

# Regulation F: EDI communication

May 2008

Rev. 1

In case of any discrepancy between the Danish text and the English translation,  
the Danish text shall prevail

		Jan. 2007	Feb. 2007	Apr. 2007	Apr. 2007	DATE
		CCO	HEP	CCO	LSO	NAME
						DATE
						NAME
REV.	DESCRIPTION	PREPARED	CHECKED	REVIEWED	APPROVED	
		<b>79831-07</b>				
		DOC. NO.				

## Introduction

This regulation sets the standard for data communication – ie exchange of notifications, metered time series, etc. – between Energinet.dk and the players in the market and mutually between market players.

Energinet.dk supports the coordinated use and development of electronic data interchange (EDI) in the Danish energy sector for electricity and gas. The purpose of data interchange is to simplify and streamline business processes in the sector.

This regulation provides a collection of principles and rules describing how to exchange EDI messages in the Danish electricity and gas markets.

The regulation is primarily targeted at persons with an IT background and is relevant to electricity and gas market players alike.

The regulation is effective within the framework of the Danish Electricity Supply (Consolidated) Act no. 115 of 8 November 2006 as amended and the Danish Natural Gas Supply Act cf. Executive Order no. 1116 of 8 November 2006 as amended.

The regulation has been issued under the provisions of part 3 of Executive Order no. 1463 of 19 December 2005 on transmission system operation and the use of the electricity transmission grid, etc. (executive order on system operation) and Chapter 2 of the Danish Executive Order no. 1464 of 19 December 2005 on the use of the natural gas supply grid and plans for the future gas transmission capacity requirement.

The regulation has been filed with the Danish Energy Authority.

Complaints about the regulation can be filed with the Danish Energy Authority, Nyropsgade 30, DK-1780 Copenhagen V.

This regulation takes effect on 15 November 2007 and supersedes Eltra's Regulation E1, 'Ediel Regulation', and Regulation E3, 'Emergency procedures in the event of breakdown in normal communication paths', Elkraft System's Regulation F, 'Communication', and 'Ediel-ebIX General Guide for Denmark'.

On the gas market this regulation takes effect with a notice of six months, replacing the 'EdiDKgas Implementation Guide' and the "EdiTransDist EDI Specification for Data Exchange of Aggregated Consumption in the Danish Gas Market".

Requests for additional information and queries should be directed to Energinet.dk's contact person responsible for Regulation F, see Energinet.dk's website at [www.energinet.dk](http://www.energinet.dk), where the latest applicable regulation can also be downloaded.

Table of contents

1.	Purpose and structure of the regulation .....	4
2.	Document hierarchy.....	6
2.1	Energinet.dk .....	6
2.2	Danish provisions.....	6
2.2.1	Market regulations .....	7
2.2.2	Business processes (Business Scenario – BS).....	7
2.2.3	Business transactions (BT) .....	7
2.2.4	Message implementation guides (MIG) .....	7
2.3	Technical rules .....	8
3.	Principles of data interchange.....	9
3.1	Player identification.....	9
3.2	BPI, routing and communication address .....	9
4.	General rules for messages .....	12
4.1	EDIFACT and XML .....	12
4.2	Responsibility for EDI messages.....	12
4.3	Error handling and acknowledgements .....	12
4.4	Time, date and period formats.....	12
4.5	Opening hours for EDI messages.....	13
4.6	Identification.....	14
4.6.1	Global Location Number (GLN) .....	14
4.6.2	EIC .....	14
4.6.3	Changes to GLN/EIC codes .....	15
4.6.4	Identification of consumption metering points .....	15
4.6.5	Identification of time series .....	15
4.6.6	Identification of grid areas.....	16
4.7	Use of signs .....	16
4.8	Identification of price areas in the electricity market .....	16
4.9	Rules for rounding, digits and decimals .....	16
4.10	Versioning of business transaction (BT).....	17
4.11	IT system errors .....	17
4.12	Discrepancies between players .....	17
5.	Communication platform.....	19
5.1	SMTP (e-mail) .....	19
5.2	Web service .....	20
6.	Web-based system for notifications and schedules.....	21
7.	Register of Players.....	22
8.	IT system requirements.....	23
8.1	Requirements for functionality .....	23
8.2	Requirements for tests .....	23
8.2.1	Purposes of individual tests .....	24
8.2.2	Test performance in practice.....	25
9.	Security of data interchange .....	26

## 1. Purpose and structure of the regulation

This communications regulation provides a collection of principles and rules describing how to exchange EDI messages in the market.

