlying use case, function or service and related information objects or data models – reference: CEN-CLC-ETSI Smart Grid Coordination Group M/490: " Smart Grid Reference Architecture"
[29] Reference: European Interoperability Framework (COM(2017) 134 final; Annex 2 - http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF]; *"The semantic interoperability ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties, in other words 'what is sent is what is understood'. In the European Interoperability Framework for public services, semantic interoperability covers both semantic and syntactic aspects: (a)* ***The semantic*** *aspect refers to the meaning of data elements and the relationship between them. It includes developing vocabularies and schemata to describe data exchanges, and ensures that data elements are understood in the same way by all communicating parties; (b)* ***The syntactic*** *aspect refers to describing the exact format of the information to be exchanged in terms of grammar and format".*
[30] See https://www.thinkmind.org/index.php?view=article&articleid=dbkda_2017_4_30_50046

5.3 Benefits and cost drivers for interoperability

Since the start of the liberalisation of the energy markets in Europe market parties and network operators have been making significant investments and efforts to comply with national market rules in each of the energy markets where they operate.

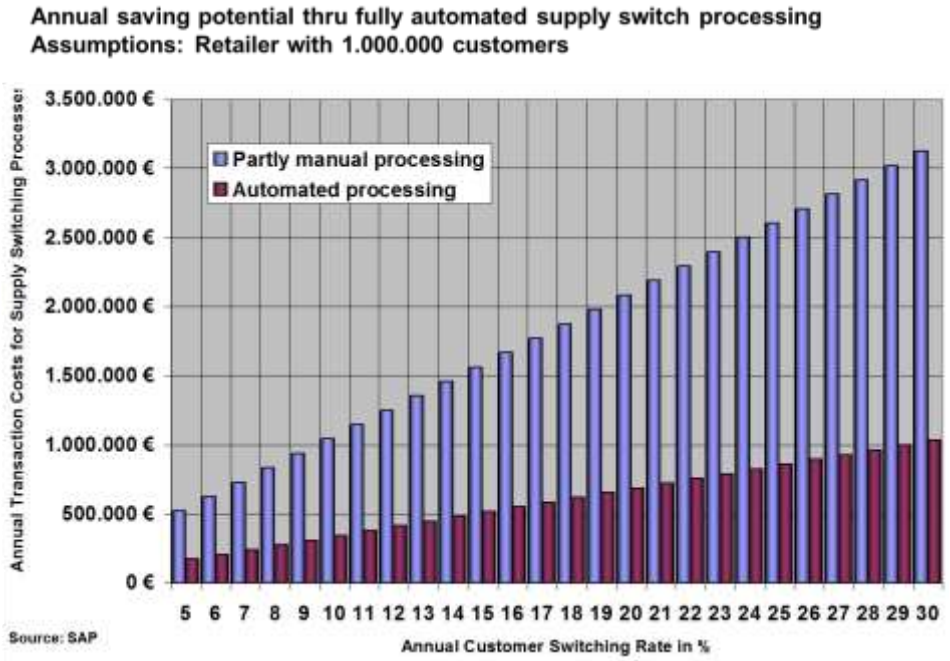
The scale of the operation, the maturity of the market and also the complexity inherent to (sometimes, more than 300 market) messages to handle, resulted in different magnitudes of investments by the different market parties and network operators.

Most niche energy retailers have been able to find ways of operating in their respective national energy markets with low levels of automation and limited investments in interoperability. Large utilities, many times resulting from the previous incumbent businesses have made huge investments to accommodate different national market rules and standards over the years that would allow them to handle high volumes of market processes with high levels of collaborative business processes automation.

The range of the operational costs and associated benefits about operating in different national markets will for sure be different from national market to national market and from market party to market party.

It is well known, nevertheless, that the costs of compliance to the national rules are high and that these investments still bring high levels of return (not business return given the nature of a compliance related investment) compared to options of having partially automated collaborative business processes, like in the case of supplier switch, illustrated in Figure 6.

Figure 6 – An example of costs of compliance to changes in national rules in the case of supplier switch



[31] ETSI TS 103 264 SmartM2M Smart Appliances Common Ontology and SmartM2M/oneM2M mapping; and http://ontology.tno.nl/saref/

[32] CIM - https://www.entsoe.eu/major-projects/common-information-model-cim/cim-for-energy-markets/Pages/default.aspx

[33] DLMS/COSEM - http://dlms.com/information/whatisdlmscosem/index.html

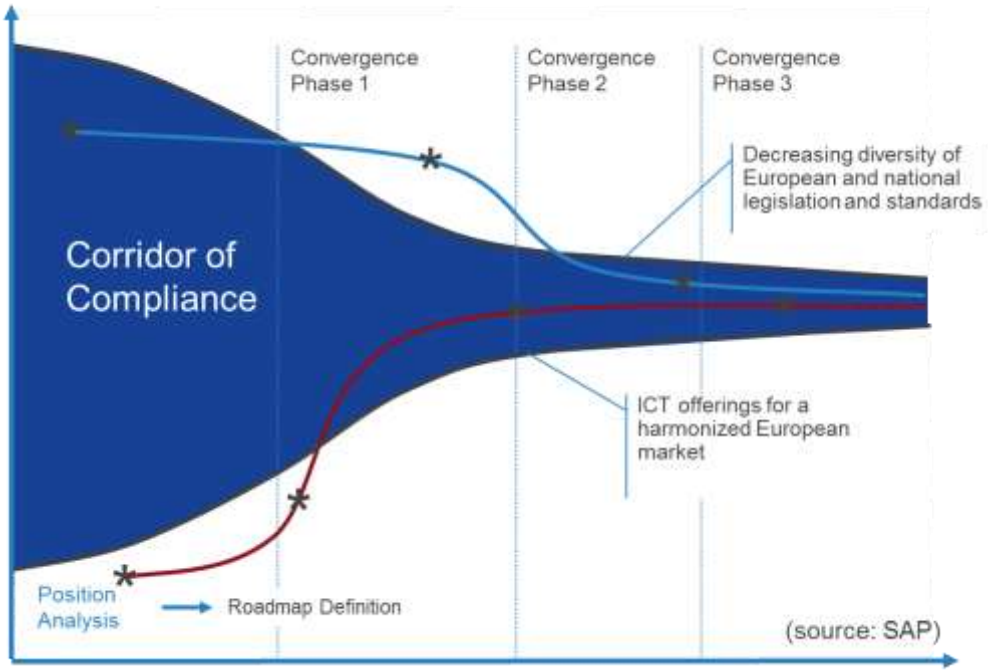
When we look at costs and benefits of harmonization of market rules and standards within European Energy Markets we are looking at the costs of operations of a market with more than 250 million Electricity Points of Delivery and more than 100 million Gas Points of Delivery.

The costs of automating collaborative business processes in the liberalized energy markets are therefore, immense, compared with a reality of one single retailer operating in one single market with an annual switching rate of 10% to 15% every year. In reality, Europe consist of many national markets, many market participants orchestrating many processes on top of 350 million Utilities Points of Delivery.

It should also be noted that many market participants are operating in the regulated side of the business (e.g. network operators). In practice, this means that the costs for compliance are not only carried by the commercial operators (that face a high barrier to entrance to scale here) but are also carried by the regulated market participants.

Convergence of standards offers here a unique possibility to ensure that while we decrease divergence of the national rules and standards we will have a better standardized fit of, in particular, ICT solutions and therefore reducing the high costs of compliance that are being carried by the market parties and network operators.

Figure 7 – Step-wise convergence and corridor of compliance effect



As European regulation is pushing for better interoperability of the European energy (gas and electricity) Market, it is important to ask the question of the main benefits and cost drivers for interoperability.

The aim of this question is to comfort us in the need of the required interoperability and to extract some recommendations on how to implement the changes to better interoperable systems, to maximize the social welfare.

In this paragraph, we will focus on the supplier switching process, but the same logic can be applied for other use cases (customer billing, new services, etc.).

Reduces Costs of Operations

There are several cases when within one organisation a new implementation of business operations and IT systems are needed, examples are:

- a new supplier enters the market in one or several countries in Europe,
- an existing supplier decides to enter the market in a new country in Europe,
- an existing supplier needs to update its IT system to meet new requirements
- an existing supplier needs to redevelop its old IT system to meet new legislation or other requirements (the average lifetime of an IT solution is approximately 10 to 15 years before it has to be redeveloped)
- ….

In these cases, the implementation of a new IT system is an opportunity to conform to the last European standards.

Economic and Business advantages of harmonized practices

The Group will investigate in the coming period further the issue of economic and business benefits that comes with the alignment of rules and standards within the EU, bearing in mind the following:

- For the utilities having business in several countries or willing to enter a new market in Europe, having European common regulation and rules for data access reduces barriers for market competition as it is easier and cheaper to enter a new market.
- Convergence on European level of national rules and standards will accelerate the development and availability of innovative Energy Services for all market participants.
- Too much standardization could lead to less flexibility; there is the fear of finding ourselves locked into one solution and might lose the possibility to be flexibly-, timely- and cost-effectively responsive to changes.

Disadvantages of harmonized practices

Harmonizing data formats makes no sense if the rules are not roughly the same. Harmonizing the rules reduces significantly the room to manoeuvre for national regulators. A principle choice has to be made if the principle of subsidiarity applies here. The principle of subsidiarity is defined in Article 5 of the Treaty on European Union. It aims to ensure that decisions are taken as closely as possible to the citizen and that constant checks are made to verify that action at EU level is justified in light of the possibilities available at national, regional or local level. Specifically, it is the principle whereby the EU does not take action (except in the areas that fall within its exclusive competence), unless it is more effective than action taken at national, regional or local level. It is closely bound up with the principle of proportionality, which requires that any action by the EU should not go beyond what is necessary to achieve the objectives of the Treaties.

Electricity is seen as a necessity of life. Giving up national powers to decide on these matters for its citizens may breach the principle of subsidiarity.

The Group intends to further reflect amongst others on the issues raised above regarding benefits and cost drivers of interoperability, as well as advantages and disadvantages of reaching and maintaining interoperability.

5.4 State –of– the art of standardization for data format and procedures

The IEC[34] , jointly with CENELEC , have a Technical Committee dedicated to the power systems management and associated information exchange (TC57). In this Technical Committee, one of the working group is about the Deregulated energy market communications (WG16). In this working group (together with WGs on Energy management system application program interface (EMS - API), System interfaces for distribution management (SIDM)), the Common Information Model (CIM) has been developed.

5.4.1 Supplier switching and consumer billing

The European Style Energy Market Profile is based on canonical CIM and has been developed by WG16 of TC57 of IEC. Especially, the first focus was on the wholesale market and ENTSO-E participates to develop profiles to meet network codes requirements.

An initiative from ebIX coordinated by IEC TC57 WG16 is ongoing to propose a Technical Report to IEC to make a review of information exchanges within the deregulated European style retail energy market from a CIM perspective. The draft Technical Report includes the supplier switching process and customer billing process.

The draft Technical Report shows the feasibility for the CIM to meet retail market requirements on the studied use cases; a modelling work is now ongoing at IEC TC57 WG16 level to analyze the impact on the CIM.

5.4.2 New services

Another initiative is the “My Energy Data” (MED). This is the term adopted as a generic description of services to offer customers (residential, municipalities, …) the possibility of downloading their energy consumption information and granting access to third parties to that information to enable service providers to offer services to customers.

EG1 has already looked into this issue back in 2016. That earlier work was performed with the aim of getting an overview of some of the existing initiatives on data access and data management in the field of energy distribution, and to identify possible obstacles for controlled data access and data management, and explore at EU level the potential for and scope of a possible industrial initiative on a common format for energy data interchange. The ad hoc group produced a report with their findings (in November 2016) which could serve as background to the current work[35].

[34] IEC – International Electrotechnical Commission

[35] Report by Smart Grids Task Force. Ad hoc group of the Expert Group 1 – Standards and Interoperability (November 2016) “My Energy Data”;

"My Energy Data" is primarily subject to the Article 23 and Article 24 of the proposal for a recast Electricity Directive (COM(2016) 864). As stated in the "My Energy Data" EG1 report[36]:

- My Energy Data services are primarily subject to the EU General Data Protection Regulation (GDPR) 2016/679/EC, the Energy Efficiency Directive 2012/27/EU, the Electricity Directive 2009/72/EC, the Gas Directive 2009/73/EC and further country-specific legislation;
- One of the key aspects that would significantly contribute to opening the European internal market for future Energy Services is for the industrial initiative to establish a common format for energy data interchange that allows companies to seamlessly provide their services throughout the EU Member State;
- Europe needs to define a standard to support the "My Energy Data" requirements. The application domain of this work is limited to customers connected to Distribution System Operator (DSO) grids.

6. Next steps

Based on their reflections so far and their first findings, and in appreciation of the complexity of the task, the Group has decided to proceed as follows for the first quarter in 2018:

i. work in parallel the description of the different processes for both electricity and gas, and continue the reflection on interoperability;

ii. build on this basis (see (i)) a simple, but detailed-enough, template, based on a national practice (e.g. that of Austria), potentially using an available standard, and then run it for few countries (for which comprehensive descriptions exist or members have easier access to information – e.g. FR, NL, Nordics, IT, ES) as to get a first indication of commonalities, divergences, and how to address them or potentially bridge them;

iii. then, in the light of the above, agree the following steps at the next Group meeting scheduled in March 2018.

The next steps will be divided into three sub-groups. The first sub-group will address the switching processes, the second sub-group is about the new and emerging services and the last one is on the investigation of the required interoperability.

Harmonization of the EU switching processes:

– The Group had a meeting the 7th of December 2017, where it reviewed amongst others the Austrian template containing the switching process and concluded that it contained too much detail. A template with this much of detail is difficult to compare between all the EU member states. Therefore, it was decided to develop one common description of a switching process. This description

https://ec.europa.eu/energy/sites/ener/files/documents/report_final_eg1_my_energy_data_15_november_2016.pdf

[36] idem

will be based on the the switching process in one member state or it will be based on a format like for instance the ebIX format or the CIM International Standard. Further investigation is needed to decide on the format of reference. Once the standard switching process is described with enough details specialists from other member states can specify how the switching process in their country deviates from this standard. This way a first indication of the most common deviation can be presented.

- The Nordic countries (Denmark, Sweden, Norway and Finland) are trying to harmonize their customer processes like switching moving etc. already for a long time. They have encountered many difficulties. It is likely that we can learn a lot from this process for our future recommendations.

New and emerging services:

- We will continue trying to describe the development of new and emerging services in different member states. Especially the difficulties and barriers they encounter.

Interoperability:

- The activities on interoperability will also continue. Investigation of standards which can be used will be continued. It is very likely that we can learn from other sectors or other interoperability standardization initiatives on EU level.

These are the three topics that will be further investigated in the coming year. This will lead to a second interim report at the end of June 2018 and a final report at the end of December 2018. The end result is a set of recommendations concerning the harmonization and interoperability of the customer processes in the EU energy sector.