EDI is short for Electronic Data Interchange, a set of standards for the exchange of electronic data. A key feature of EDI is the fact that data intended for being read by people (eg invoices, orders, etc.) are read by a receiving IT system, which initiates a process corresponding to their contents, eg that an invoice will automatically be entered in the bookkeeping records.

This requires the establishment of a standard or 'language' for both content and structure that leaves no doubt as to the data to be transferred.

The regulation prevents problems related to EDI communication, ensuring that the exchange of EDI messages is performed on identical and efficient terms between market players. The target group is players who, in connection with their roles in the market, exchange data with other players through EDI.

All messages are subject to the Danish rules described. In addition, the ebIX rules apply as set out in 'ebIX Common rules and recommendations'<sup>1</sup>. In the event of doubt in a given case, the principles and rules of the regulation shall always prevail.

Three documents are appended to the regulation, supporting and explaining central sections in detail. These include the following appendix reports:

1. **Syntax and structure of EDI messages.** A description of the syntax and structure used for XML and EDIFACT messages.
2. **Principles and rules of acknowledgement.** A description of the acknowledgements used in EDI messages in XML and EDIFACT formats.
3. **The Danish role model.** A definition of roles and players in the Danish market. The appendix contains a figure presenting how the players in the market are interrelated.

The regulation is divided into the following sections:

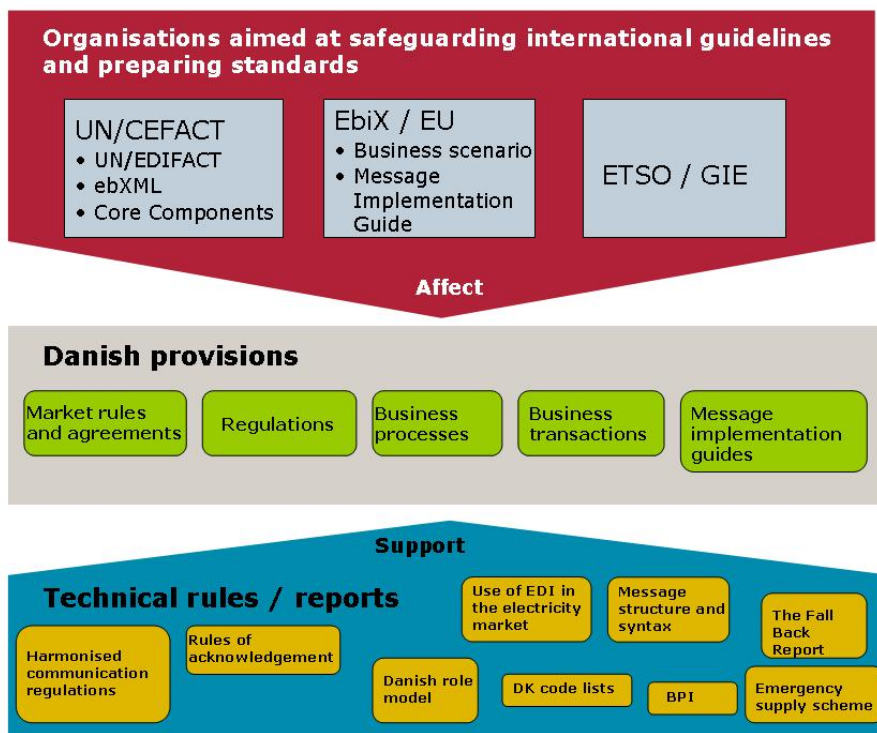
Section	Description
2 - Document hierarchy	An illustration of the ranking of the regulation against related documents and its relation to international standardisation organisations.
3 - Principles of data interchange	Describes the general principles and rules for EDI communication.
4 - General rules for messages	The detailed rules for messages concerning the contents of the messages.
5 - Communication platform	Describes the communication platforms used for the physical exchange of EDI messages.
6 - Web-based system for notifications and schedules	A short description of Energinet.dk's web-based system for notifications and schedules.
7 - Register of players	A short description of the register of players.

<sup>1</sup> [www.ebix.org/Documents/ebIX\\_Common\\_rules\\_and\\_recommendations\\_v1r1C.doc](http://www.ebix.org/Documents/ebIX_Common_rules_and_recommendations_v1r1C.doc)

8 - System requirements	Requirements imposed by the regulation on the IT systems processing the EDI messages.
9 - Security of data interchange	A short description of the security of data interchange and related systems.

## 2. Document hierarchy

The regulation forms part of a hierarchy of documents, national and international alike. The figure below shows the principal organisations and documents, ranked with their mutual relationships.



The purpose of subdividing the documents is to simplify the work involved in mapping out and documenting new processes and changing existing ones. It will not be necessary for the business representatives to focus on the technical aspects, whereas the technicians can concentrate on such aspects. The figure components are described below.