Annex A – Membership in the Smart Grids Task Force EG1 Working Group

Working Group"Electricity and Gas Data Format & Procedures", chair: European Commission			
EC	**DG ENER**	Manuel Sánchez Jiménez Constantina Filiou Niels Ladefoged Remy Denos	
	DG CNECT	Patricia Arsene	
	DG GROW	Daniel Hanekuyk Zsuzsanna Dakai (*)	
	DG JRC	Ioulia Papaioannou Nikoleta Andreadou Igor Nai Fovino	
	DG JUST	Georgios Kiriazis	
	DG RTD	Patrick van Hove	
	INEA	Mariana Stantcheva	
	Association	**Expert**	**Alternate**
Nomination of one expert and one alternate (1) no alternate (2) Multiple functional player (3) Covering also the role of supplier (4) 2 experts and 2 alternates (5) EC ask BEUC case by case, according with the issue to discuss (*) Changes in composition since last notification to the Steering Committee	**CEER**	Amandine Deboisse – FR NRA (*)	Deniz Erdem – DE NRA
	CEDEC(1) (2)	Christian Richter – vku (DE)	-
	EDSO (1)	Jean-François Montagne -Enedis	-
	Eurelectric (1) (3)	DSO issues: Paul de Wit – Alliander Supply issues: Kajsa Lilius – Öresundskraft	-
	GEODE (1)	Franz Fischer – Energie AG	-
	ENTSO-E (4)	Olivier Aine – ENTSO-E Milos Bunda – BUNDA	Norela Constantinescu – ENTSO-E Marcos Olmos – ENTSO-E
	Orgalime/T&D	Rodolphe de Beaufort – GE	Sigrid Linher – ORGALIME
	ESMIG	Miguel Gaspar – SAP	Willem Strabbing –ESMIG
	ANEC/BEUC (5)	Neil Avery – ANEC	Kristina Aleksandrova – ANEC (*)
	SmartEn [(*) former SEDC]	Frauke Thies – SmartEn	Chris King – Siemens Digital Grid
	ENTSO-G (4)	Marin Zwetkow – ENTSOG (*) Jef de Keyser – ENTSOG	
	Eurogas (1)	Julien Quainon – DSO GRDF	
	MARCOGAZ	Jos Dehaeseleer – Marcogaz	Henk Koorenhof –gasunie (*)
	ebIX	Kees Sparreboom – TenneT	Vlatka Cordes - Westnetz
	CEN/CENELEC (observer) (*)	Constant Kohler (*)	Manuel Jesus de Tellechea (*)

Association	Editorial Team (ET)
CEER	Amandine Deboisse
Eurelectric	Paul de Wit
ENTSO-E	Olivier Aine
ESMIG	Miguel Gaspar
ebIX	Kees Sparreboom

Association	Members that assisted the ET through this reporting period
EDSO	Jean-François Montagne
GEODE	Franz Fischer
CEN/CENELEC	Manuel Jesus de Tellechea

Annex B – Example – Emerging services in France

Hereunder is the step by step description of customer data sharing that is experimented by Enedis in 2017 for new emerging services in France. It is based on the assumption of the following two pre-conditions.

- The customer has a smart meter and an online account with the Smart Meter Data Manager
- The Third party providing a new service is accredited with the Smart Meter Data Manager (SMDM); it has already developed its service and the interface between its IT system and the SMDM's one has been validated

Step	Procedure Step Name	mandatory/ optionnal	Condition/Description	Exchanged information	Scheduling
NS01	Presentation of Energy Service	mandatory	The ESCO describes the Energy Service he's offering the customer		synchronously
NS02	Presentation of Data sharing process	mandatory	The ESCO explains to the customer why they need data from customer's smart meter and that they have to grant them access to it		synchronously
NS03	Presentation of Connect Service starting	mandatory	The ESCO displays to the customer a "Connect" button, designed by the SMDM, with the information about what data he needs, for how much time, with how much history, the name of the service and a logo	data scope consent duration history length service name service logo ESCO credentials	synchronously
NS04	Consent process initiation	mandatory	The customer clicks on the Connect button		synchronously
NS05	Customer authentication initiation	mandatory	The SMDM redirects the customer to an authentication page provided by the authentication service provider		synchronously
NS06	Customer authenticated	mandatory	The customer provides his credential and is aut	customers' credentials	synchronously
NS07	Autorisation page presentation	mandatory	The SMDM displays a consent page describing the proposition of the ESCO : name of service, logo of ESCO, data required, duration of the share, history needed. They also describe how the customer will be able to change his mind.		synchronously
NS08	Data additionnal information	optionnal	The SMDM can also provide the customer with pedagogical information about the data they are about to share		synchronously
NS09	Consent personnalisation	optionnal	The SMDM can also offer the customer to personnalize one of several terms of the autorisation : add or remove data, change the duration of the share and/or the history available.	data scope modification consent duration modification history length modification	synchronously
NS10	Consent acceptation	mandatory	The customer approves the share with a clear affirmative action		synchronously
NS11	Consent recording	mandatory	The SMDM sends the consent information to the Consent registry manager so that the consent is properly stored	data scope consent duration history length service name ESCO reference energy delivery point identifier	synchronously
NS12	Consent receipt	mandatory	The SMDM sends a receipt by email to the customer with a summary of the consent, with a timestamp and a reminder about how to revoke it		synchronously
NS13	Access grant	mandatory	The SMDM sends to the ESCO a token to grant him access to data the customer consented to share with them	token	synchronously
NS14	Confirmation page	mandatory	The SMDM redirects the customer to a confirmation page presented by the ESCO		synchronously
NS15	Data access request	mandatory	The ESCO requests an access to a customer's smart meter's data	token ESCO credentials interval of data requested (optionnal)	at any time
NS16	Consent verification	mandatory	The SMDM checks with the Consent registry manager if a consent is recorded for this ESCO, this customer, the requested data and checks if it is still valid : not revoked by the customer, not expired, not cancelled by the cancellement of the agreement beetween the ESCO and the SMDM or by the customer's move. The SMDM also checks if the intervall requested it compatible with the consent and the time during which the customer was indeed an innocupant of the premises		synchronously
NS17	Data transmission	mandatory	The SMDM transmits data to ESCO	data	synchronously

Annex C– Example – switching process in Austria

Example Switching Process This procedure describes the transfer of a customer (indirect balancing group member) from one electricity or gas supplier to another. One or several metering points of a given customer, which are supplied by another supplier (current supplier) at the time in question, are also transferred. The use of system agreement is not affected.

Supplier transfers are subject to the following processes / Use Cases:

Prozess / Use Case	Version	Description
KUEND	03.30	Electronic notice of termination process
WIES	03.30	Change Of Supplier
ANL	03.30	Installation search process
ANM	03.30	Enabling procedure
BELNB	03.30	Expression of interest process initiated at system operator
ABM	03.30	Disabling procedure
VZ	03.30	Termination of energy supply contract for other reasons
STO	03.30	Abort process
VOL	03.30	Transmission of power of attorney
VP	03.30	Power of attorney validation process
IDZ	03.30	Installation ID selection
ZUEM	03.30	Transmission of meter reading to supplier

Overview of the (key) processes and process steps, and the maximum permitted processing times (deadlines) in the supplier transfer procedure

	Process step designation	Process step ID	Processed by	Processing time[37]
Identification of metering point and consumer in system operator's records [ZPID] (optional)	Power of attorney validation process	[VP]: [VP] to [VP]	NB	Max. 24h
	Identification of metering point and consumer	[ZPID13] to [ZPID16]	NB	
Query on minimum contract term and notice period with current supplier [BINKUN] (optional)	Validation of contract	BINKUN04	LA	Max. 24h
	Power of attorney validation	[VP]: [VP01] to [VP11]	LA	
	Notice period query	BINKUN08	LA	
Actual switch [WIES] 10/12 working days	Metering point validation	WIES04	NB	Max. 72h
	Power of attorney validation[38]	[VP]: [VP01] to [VP11]	NB	

[37]Begins upon receipt of switching data set (deadline, e.g. 24 or 48 hours)

[38]The power of attorney validation is optional and is only carried out if the power of attorney has not already been validated by the receiver

	Check for process overlaps	WIES07	NB	
	Transmit consumption data to new supplier	WIES11	NB	
				Max. 48h
	Switching message validation	WIES18	LA	
	Check on further action (insistence)	WIES27	LN	Max. 72h
	Change in supplier assignment	WIES36	NB	Max. 24h

If there are fewer than ten working days in the three calendar weeks in question due to public holidays, the notice periods are shortened as follows:

- 9 working days: notice period for system operator also reduced from 72h to 48h
- 8 working days: notice period for new supplier also reduced from 72h to 48h
- 7 working days: notice period for new supplier also reduced from 48h to 24h
- 6 working days: notice period for system operator also reduced from 48h to 24h

The resultant notice periods (switching date calculated for each working day) for the following calendar year are published by the clearing and settlement agency on ENERGYlink at least six weeks in advance.

However, the maximum permitted time of three weeks to complete the switch still applies.

The notice period begins ten working days before the effective date. It should be noted that the period of two working days for submitting the notice of termination must be complied with (if public holidays fall within the time window, the duration of the switch is shortened). If the total of both notice periods exceeds the statutory maximum permitted duration of three weeks, the duration of the switch (ten working days) is reduced accordingly. The period for submitting the notice of termination remains two working days. However, in the event of a shortened duration (from ten to eight working days), if the notice of termination is submitted early the duration of the switch is extended accordingly. The new supplier and system operator must observe the deadline as determined by the date of submission.

1. Example for Use Case "WIES - Change of Supplier"

UseCaseName:	WIES … Change Of Supplier
Defintion	In a switch in the true sense, the necessary switching data is made available to all the market participants concerned.
beginsWhen	After the supplier has signed a contract with the customer the process can be started by the new supplier
preCondition	ZPID and/or BINKUN must have been initiated but need not have been completed. Customer concerned must have executed: • Valid power of attorney Input Data: • Control data • Metering point ID • Last name/company name • Power of attorney ID • Desired switching date (YYYYMMDD) • System charges invoicee (customer or supplier ID) • Balancing group • Optional information: o Customer number used by system operator o First name(s) o Company register number o Date of birth o Customer email address o Customer telephone number o Installation address (postcode, town/city, street, house number, staircase, floor, door number) o Additional address information o Contract number
endsWhen	Change of the supplier is completed Abort by: • network operator • New supplier
postCondition	Change of the supplier is completed Abort by: • network operator • New supplier
exceptions	see ProcessDescription and Responcecodes
Actions	see ProcessDescription

UseCase description:	WIES Change of Supplier	

other UseCases included:	VDC: Power of Attorney	The power of attorney and its information transfer is an essential part of the process. The type of the power of attorney and the corresponding information shall be included in the processes.

other UseCases Conditionally included (extend)	MSCONS: Metered Services Consumption message	Condition: For customer without a standard load profile, the measured load profile of the last 12 months in the electricity / 24 months in the gas in an MSCONS data set has to be sent to the new supplier.
	MSCONS: Metered Services Consumption message	Condition: MSCONS data set for the final bill has to be sent to the current supplier.
	CP_REQ_CMI: Request Change Metering Intervall	Condition: This process is used to change the measurement interval associated with smart meters and to change the transmission interval.
	CP_REQ_CBC: Request Change BillingCycle	Condition: This process changes an annual billing-interval to a monthly billing-interval and vice versa.
	CP_REQ_APR: Request Activate Prepayment	Condition: The process is used to request the prepayment process on the supplier side.
	CP_REQ_LPT: Request LoadProfilTyp	Condition: This process is used by the supplier to send a request for the change of the synthetic load profile.

Roles	Initiating/Responsible Role:	Linked role(s):
	New supplier (LN)	a) System operator (NB) b) Current supplier (LA) c) Gas Grid Manager (VGM)

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES01	Create ANFRAGE_WIES	For each metering point to be switched, a data set is compiled that contains the following information: · Control data · Metering point ID · Last name/company name · Power of attorney ID · Desired switching date · System charges invoicee (customer or supplier ID) · Balancing group · Optional information: o Customer number used by system operator o First name(s) o Company register number o Date of birth o Customer email address o Customer telephone number o Installation address (postcode, town/city, street, house number, staircase, floor, door number) o Additional address information o Contract number		LN			ANFRAGE_WIES
WIES02	Transmit ANFRAGE_WIES	New supplier transmits data set to system operator via ENERGYlink.			LN	NB	ANFRAGE_WIES
WIES03	Receive ANFRAGE_WIES	System operator receives data set.		NB			ANFRAGE_WIES
WIES04	Validation	Check on match with metering point ID and last name/company name in system operator's system. In addition, system operator checks whether the 10/12 working-day limit (may be further curtailed by holidays) for the interval between initiation of switch and desired switching date can be met.		NB			

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES07	Check for process overlaps	An automatic check for process overlaps as defined by the overlap rules is run on system operator's system.		NB			
VP01 bis VP11	See section on power of attorney validation process	Notification of check on power of attorney is sent: · "Power of attorney being validated"		NB			VOLLPRUEF_VP
WIES44	Check on gas network access	System operator checks whether installation address has system access (gas only)		NB			
WIES08	Create FEHLER_WIES	Potential errors: · Switch application submitted too early (immediate check on receipt of message) · Switch application submitted too late (immediate check on receipt of message) · "Metering point not found" · "Consumer not identified" · "Incorrect network area" · "Customer already supplied" · "Power of attorney missing" · "Power of attorney not legally valid" · "Overlap ANM" [enabling] · "Overlap ABM" [disablement] · "Overlap VZ" [out of contract] "Overlap WIES" [switching process in the true sense] "Metering point does not match supplier's sector" "System access not possible" (gas) "Metering point not supplied"		NB			FEHLER_WIES
WIES09	Transmit FEHLER_WIES	System operator sends error message to new supplier.	Up to 72 hours after receipt of switching message		NB	LN	FEHLER_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES10	Receive FEHLER_WIES	New supplier receives error message. After consultation of customer where necessary, supplier may restart process using corrected data.		LN			FEHLER_WIES
WIES11	Create VERBRAUCH_WIES	System operator compiles the following information for transmission to new supplier as a data set: · Control data · Metering point ID · Last name/company name · Installation address (postcode, town/city, place, house number) · Direction of supply · Load profile type (gas) · Forecast annual consumption in kWh (electricity, gas) · Metering device number · Meter type · Month of annual reading (electricity, gas) · Month of next annual account statement · Year of next annual account statement · Consumption during latest account statement period · Start of latest account statement period · End of latest account statement period · Usage per network level (electricity) · System losses per network level (electricity) · Usage per network level (gas) · Maximum capacity in kWh/h as specified by system access contract (gas) · System charges invoicee · Expected switching date · Optional information: o Customer number used by system operator o First name(s) o Company register number o Date of birth		NB			VERBRAUCH_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
		o Customer email address o Customer telephone number o Staircase o Floor o Door number o Additional address information o Balancing method (load profile meter only) (gas) o Conversion of latest balancing method (load profile meter only) (gas) o Contract number					
WIES12	Transmit VERBRAUCH_WIES	System operator sends consumption data set to new supplier.	Up to 72 hours after receipt of switching message		NB	LN	VERBRAUCH_WIES
WIES13	Receive VERBRAUCH_WIES	New supplier receives consumption data set.		LN			VERBRAUCH_WIES
WIES55	Create MSCONS_LN_WIES	For consumers without standard load profiles, the metered load profile for the past 12 months (electricity) or 24 months (gas) must be generated in an MSCONS data set, intended for optional transmission to new supplier via ENERGYlink. This data set contains: · MSCONS ID · MSCONS file		NB			MSCONS_LN_WIES
WIES56	Transmit MSCONS_LN_WIES	System operator sends MSCONS consumption data set to new supplier.	Up to 72 hours after receipt of switching message		NB	LN	MSCONS_LN_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES57	Receive MSCONS_LN_WIES	New supplier receives MSCONS consumption data set.		LN			MSCONS_LN_WIES
WIES14	Initiate transmission of MSCONS data as necessary	For consumers without standard load profiles, the metered load profile for the past 12 months (electricity) or 24 months (gas) must be transmitted to new supplier in an MSCONS data set outside ENERGYlink.	Up to 72 hours after receipt of switching message	NB			
WIES15	Create WECHSELINF_WIES	System operator notifies switch to current supplier, providing the following information: Control data Metering point ID Last name/company name Desired switching date New supplier (AT number) Optional information: Customer number used by system operator First name(s) Company register number Date of birth Customer email address Customer telephone number		NB			WECHSELINF_WIES
WIES16	Transmit WECHSELINF_WIES	System operator sends switching message to current and new supplier	Up to 72 hours after receipt of switching message		NB	LA	WECHSELINF_WIES
WIES17	Receive WECHSELINF_WIES	Current supplier receives switching message.		LA			WECHSELINF_WIES
WIES81	Validation	Master data checked to ascertain whether there is a metering point and it is receiving a supply.		LA			