### 2.1 Energinet.dk

Energinet.dk is responsible for ensuring well-functioning communication between the players in the market. Energinet.dk supports the coordinated use and development of electronic data interchange (EDI) in the Danish energy sector for electricity and gas. The purpose of data interchange is to simplify and streamline business processes in the sector. Energinet.dk participates at the international level in various organisations such as the Nordic Ediel Group, ebIX (Energy Business Information eXchange) and ETSO, the purpose of which is to support the coordinated proliferation of electronic data interchange in Europe with a view to realising the European single market for energy.

### 2.2 Danish provisions

Energinet.dk applies, in cooperation with the market players, the international provisions as a basis for national provisions. The provisions are operationalised through various document levels addressing different parts of the business.

### *2.2.1 Market regulations*

Based on the Danish Electricity Supply Act and related regulations, Energinet.dk has drawn up a range of market regulations. The regulations prescribe how all players should interact in relation to their individual roles. Regulations provide a necessary framework for ensuring that market players and infrastructure companies comply with legislation. Market regulations are filed with the authorities in accordance with the Danish Electricity Supply Act. The compilation of regulations also contains the standard agreements and deviations in force from time to time.

### *2.2.2 Business processes (Business Scenario – BS)*

Business processes are descriptions of business rules and procedures for the practical handling of the conditions specified by the regulations as far as the electricity market is concerned. The same applies to the gas market where 'Business processes for EDI communication in the gas market' describes the business rules and procedures for the practical handling of the conditions specified in 'Rules for Gas Distribution'. The target group is primarily the players in the market concerned. The description is prepared in the form of sequence diagrams, which illustrate in general terms how data are interchanged between the individual players and what data are interchanged. The business process specifies the framework and requirements. The technical contents of data interchanges are not specified in detail as reference is merely made to one or more business transactions. This means that the need for new and revised business processes is easier to formulate and implement and that market players will therefore be less tied to technical specifications.

### *2.2.3 Business transactions (BT)*

Business transactions are the technical descriptions of business processes and describe the individual messages included. The business transactions further describe the interaction going on with the underlying applications by means of event and activity diagrams. The messages included in the process explicitly appear.

A business transaction is independent of other business transactions and can be included in more than one business process. A business transaction developed for a given business process can be reused in other business processes. The business transactions provide details as to how the individual message must be used in relation to the specific transaction, including how the individual elements and attributes of the message must be used. A business transaction can be included in more than one business scenario.

### *2.2.4 Message implementation guides (MIG)*

A message implementation guide describes, in concrete terms, the contents and structure of one message. The guide is subject to the international standard for syntax and, if applicable, an overall structure for the type of messages. Two formats are used for the message exchange, which the message implementation guides describe as follows:

- **EDIFACT:** The message implementation guides are an integral part of UN/CEFACT's EDIFACT documents.

- **XML:** The message implementation guides are XML schema descriptions of the message in question and to the widest possible extent based on core components specified by UN/CEFACT.

### 2.3 Technical rules

The Danish provisions are supplemented with a range of technical documents, rules and process groups as shown below:

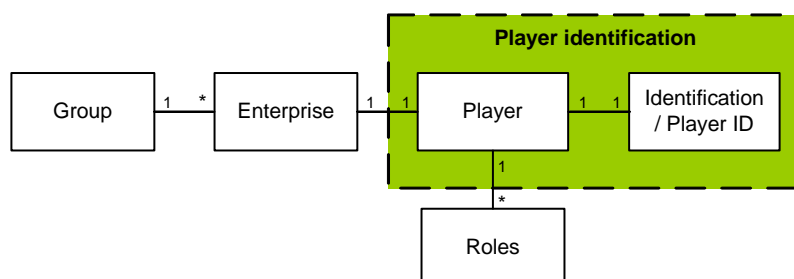
- **Communication regulation** (the present document) describes through principles and rules the processes for data interchange in the Danish market. The regulation includes supplementary sub-documents that specify the principles and rules set out in the regulation.
  - **The rules of acknowledgement** describe the rules and principles governing how to handle data interchange errors.
  - **The Danish role model** describes all roles and players in the Danish electricity and gas markets and their mutual relationships.
  - **Message structure and syntax** describes the fundamental rules for data formats used in the electricity and gas markets.
- **BPI** (Business Process Identifier) covers various business processes grouped in general BPIs, each with its own identification. The BPI is a technical grouping of messages by type, used for routing and addressing (see section 3.2).
- **DK code lists** provide a description of codes used for interchanging data in the electricity and gas markets.