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES18	Switching data (incl. notice of termination) validated as necessary	· Validation: formal validation of notice of termination · Conflict with existing minimum contract term or termination conditions? · If notice of termination already received from customer: check on match with termination date If there is an objection, this must be lodged as quickly as possible, and no later than 48 hours after receipt. If current supplier does not object within prescribed deadline, system operator automatically sends confirmation of switching process in the true sense.		LA			
WIES19	Create KEIN_EW_LN_WIES and KEIN_EW_NB_WIES	Confirmation from current supplier that there is no objection: "No objection to switch"		LA			KEIN_EW_LN_WIES KEIN_EW_NB_WIES
WIES20	Transmit KEIN_EW_LN_WIES	Confirmation that there is no objection sent to new supplier.	Up to 48 hours after receipt of switching message		LA	LN	KEIN_EW_LN_WIES
WIES49	Transmit KEIN_EW_LN_WIES	Confirmation that there is no objection sent to system operator.	Up to 48 hours after receipt of switching message		LA	NB	KEIN_EW_NB_WIES
WIES21	Receive KEIN_EW_NB_WIES	System operator notified that there is no objection on the part of current supplier.		NB			KEIN_EW_NB_WIES
WIES22	Receive KEIN_EW_LN_WIES	New supplier notified that there is no objection on the part of current supplier.		LN			KEIN_EW_LN_WIES
WIES23	Create EINWAND_LN_WIES and	In the event of an objection (see WIES18) this is sent to system operator, together with the switching data set (for information only), and to new supplier for further validation. Data set contains:		LA			EINWAND_LN_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
	EINWAND_NB_WIES	· Control data · Metering point ID · Desired switching date · Response code: "Minimum contract term applies" "No notice of termination received" "Termination date differs from switching date" "Notice of termination not legally valid" · Optional information: Contract number End of minimum contract term					EINWAND_NB_WIES
WIES24	Transmit EINWAND_LN_WIES	Current supplier transmits objection data set containing standardised data to new supplier.	Up to 48 hours after receipt of switching message		LA	LN	EINWAND_LN_WIES
WIES50	Transmit EINWAND_NB_WIES	Current supplier transmits objection data set containing standardised data to system operator.	Up to 48 hours after receipt of switching message		LA	NB	EINWAND_NB_WIES
WIES25	Receive EINWAND_NB_WIES	System operator receives data set via the switching platform.		NB			EINWAND_NB_WIES
WIES26	Receive EINWAND_LN_WIES	New supplier receives data set via the switching platform.		LN			EINWAND_LN_WIES
WIES27	Check on further action	New supplier considers objection and decides whether switch should still be carried out. It may set a new switching date which will subsequently be notified to system operator and current supplier. In the event of rescheduling, the process is aborted and re-initiated with revised switching date. Notice of insistence on switch must be lodged as quickly as possible, and no later than 72 hours after receipt.		LN			

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES45	Create ABBRUCH_LA_WIES and ABBRUCH_LN_WIES	In the absence of an insistence message [WIES34] or on receipt of abort message [WIES30], within 72 hours system operator creates an abort message for transmission to current and new supplier. This contains: Control data "Switch aborted"		NB			ABBRUCH_LA_WIES ABBRUCH_LN_WIES
WIES46	Transmit ABBRUCH_LA_WIES	System operator sends abort message to current supplier.	Within 24 hours of receipt of abort message		NB	LA	ABBRUCH_LA_WIES
WIES51	Transmit ABBRUCH_LN_WIES	System operator sends abort message to new supplier.	Within 24 hours of receipt of abort message		NB	LN	ABBRUCH_LN_WIES
WIES47	Receive ABBRUCH_LN_WIES	New supplier receives abort message from system operator. New supplier must immediately inform consumer of reason for abort.		LN			ABBRUCH_LN_WIES
WIES48	Receive ABBRUCH_LA_WIES	Current supplier receives abort message from system operator.		LA			ABBRUCH_LA_WIES
WIES28	Create ABBRUCH_NB_WIES	New supplier can abort switch after reviewing current supplier's objection. The message in question, sent to system operator, must contain: Control data "No insistence"		LN			ABBRUCH_NB_WIES
WIES52	Transmit ABBRUCH_NB_WIES	New supplier transmits abort message to system operator			LN	NB	ABBRUCH_NB_WIES
WIES30	Receive ABBRUCH_NB_WIES	System operator receives abort message		NB			ABBRUCH_NB_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES32	Create BEHARR_LA_WIES and BEHARR_NB_WIES	If new supplier insists on specified switching date, it notifies system operator and current supplier of such by sending an insistence data set containing the following: Control data "Insistence on switch"		LN			BEHARR_LA_WIES BEHARR_NB_WIES
WIES33	Transmit BEHARR_LA_WIES	New supplier sends insistence data set to current supplier via the switching platform	Within 72 hours of receipt of objection message by current supplier		LN	LA	BEHARR_LA_WIES
WIES53	Transmit BEHARR_NB_WIES	New supplier sends insistence data set to system operator via the switching platform	Within 72 hours of receipt of objection message by current supplier		LN	NB	BEHARR_NB_WIES
WIES34	Receive BEHARR_NB_WIES	System operator receives insistence data set		NB			BEHARR_NB_WIES
WIES35	Receive BEHARR_LA_WIES	Current supplier receives insistence data set		LA			BEHARR_LA_WIES
WIES82	Set provisional switching date			NB			
WIES69	Create ERSTE_LN_WIES and ERSTE_LA_WIES	Notification of switching date represents provisional confirmation of switch and corresponding date. Content of provisional confirmation: · Switch accepted From this point, WIES process (switching process in the true sense) can only be stopped by aborting it.	Within 24 hours of receipt of insistence message or "no objection" message,	NB			ERSTE_LN_WIES ERSTE_LA_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
			or automatically 48 hours after WECHSELINF_WIES is sent, provided no message has been received from current supplier				
WIES70	Transmit ERSTE_LN_WIES	Notification of switching date represents provisional confirmation of switch and corresponding date. From this point, WIES process (switching process in the true sense) can only be stopped by aborting it. New supplier must immediately inform consumer of switching date. New supplier must also inform consumer of its contact details and of its authorisation to notify system operator or current supplier of the meter reading five working days before the switching date at the earliest, or up to five working days after the switching date.	Within 24 hours of receipt of insistence message or the “no objection” message, or automatically 48 hours after WECHSELINF_WIES is sent, provided no message has been received from		NB	LN	ERSTE_LN_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
			current supplier				
WIES72	Receive ERSTE_LN_WIES			LN			ERSTE_LN_WIES
WIES71	Transmit ERSTE_LA_WIES	Notification of switching date represents provisional confirmation of switch and corresponding date. From this point, WIES process (switching process in the true sense) can only be stopped by aborting it. New supplier must immediately inform consumer of switching date. New supplier must also inform consumer of its contact details and of its authorisation to notify system operator or current supplier of the meter reading five working days before the switching date at the earliest, or up to five working days after the switching date.	Within 24 hours of receiving the insistence message or the “no objection” message, or automatically 48 hours after WECHSELINF_WIES is sent, provided no message has been received from current supplier		NB	LA	ERSTE_LA_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES73	Receive ERSTE_LA_WIES			LA			ERSTE_LA_WIES
WIES36	Initiate change in assignment of supplier – set switching date	If the preceding process steps have been carried out in the maximum permitted time, system operator will have one working day to complete the switch within the statutory limit of three weeks.		NB			
WIES37	Create FINALE_LN_WIES, FINALE_LA_WIES, MLDG_VGM_WIES	Final message created to notify suppliers concerned that switch has taken place. This message contains: · Control data · Response code: “Switch accepted” · Last name/company name · Installation address (postcode, town/city, street, house number) · Metering point designation · Direction of supply (generator/consumer) · Forecast annual consumption · Load profile type (gas: incl. temperature range) · Metering device number · Meter type · Month of annual reading · Month of annual account statement (via MSCONS) · Year of next annual account statement · Consumption during latest account statement period · Start of latest account statement period · End of latest account statement period · Usage per network level (electricity) · System losses per network level (electricity) · Usage per network level (gas) · Maximum capacity in kWh/h as specified by system access contract (gas) · System charges invoicee · Actual switching date ·		NB			FINALE_LN_WIES FINALE_LA_WIES MLDG_VGM_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
		· Optional information: o Customer number used by system operator o First name(s) o Company register number o Date of birth o Customer email address o Customer telephone number o Staircase o Floor o Door number o Additional address information o Balancing method (load profile meter only) (gas) o Conversion of latest balancing method (load profile meter) (gas) o Contract number In the gas sector, the distribution area manager must be informed that the switch has been completed (MLDG_VGM_WIES). This only applies to load profile meters with capacities of over 50,000 kWh/h. The message to the distribution area manager must include the following details: · Metering point ID · New supplier · Postcode · Town/city · Expected switching date · Load profile type · Maximum capacity in kWh/h as specified by system access contract · Usage per network level · Optional information:					

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
		o Balancing method o Date of last change in balancing period					
WIES38	Transmit FINALE_LN_WIES	System operator sends final switching message to new supplier via the switching platform (switching date: effective date 26 June 2014; deadline for aborting process: 23 June 2014, before 17:00; final confirmation: between 23 June 2014, 17:00 and 24 June 2014, 17:00)	One working day before switching date		NB	LN	FINALE_LN_WIES
WIES54	Transmit FINALE_LA_WIES	System operator sends final switching message to current supplier via the switching platform (switching date: effective date 26 June 2014; deadline for aborting process: 23 June 2014, 17:00; final confirmation: between 23 June 2014, 17:00 and 24 June 2014, 17:00)	One working day before switching date		NB	LA	FINALE_LA_WIES
WIES39	Receive FINALE_LN_WIES	New supplier receives final switching message; if the preceding process steps have been carried out in the maximum permitted time, new supplier will have one working day to take the necessary steps before it begins supplying new customer.		LN			FINALE_LN_WIES
WIES79	Notification to consumer	New supplier must immediately inform consumer of reason for abort.		LN			
WIES80	Notification to consumer	New supplier must immediately inform consumer of switching date. New supplier must also inform consumer of its contact details and of its authorisation to notify system operator of the meter reading.		LN			
WIES40	Receive FINALE_LA_WIES	Current supplier receives final switching message		LA			FINALE_LA_WIES
WIES74	Transmit MLDG_VGM_WIES		One working day before switching date, e.g. MI à between Fri. 17:00 and Mon. 17:00		NB	VGM	MLDG_VGM_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
WIES75	Receive MLDG_VGM_WIES		One working day before switching date, e.g. MI à between Fri. 17:00 and Mon. 17:00	VGM			MLDG_VGM_WIES
WIES76	Create LIEF_ZUORD_WIES	Check whether supplier is supplying metering point; in case of error, create related message. Errors may include: · Metering point not found · Customer not supplied by supplier Supplier should contact system operator to resolve the problem.		LA			LIEF_ZUORD_WIES
WIES77	Transmit LIEF_ZUORD_WIES				LA	NB	LIEF_ZUORD_WIES
WIES78	Receive LIEF_ZUORD_WIES	System operator checks whether metering point is correctly assigned to supplier. Where appropriate, system operator can abort the process, or resend the switching message to a different current supplier (note: the time limit for processing restarts).		NB			LIEF_ZUORD_WIES
WIES58	Create ABLWU_LN_WIES	New supplier requests system operator to read customer's meter. This message contains: · Control data · "Meter reading requested"		LN			ABLWU_LN_WIES
WIES59	Transmit ABLWU_LN_WIES	New supplier sends meter reading request to system operator via ENERGYlink.			LN	NB	ABLWU_LN_WIES
WIES60	Receive ABLWU_LN_WIES	System operator receives new supplier's request for meter reading.		NB			ABLWU_LN_WIES
WIES61	Create	Current supplier requests system operator to read customer's meter.		LA			ABLWU_LA_WIES

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
	ABLWU_LA_WIES	This message contains: · Control data · "Meter reading requested"					
WIES62	Transmit ABLWU_LA_WIES	Current supplier sends request for meter reading to system operator via ENERGYlink.			LA	NB	ABLWU_LA_WIES
WIES63	Receive ABLWU_LA_WIES	System operator receives current supplier's request for meter reading.		NB			ABLWU_LA_WIES
WIES64	Read meter	System operator reads consumer's meter.		NB			
WIES65	Create MSCONS_LA_WIES	System operator creates MSCONS data set with meter reading. This data set contains: · MSCONS ID · MSCONS file		NB			MSCONS_LA_WIES
WIES66	Transmit MSCONS_LA_WIES	System operator sends MSCONS consumption data set to current supplier	Up to 15 working days after the switching date		NB	LA	MSCONS_LA_WIES
WIES67	Receive MSCONS_LA_WIES	Current supplier creates MSCONS data set with meter reading.		LA			MSCONS_LA_WIES
WIES68	Initiate transmission of MSCONS data as necessary	Initiate transmission of MSCONS consumption data set to current supplier outside ENERGYlink.		LA			
WIES83	Plausibility check			NB			
WIES84	Determination of consumption as at switching date using standard load			NB			

Process step	Designation	Explanation	Deadline	Process-execution	Sender	Receiver	Message code
	profiles						

2. Master data

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
ENERGYlink Header										
MarketParticipantData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
SchemaVersion	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	
DocumentMode	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	
Sector	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Sector (01 ... electricity; 02 ... gas)
LogicalSender	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	AT number of technical sender (market participant or ENERGYlink)
LogicalReceiver	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	AT number of technical receiver (market participant or ENERGYlink)
InstallationId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Installation number (AIN)
ConversationId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Group of messages in a process
MessageData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
MessageId	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*Unique message ID for logical senders, TIN in the case of ENERGYlink messages*

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
MessageCode	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Process step
Timestamp	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Message creation date on technical sender’s system
ReferenceMessageId	E									Message ID referred to by error message
CasesData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**Cases**
NumberOfCases	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*Number of cases*
CaseId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Case ID (FIN)
RoutingHeaderData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
Duplicate	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	
TechnicalSender	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	AT number of logical sender
TechnicalReceiver	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	AT number of logical receiver
EnergylinkId	E	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	Reference to original message in Acknowledge
DocumentCreationDateTime	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Date of transmission by logical sender
DocumentReceiveDateTime	E	0..1	0..1	0..1	0..1	0..1	0..1	0..1	0..1	Date of receipt by ENERGYlink

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
ENERGYlink Fault Daten										
EnergylinkFaultData	**E**									
ResponseCodeGroup	*A*									*Code group: list of valid codes (validator "ENERGYLINK_FAULT")*
ResponseCode	E									Message code within the procedural step
ENERGYlink Privat Data - Payload										
MarketParticipantData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
SchemaVersion	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1:1 from header*
DocumentMode	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1:1 from header*
Sector	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1:1 from header
LogicalSender	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1:1 from header
LogicalReceiver	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1:1 from header
InstallationId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1:1 from header
ConversationId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1:1 from header

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
MessageData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
MessageId	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1:1 from header*
MessageCode	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	*1:1 from header*
Timestamp	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	*1:1 from header*
ReferenceMessageId	E									*1:1 from header*
CasesData	**E**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**Cases**
NumberOfCases	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*Number of cases*
CaseId	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Fallnummer FIN
ProcessData	**E**									
ResponseCodeData	**E**				**1..1**		**1..1**		**1..1**	
ResponseCodeGroup	*A*				*1..1*		*1..1*		*1..1*	*Code group: list of valid codes*
ResponseCode	E				1..150		1..150		1..150	Message code within the procedural step
ContractPartnerData	**E**	**1..1**		**1..1**		**1..1**	**1..1**		**1..1**	