### 3. Principles of data interchange

The electricity and gas markets use EDIFACT (UN/EDIFACT) and XML (only in the electricity market) for the structured building of interchanges between market players. EDIFACT is a standard, and interchanges therefore follow the same rules for structure and processing. XML offers no pre-defined standard messages, and to ensure a standardised structure, it is therefore necessary to adopt a central organisation of the development of messages.

#### 3.1 Player identification

According to the rule for player identification, one player has one player ID in the form of a GLN number (Global Location Number) or an ETSO EIC number (Energy Identification Code). This identification must be used regardless of the number of roles assumed by a player (see the Appendix 'The Danish role model'). The rules for player identification are illustrated in the figure below.

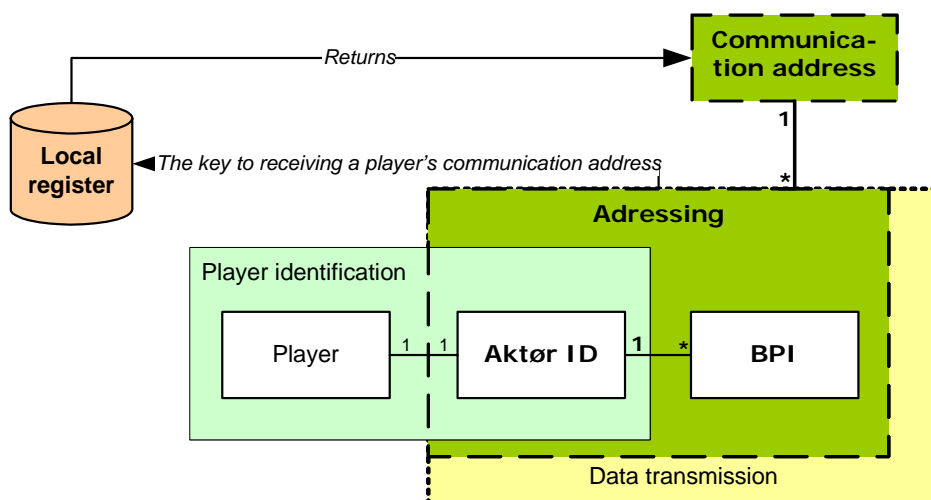


The figure uses some key terms, which – for the purpose of the further description – are defined as follows:

- **Group** – A general term used if a business undertaking comprises two or more companies.
- **Enterprise** – An enterprise has a range of legal obligations and a separate CVR no. By virtue of its commercial status, the enterprise is legally responsible for the player's roles.
- **Player** – A player is responsible for the exchange of EDI messages related to the role.
- **Role** – The roles a player can assume are defined in the Danish role model.
- **Player ID** – The technical identification of a player in the form of a GLN number (Global Location Number) or an ETSO EIC number (Energy Identification Code), see section 4.6.

#### 3.2 BPI, routing and communication address

The figure below illustrates the addressing principle. To show the context in which the addressing principle appears, the connection to the related terms and principles has been included. The addressing principle exclusively relates to the box titled 'Addressing', including the relation to the communication address.



The terms shown in the figure are defined as follows:

- **(Aktør ID) Player ID** – A unique identification of a player.
- **BPI** (Business Process Identifier) – Various business processes grouped in general BPIs, each with its own identification. The relation between player ID and BPI is a one-to-many relation, 'many' being the number of BPIs the player has. The messages included in the same BPI can be expected to be processed by the same application. The BPI is used for routing and addressing, and reference is made to this in the EDI message, see the following rules:
  - In EDIFACT messages the BPI must appear from the application reference (UNB element S004.0026). UNB-element S004.0032 must be 'DK' to indicate that the Danish provisions apply.
  - In XML messages the BPI must appear from the 'ProcessType' element under the XML header.

BPI	Description
DK-CUS	Change of suppliers expected to take place between the customer information systems.
DK-TIS-SHA	Exchange relating to market share values.
DK-TIS-MET	Exchange relating to time series based on metered data information.
DK-TIS-SCH	Exchange relating to time series based on notifications and schedules.
DK-OP	Operational schedules and bids etc.
DK-GAS-ACD	Summed consumption data exchanged in the Danish gas market.

- **Communication address** – Is the transmission reference to a receiver's system. The key to the right communication address is player ID and BPI. The relation between player ID and BPI on the one hand and the communication address on the other hand is a one-to-many relation. This means in practice that a player can have one communication address per BPI. The communication address can be an e-mail address or web service address. It can be agreed bilaterally to use communication addresses other than those listed in the Register of Players.

- **Local register** – A player is obliged to maintain and keep up to date information about the communicating parties.

## 4. General rules for messages

The section describes the general rules for messages that do not specifically apply to the exchange formats EDIFACT and XML. To the extent that it is relevant, the specific rules are specified in relation to EDIFACT and XML.

### 4.1 EDIFACT and XML

EDIFACT and XML are the two exchange formats used for transmitting data between players in the market. Rules and principles for the data content of messages are described in the following section. The two data formats as well as the syntax and structure are described in detail in the Appendix 'Syntax and structure of EDI messages'.

### 4.2 Responsibility for EDI messages

It is the responsibility of the sender to make sure that the EDI message has reached the receiver's system. The Danish business processes require that an EDI message must always have a reply. In the event that the sender has not received a reply within the agreed time limit, he must check his system configuration. If no error is found, the receiver must be contacted to solve the problem.

### 4.3 Error handling and acknowledgements

The business processes will provide a description of reply procedures in connection with the exchange of EDI messages. The normal procedure specifies a reply. If the receiver registers an error during converting or in connection with data handling, an error message must be returned.

For EDIFACT messages, syntax errors are handled by a CONTRL message. When a CONTRL is requested in an EDIFACT message, it must be returned.

An APERAK message is used for handling other errors if it is not specified that a 'real' EDIFACT message must be used as a reply.

For XML an 'Acknowledgement document' is used in case of syntax or data content errors.

The detailed description of rules and principles for errors and acknowledgements appears from the Appendix 'Principles and rules of acknowledgement'.

### 4.4 Time, date and period formats

Terms and their use:

- **UTC:** Universal Time Coordinated. In practice identical to GMT (Greenwich Mean Time).
- **Local time:** Time at the location.

Denmark uses UTC+0. All IT systems must be able to handle the receipt of different offsets to UTC. In EDIFACT time in the C507.2380 UNB element is always expressed in local time.

#### **Daylight saving time/standard time**

The same UTC offset is used in the messages all year round.

UTC+0	Daylight saving time in Denmark	Elec-tricity	The day runs from 22:00 to 22:00 on the following day.
		Gas	The day runs from 04:00 to 04:00 on the following day.
	Standard time in Denmark	Elec-tricity	The day runs from 23:00 to 23:00 on the following day.
		Gas	The day runs from 05:00 to 05:00 on the following day.

Denmark moves to daylight saving time on the last Sunday of March and returns to standard time on the last Sunday of October. The day we move to daylight saving time has 23 hours. The day we return to standard time has 25 hours.

### Notation and periods

All time intervals in messages are expressed using an inclusive start date/time and an exclusive end date/time.

For instance, a day is written in EDIFACT syntax as

200610172300200610182300 and an hour as 200610172200200610172300.

### XML date/time formats

All date/time formats in XML are written as follows:

YYYY-MM-DDTHH:MMZ

Format explanation:

'-', ':' and 'T' are separators, and 'Z' specifies no offset to UTC time (UTC-0).

### Time series start and end dates

In certain types of messages the period must be specified in the form of a start and end date in the message header. This period is needed for control purposes. In case a period in the retail section is outside this period, the message must be rejected.

### Time synchronisation

It is important that IT systems generating and processing messages is within 1 minute +/- of local time.

## 4.5 Opening hours for EDI messages

The following service rules apply to IT systems related to messages exchanged:

Business days are Monday through Friday, excluding public holidays and the following days: 24 December, 31 January, 5 June, 1 May and the Friday following the Day of Ascension.

In principle EDI systems are always open and so are e-mail systems or web services for processing messages. However, in exceptional cases, other rules may apply to some business processes. Business processes subject to DK-CUS

and DK-TIS-SHA are, for instance, only obliged to open their systems in the period 08:00 to 20:00.

Support (be it in the form of IT support, error handling, Metering Point Identification requests, etc.) can only be expected within normal working hours (8:00-16:00).

It is up to the player to minimise the downtime and plan major system changes so as to cause the least inconvenience to the market.

Regardless of time/date, the downtime must be notified to the affected players in due course, for instance by e-mail. When the system is up again, this must also be announced.

Some systems may be subject to tighter uptime requirements, which will be described in the business processes. This applies, for instance, to business processes for operational schedules and the regulating power market.

#### 4.6 Identification

Below follows a description of the identification systems used in the electricity and gas markets. A unique identification of players, areas, metering points, etc. is needed.