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
ContractPartnerNumber	*A*	*0..1*		*0..1*		*0..1*	*0..1*		*0..1*	*Customer number maintained by NB; optional field – customer number; no special characters permitted*
Name1	E	1..1		1..1		1..1	1..1		1..1	Last name or company name (mandatory)
Name2	E	0..1		0..1		0..1	0..1		0..1	Alternative company name if 40 characters insufficient or first name of customer
CompanyRegistrationNumber	E	0..1		0..1		0..1	0..1		0..1	Company register number
DateOfBirth	E	0..1		0..1		0..1	0..1		0..1	Date of birth (natural persons)
EmailAddress	E	0..1		0..1		0..1	0..1		0..1	Email address
PhoneNumber	E	0..1		0..1		0..1	0..1		0..1	Telephone number
DeliveryAddressData	**E**	**0..1**				**1..1**	**1..1**	**1..1**	**1..1**	
PostalCode	E	1..1				1..1	1..1	1..1	1..1	Postcode (max. 10 characters)
City	E	1..1				1..1	1..1	1..1	1..1	Town/city (max. 40 characters)
Street	E	1..1				1..1	1..1		1..1	Street (max. 60 characters)
StreetNo	E	1..1				1..1	1..1		1..1	House number (max. 20 characters)
Staircase	E	0..1				0..1	0..1		0..1	Staircase (max. 10 characters)

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
Floor	E	0..1				0..1	0..1		0..1	Floor (max. 10 characters)
DoorNumber	E	0..1				0..1	0..1		0..1	Door number (max. 10 characters)
AdditionalAddress	E	0..1				0..1	0..1		0..1	Additional information on existing address data (hospitality enterprise, cellar, etc.)
MeteringPointId	E									Links metering points to a related installation address [mainly relevant to NotificationWithInstallation]
MeteringPointData	**E**	**1..1**		**1..1**	**0..1**	**1..1**	**1..1**	**1..1**	**1..1**	
CaseId	*A*	*1..1*		*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*No manual input required*
MeteringPointId	*A*	*1..1*		*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*Metering point ID; max. 33 digits; no special characters permitted*
EnergyDirection	E					1..1	1..1		1..1	Field for the direction of supply: CONSUMPTION = offtake; GENERATION = infeed
ForecastConsumption	E					1..1	1..1		1..1	Forecast annual consumption in kWh (rounded to nearest whole number)
ForecastConsumptionCustomer	E									Customer interaction enables supplier to forecast consumer behaviour (property manager, notary, etc.)

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
LoadProfileType	E					1..1	1..1	1..1	1..1	For electricity, see Chapter 6 of the electricity market code: http://www.apcs.at/apcs/regelwerk/aktuelle_version/english/ab-bko-apcs-feb-2014-v11.0-en.pdf; for gas, see Chapter 4 of the gas market code (only available in German): http://www.agcs.at/agcs/regelwerk/aktuelle-version/soma-gas-kapitel-4-datenformate-fuer-zaehlerwerte-jan-2013.pdf; max. 10 digits
DeviceData	**E**					**1..1000**	**1..1000**		**1..1000**	
DeviceNumber	*A*					*1..1*	*1..1*		*1..1*	*Metering device number; max. 18 digits; no special characters permitted*
DeviceType	E					1..1	1..1		1..1	NONSMART (IMN) not a smart meter; DSZ ... Standard digital meter IMS ... Smart meter, standard configuration IME ... Smart meter, extended configuration; LPZ ... Load profile meter; PAUSCHAL
MeterData	**E**									
MeterCode	*A*									*Meter code (wherever possible, OBIS code); other examples: upper or lower; high or low tariff; must be submitted to the NB for precise assignment if there is more than one meter; max. 25 digits*
DateTo	E									Reading date

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
MeterValueTo	E									Meter reading as a decimal number; 6 decimal places possible
MeterReadingInfoData	**E**					**1..1**	**1..1**		**1..1**	
MeterReadingMonth	E					1..1	1..1		1..1	Month of the annual reading; monthly = once per month; 1-12 = month; only one input value possible
ConsumptionBillingMonth	E					1..1	1..1		1..1	Month when annual account statement presented; 1-12 = last Monday of month; only one input value possible
YearOfNextBill	E					1..1	1..1		1..1	Period to which next annual account statement applies
BillingInfoData						**1..1**	**1..1**		**1..1**	
ConsumptionLastPeriod	E					1..1	1..1		1..1	Consumption during latest account statement period
AccountPeriodBegin	E					1..1	1..1		1..1	Start of latest account statement period
AccountPeriodEnd	E					1..1	1..1		1..1	End of latest account statement period
MPElectricitySpecificData	**E**					**Choice 1..1**	**Choice 1..1**		**Choice 1..1**	
ElectricityGridUsageLevel	*A*					*1..1*	*1..1*		*1..1*	*Usage per network level (number between 1 and 7)*
ElectricityGridLossLevel	E					1..1	1..1		1..1	System losses per network level (number between 1 and 7)

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
GreenPowerData	**E**									**Optional information on renewable electricity generating equipment**
PlantCategory	*A*									*Generating equipment category (PHOTOVOLTAIC; WIND; SMALL HYDROPOWER; BIOGAS; SOLID BIOMASS; LIQUID BIOMASS; GEOTHERMAL; LANDFILL GAS; SEWAGE GAS; HYBRID)*
ShortageCapacity	E									Maximum electric capacity or, in the case of PV arrays, maximum module capacity
DateOfFirstOperation	E									Commissioning date (only 2005 or after)
ForecastSupply	E									Forecast supply: based on deliveries over the past 12 months (if the period is shorter, extrapolation to 12 months) –> information is sent by the system operator during the enablement process. Precise figure not possible in the event of surplus infeed.
MPGasSpecificData	**E**					**Choice 1..1**	**Choice 1..1**	**1..1**	**Choice 1..1**	
GasGridUsageLevel	*A*					*1..1*	*1..1*	*1..1*	*1..1*	*Usage per network level (1, 2 or 3)*
GasPeakPower	E					1..1	1..1	1..1	1..1	Peak capacity (rounded to nearest whole number)
MPGasSpecificLPCData	**E**					**0..1**	**0..1**	**0..1**	**0..1**	
GasBalancingType	*A*					*1..1*	*1..1*	*1..1*	*1..1*	*D = daily balancing; H = hourly balancing*

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
GasBalancingChangeDate	E					1..1	1..1	1..1	1..1	Date of last change in the balancing period
GasGridUsageContractData	**E**									
RequestForGridUsageContract	*A*									*Flag for supplier's application for system access; JA = true; NEIN = false*
StandardTerms	*A*									*Flag for system access contract in accordance with the GTC; JA = true; NEIN = false*
LimitedGridUsageContract	*A*									*Flag for application for curtailable system access*
ContractDateTo	E									Desired termination date
PeakPower	E									Peak capacity (rounded to nearest whole number)
ForecastConsumption	E									Forecast annual consumption in kWh (rounded to nearest whole number)
MinimalPressure	E									Minimum pressure (bar): max. 3 digits plus max. 3 decimal places
MaximalPressure	E									Maximum pressure (bar): max. 3 digits plus max. 3 decimal places
GasConsumerData	**E**									
KindOfConsumer	*A*									*001 = household and SME (up to 50,000 kWh/h); 002 = large-scale industry (above 50,000 kWh/h); 003 = power station (up to 50,000 kWh/h); 004 = power station (above 50,000 kWh/h);*

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
MonthOfUse	E									Only for seasonal offtake; must be sent for every month in which deliveries are to be made. If supply extends over the entire year, this field must not be included. 1=January,..12=December
GridUsage	E									To be populated as required by Annex 1 Gas Market Model Order (Hxx [heating], Wxx [water heating], Kxx [cooking] or Pxx [process gas]; for safety's sake, a second and third digit should be provided for the code in case it is lengthened by the regulator in a future amended version of the order)
GasProducerData	**E**									
KindOfProducer	*A*									*Type of infeed: BG = biogas; EG = natural gas producer; SP = pumped storage; SG = synthetic gas*
SupplierContractData	**E**	**1..1**		**-**	**1..1**	**1..1**	**1..1**	**-**	**1..1**	
ContractNumber	*A*	*0..1*			*0..1*	*0..1*	*0..1*		*0..1*	*Optional field: contract number; no special characters permitted*
ContractDateTo	E									Contract termination date of a limited-term contract or a contract for which notice has already been given
GridInvoiceRecipient	E	1..1				1..1	1..1		1..1	System charges invoicee: CUSTOMER = direct to customer; SUPPLIER = supplier

Name XML Element / Attribut	A/E	ANFRAGE_WIES MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
SupplyOfLastResort	E								Supplier of last resort = true; NOT supplier of last resort = false
CurrentSupplier	E								AT number of current supplier
ContractTerminationInfoData	**E**			**0..1**					
RegisteredContractTermination	*A*								*Notice of termination by registered mail = true; notice of termination need not be by registered mail = false*
ContractTerminationDeadLine	E			1..1					Minimum contract term expires: date DD.MM.YYYY
CTTermOfNoticeData	**E**								
TimeOfNotice	*A*								*Time when the notice of termination can take effect (DAILY = DAILY; END_OF_MONTH = MONTHLY [on last day of the month]; END_OF_QUARTER = QUARTERLY [on last day of the month]); END_OF_YEAR = AT YEAR END [on 31 Dec.]*
TimeUnit	E								Notice period: DAY = notice period stated in days; WEEK = notice period stated in weeks; MONTH = notice period stated in months
TimeShare	E								
POAData	***E***	***1..1***							

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LIN_WIES / MSCONS_LA_WIES	WECHSELINF_WIES	ERSTE_LIN_WIES / EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
POANumber	*A*	*1..1*								*ID of the power of attorney; no special characters permitted and max. 35 digits; AT number followed by a code with max. 35 digits; power of attorney selected: POA number must be stated if there is a written power of attorney.*
POAFile	E									Must be used if written notice of termination is required/has been given. Max. 300KB
POASubstantiationData	**E**									
POAProcess	*A*									*Market participants must request performance of this procedural step by OE, FGW and AxCS; see annex to specification*
POASubstantiation	E									Each procedural step requires additional information on the process; see annex to specification
MsconsData	**E**		**1..1**							
MsconsId	*A*		*1..1*							*ID of the MSCONS file; no special characters permitted and max. 35 digits*
MsconsFile	E		1..1							MSCONS file, max. 5MB
ProcessControlData	**E**	**1..1**		**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	**1..1**	
RequestForManualSearch	E									Flag to indicate whether a manual search is desired in the event of a

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
										negative/ambiguous automated search result
BalancingGroup	E	1..1								Supplier's balancing group
NewSupplier	E			1..1				1..1		AT number of new supplier
RequestedContractTerminationData	**E**									
EarliestContractTermination	*A*									*Flag to indicate whether termination will be at the next possible date: JA = true; NEIN = false*
RequestedContractTerminationDate	E									Desired termination date
ConfirmedContractTerminationDate	*E*									*Actual termination date*
RequestedChangeSupplyDate	E	1..1		1..1	1..1					Desired switching date
EstimatedChangeSupplyDate	E					1..1	1..1	1..1		Expected switching date
ConfirmedChangeSupplyDate	E								1..1	Actual switching date
RequestedStartSupplyData	**E**									
RecognitionDate	*A*									*Acknowledgement date: date of acknowledgement by the system operator, e.g. contact with the customer (DD/MM/YYYY)*

Name XML Element / Attribut	A/E	ANFRAGE_WIES MSCONS_LA_WIES WECHSELINF_WIES EINWAND_NB_WIES VERBRAUCH_WIES ERSTE_LN_WIES MLDG_VGM_WIES ANFRAGE_WIES	Description
RequestedStartSupplyDate	E		Desired enablement date
EstimatedStartSupplyDate	E		Expected enablement date
ConfirmedStartSupplyDate	E		Actual enablement date
RequestedEndSupplyData	**E**		
ContractTerminated	*A*		*Flag to indicate expired contract; JA = true; NEIN = false*
QualifiedDunningDone	*A*		*Flag to indicate dunning procedure; JA = true; NEIN = false*
InsolvencyOrDecease	*A*		*UNBEK = unknown; INSOL = insolvency; VERLA = deceased*
RequestedEndSupplyDate	E		Desired disablement date
EstimatedEndSupplyDate	E		Expected disablement date
ConfirmedEndSupplyDate	E		Actual disablement date
AddressSelectionData	**E**		
AllMeteringPointsToPremise	*A*		*Selection of metering points for the installation address: ALLE ZP (all metering points) = true; only one = false*
EnergyDirectionSelection	E		Field for the direction of supply: ALL= virtual or both directions;

Name XML Element / Attribut	A/E	ANFRAGE_WIES	MSCONS_LA_WIES	WECHSELINF_WIES	EINWAND_NB_WIES	VERBRAUCH_WIES	ERSTE_LN_WIES	MLDG_VGM_WIES	ANFRAGE_WIES	Description
										CONSUMPTION = offtake; GENERATION = infeed
AdditionalData	**E**	**0..1000**	**0..1000**	**0..1000**	**0..1000**	**0..1000**	**0..1000**	**0..1000**	**0..1000**	
Name	*A*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*1..1*	*Name of the additional data*
Value	E	1..1	1..1	1..1	1..1	1..1	1..1	1..1	1..1	Additional data in text form

Annex D – Interoperability considerations

1. Semantic interoperability: existing tools and approaches to reach the target

To address the semantic interoperability level and help to formalize common understanding on used terms for a specific domain or project, two approaches and tools have been developed and used for years.

The first one is a "model-driven" approach: UML[39] is a tool widely used for modelling and describing complex hierarchical systems. The IEC Common Information Model, for instance, is using UML to model and describe a generic electricity system.

The second one is an "ontology[40] -driven" approach: OWL[41] and RDF[42] are tools widely used for defining taxonomies and representing relationship between terms. Ontologies are used to describe and share existing information models, such as UN/EDIFACT (OntoEDIFACT[43]) or new ontologies, like the Smart Appliance REFerence (SAREF[44]). RDF is a formal language used to describe web resources; combined with OWL it allows (world wide) distributed and standardized representations of ontologies.

The logical representation used in RDF to link objects/concepts/actions together, more flexible than hierarchical classes/subclasses representation, seems to bring OWL/RDF more complete and accurate modelling capacities of domain knowledge than UML data model. In the sector of energy, the potential use of OWL/RDF for the IEC CIM model has been analysed and evaluated by the CIM users group in 2006[45] , with a positive recommendation.

2. Syntactic interoperability: which data and file formats may be elaborated?

In this level, data and file formats are logically derived from information models used to ensure semantic interoperability. They must base on international file standards like XML/XSD, JSON, CSV that are human readable and can also be processed by machines using computer languages.

Once the ontology and/or information model are defined, it is necessary to specify data formats derivations for identified use cases: at this stage one should select all or only parts of the model, define which data should be mandatory and optional, specify a hierarchical structure, etc. Moreover, if the use case is an exchange within a specific process, the data format may be encapsulated in a "message format" including a header with a sender ID, one or more recipient ID(s), and other contextual data.

Data file format choices (e.g. XML or JSON) and data structure specification (classes, hierarchical levels) will have a direct impact on the size of the data file. This point should be taken into consideration in case

---

[39] Unified Modeling Language. Standard from the OMG. See http://www.omg.org/spec/UML/

[40] Ontology : in information science, ontology can be defined as the working model of entities and interactions in some particular domain of knowledge or practices. It is not only taxonomy, it helps to specify a set of concepts - such as things, events, and relations - in order to create an agreed-upon vocabulary for exchanging information.

[41] Ontology Web Language. W3C Standard. https://www.w3.org/TR/2012/REC-owl2-overview-20121211/

[42] Ressource Description Framework. W3C Standard. https://www.w3.org/RDF/

[43] See https://www.thinkmind.org/index.php?view=article&articleid=dbkda_2017_4_30_50046

[44] See http://ontology.tno.nl/saref/

[45] See http://cimug.ucaiug.org/KB/Knowledge%20Base/Use_of_the_CIM_Ontology_DistribuTech_2006.pdf

of data processing performance issues, along with the possibility to use compression mechanisms to optimize required bandwidth for data transmission in the network sublevel.

[In conclusion (to be discussed) : to ensure interoperability at the syntactic level, data and message formats must be defined, as well as one or more file formats (XML and JSON are both recommended). They shall rely on a commonly shared information model, which can be represented with a standard language like UML or OWL/RDF]