##### 4.6.1 Global Location Number (GLN)<sup>2</sup>

The GLN number is used for providing a unique identification of a player. The numbers are globally administered by GS1. In Denmark GLN numbers are allocated by GS1 Denmark and are composed of 13 digits:

- **Positions 1-3:** The three first digits are always the prefix (country code), which is 579 in Denmark's case.
- **Positions 3-12:** The following positions are allocated consecutively according to the Modulus 10 rules and are administered by GS1.
- **Position 13:** The last digit (K) is a check digit calculated on the basis of an algorithm (Modulus 10). The check digit for the GLN number is an integral part of the location number. The check digit is calculated on the basis of the preceding characters by means of a Modulus 10 algorithm.

Example: 5790000705245

##### 4.6.2 EIC<sup>3</sup>

The European Identification Code, just like the GLN number, is used for providing a unique player identification. EIC numbers are administered by a unit under the ETSO organisation. Moreover, ETSO's members benefit from local administrative units who are authorised to issue EIC numbers.

<sup>2</sup> www.GS1.dk

<sup>3</sup> For more information, see - <http://www.edi.etso-net.org/eic/eic-v3r0.pdf>

Depending on what the EIC number identifies, different structures have been established. Basically, the number is made up of 16 characters and is structured as follows for the player identification code:

- **Positions 1-2:** The two first characters refer to the issuing entity allocated by ETSO.
- **Position 3:** Identifies that it is a player identification number in the form of the letter 'X'.
- **Positions 4-15:** 12 characters in uppercase letters allocated by the issuing entity.
- **Position 16:** Check character.

Example: 11XRWENET123452

#### 4.6.3 Changes to GLN/EIC codes

A player who wants to change GLN/EIC codes must notify the market players at least five business days before the change takes effect.

#### 4.6.4 Identification of consumption metering points

**GSRN** (Global Service Relation Number)<sup>4</sup> is a uniquely defined number series allocated by GS1, which provides a unique identification of a metering point and consumer portfolios within a distribution company's distribution system. The number is used as identification in EDI messages. All metering points (active, virtual and passive) must be identified by means of the GSRN number, which must be stable over time. It must not be changed in the event of a change of supplier, for instance.

#### Structure of the 18 digits of GSRN

Position	Example	Explanation
Pos 1-2:	57	GS1 Denmark.
Pos 3-7:	13131 (electricity) 15151 (gas)	5 digits fixed for the entire Danish electricity and gas supply sectors for identification of metering points.
Pos 8-10:	676	Number for the electricity supply company.
Pos 11-17:	XXXXXXX	7 digits for consecutive numbering of the individual metering points allocated by the electricity supply company.
Pos 18:	X	Check digit.

#### 4.6.5 Identification of time series

All grid companies in the electricity market have been allocated 10,000 numbers for unique identification of time series in relation to Energinet.dk. The time series number is used in relation to production metering, exchange metering and market share values.

<sup>4</sup> GS1 administers the number series in Denmark. For more information, see - [http://www.ean.dk/EAN\\_Sys/ADC/EAN\\_GSRN.htm](http://www.ean.dk/EAN_Sys/ADC/EAN_GSRN.htm)

#### 4.6.6 Identification of grid areas

Any grid area has a metering point identification composed of three digits (DE number) to be capable of identifying the area in relevant messages (in the gas market GSRN numbers are used). The DE number is allocated by the Danish Energy Association and must be used for grid area identification.

#### 4.7 Use of signs

Sign rules in relation to Energinet.dk.

Description	Sign
Production in the area	+
Area consumption	-
Energy supplied to area, including purchases	+
Energy out of area, including sales	-

Sign rules in relation to business processes for a Danish change of suppliers.

Description	Sign
Consumption metering	+
Market share values	+

The use of signs will be specified in the individual business processes (BS<sup>5</sup>).

#### 4.8 Identification of price areas in the electricity market

Denmark is divided into two general market price areas to which reference can be made in EDI messages, see the table below.

Area	Reference (EIC)	Alternative reference
Western Denmark (Jutland/Funen)	10YDK-1-----W	DK1
Eastern Denmark (Zealand and Bornholm)	10YDK-2-----M	DK2

The use is described in greater detail in the related business processes and documents.

#### 4.9 Rules for rounding, digits and decimals

The following principles for rounding should be used regardless of interchange format:

##### Rounding rules

The usual rules for rounding are applied. Values less than 5 are rounded down, and 5 and above are rounded up. Any residual value resulting from rounding is ignored.

<sup>5</sup> Business Scenarios

### Separators and digits

- Full stop (.) is used as decimal separator. If a decimal separator is included in a value, the separator must be both preceded and followed by at least one digit. For instance, it is not allowed to send .5 – instead it should be 0.5.
- A decimal separator may be used only where it is allowed, see the message implementation guide applied.
- Triad separators are not allowed in data interchange.
- A numeric value must not contain special characters.

### Characters

- If a value has leading zeros (0), these will not be transmitted.
- Leading and trailing blanks will not be transmitted. If, for instance, a field has 20 characters available, but only five characters are used, only the five characters will be transmitted.

#### 4.10 Versioning of business transaction (BT<sup>6</sup>)

The versioning of a business transaction refers to changes in the business transaction concerned, which will affect the implementation guide for a given message. An IT system must be capable of handling the two latest versions of a business transaction (applies to both EDIFACT and XML messages). All players must regularly update the Register of Players with the version of the implementation guide they use.

Business transaction number is specified in the message in UNH, element 0068.

The business transaction and the version of the transaction are identified by a 13-character string structured in the following format: CC-GGGGGG-NNN.

CC	Two letters indicating country code – ISO 3166.
GGGGGG	Six characters to identify the business transaction based on a combination of the letters A-Z (uppercase) and the numbers 0-9 and the separator '-'. and the separator '-'.
NNN	Implementation guide version number with trailing zeros.

#### 4.11 IT system errors

In the event of serious errors affecting other players' IT systems, the affected players must be contacted and informed of the consequence of the error. The players must be contacted by phone or e-mail.

#### 4.12 Discrepancies between players

If an error occurs in the data interchange between two players, the players must:

1. Contact each other with a view to identifying and correcting the error. If this fails, the players should proceed to paragraph 2.
2. Contact Energinet.dk, who will initiate all necessary measures (for instance test of IT systems, consultant's survey, etc.), depending on the situation.

<sup>6</sup> Business Transaction

If Energinet.dk contributes to identifying the error, the players may be instructed to pay the expenses incurred for tests or external consultant's surveys. The total expenses will be payable by the player who turns out to be responsible for the error. The player in question will also be instructed to correct the error within a time limit set by Energinet.dk.

## 5. Communication platform

The electronic communication between market players is made by means of specified communication protocols depending on the type of interchange. The protocols transmit the interchanges from sender to receiver and ensure that the interchanges reach the intended receiver intact. If an error occurs in the transmission, the communication protocols must inform the sender (sender's system).

If it is not possible to send the interchanges electronically, reference is made to separate documents with business scenarios that describe alternative ways of communication.

The following sections describe the protocols applied.

### 5.1 SMTP (e-mail)

EDIFACT interchanges transmitted through the SMTP protocol over the Internet (non-encrypted) must contain a MIME header (RFC 1767 / RFC 822), the use of which is specified below.

MIME header	Contents	Comments
MIME version 1.0		
Content type:	Application/EDIFACT	
	Application/octet stream	
Content transfer encoding	QUOTED PRINTABLE	QUOTED PRINTABLE is readable in the form of the ASCII character set.
	BASE64	BASE64 encoded files are a subset of the ASCII character set, which must be decoded before use.
Content disposition	Attachment name = 'file name'	<i>(optional, not recommended)</i>

The following rules and recommendations apply to the use of the SMTP protocol for EDIFACT interchanges:

- Only one EDIFACT interchange per e-mail is allowed.
- The contents of the e-mail subject field are of no importance as the field is not processed by the receiving IT system.
- The body text of the e-mail is not processed either and should therefore not be used.
- The EDIFACT file must be sent as one long string without HEX 0A (line feed) and HEX 0D (carriage return).
- The EDIFACT file must not contain routing information that needs to be read as a precondition for a successful data interchange from sender to receiver.

- It is the sender's duty to make sure that a message is not too big for the receiver's IT system to receive<sup>7</sup>. If the receiver has special restrictions, the sender should be informed of these.
- Energinet.dk does not use secure SMTP communication.

## 5.2 Web service

Energinet.dk's web services are an initiative designed to provide the framework for the exchange of messages over the Internet in a secure and reliable manner. The web services in question are targeted at the players who want to exchange messages over the Internet. The following terms are used in relation to web services.

<b>Web service:</b> Open XML standard for data interchange from application to application over the Internet. The service is typically designed to function with a specific interchange type.
---

<b>SOAP:</b> An XML protocol for exchanging structured data against a web service. SOAP ensures the data transmission over the HTTP protocol.
---

<b>WSDL:</b> A structured XML model for describing the web service, containing information about the correct format of calls to the web service.
--

Energinet.dk provides web services to which the players can send their messages and from which they can collect messages. The service runs at a fixed, defined address, which enables the sender to design a fixed SOAP header. Messages are received by calling the web service, which then returns the messages ready for transmission.

Calls to Energinet.dk's web services are made over an SSL connection with a user logon facility. This ensures that the requirements set out in the Danish Data Protection Agency's recommendation for secure communication are observed.

When a message has been sent to the web service, it will be syntax validated, and in the same session the sender will be informed whether the message has been correctly received and whether its syntax is correct.

<sup>7</sup> For the time being a message must not exceed 5 MB saved as a file. E-mails will be larger than the attached file when SMTP is used. We therefore recommend setting up firewalls and/or mail systems so that they can accept e-mails up to 10 MW. In the future the current limits will be shown on Energinet.dk's self-service portal.

## **6. Web-based system for notifications and schedules**

As an integral part of Energinet.dk's portal solution, a web-based system has been established for the submission of notifications and schedules in the electricity market (notifications, operational schedules, regulating power bids and regulating power orders) and nominations in the gas market. The system enables the players to submit notifications and schedules without having access to EDI communication.

The purposes of the system are:

- To meet the needs of players who find it inexpedient to submit notifications and schedules through EDI.
- To make an alternative form of exchange available to players who are affected by system failures.

The players can use the system free of charge. If the system is inaccessible against expectations, it is the player's responsibility to submit notifications and schedules to Energinet.dk in a different way.

## **7. Register of Players**

In connection with the self-service portal, Energinet.dk will establish a register of players with the information necessary for the practical data interchange to function. Energinet.dk will place the register at the disposal of the players in the market. The register will also be made available to the public at large to the extent that the information is of public interest. The register will contain corporate information and EDI technical information as well as statutory and financial requirements to be met by the players.

In the forthcoming Register of Players, the players in the electricity and gas markets will themselves be responsible for:

- Maintaining their own information in the register.
- Keeping up to date on changes in the register.

The players must keep up to date on changes, either by subscribing to notifications of changes or by regularly allowing the IT systems to collect the information in the register of players. In the latter case, the IT systems must support the possibility of collecting data made available by the register.

## **8. IT system requirements**

Energinet.dk has adopted requirements for the IT systems in the electricity and gas markets. These requirements are listed in the following sections as requirements for functionality and tests, respectively.

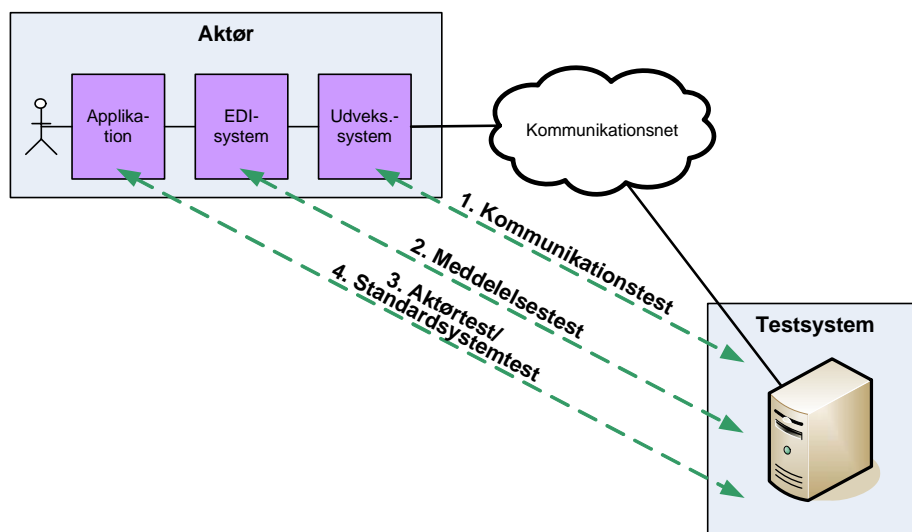
### **8.1 Requirements for functionality**

IT systems (EDI systems, applications, etc.) directly or indirectly involved in data interchange between players must meet the following requirements:

- The systems must be simultaneously capable of receiving two main versions of a business transaction (see separate documents for description of business transactions).
- Systems designed to communicate with foreign players not covered by the Danish rules must be capable of handling other formats and codes (including time zones) than those described in section 4.
- The systems must provide logging of outgoing and incoming messages to facilitate documentation of all data interchange. The logging must be of such a quality that it is able to contribute to troubleshooting and error correction.
- Earlier messages must be retrievable in readable form (ie non-encrypted) as and when needed through an easily accessible user interface.
- For three years the systems must store in a secure manner the individual messages or copies of messages in the format in which the messages were originally sent.
- The systems must be capable of passing an IT system test as defined by Energinet.dk. A central system will be established with specifications for testing of IT systems. Until this system has been established, detailed information about the test can be obtained by contacting Energinet.dk.
- The systems must either contain a parallel test system or provide an opportunity to perform tests in the production environment without affecting production data.

### **8.2 Requirements for tests**

IT systems in the electricity and gas markets must be approved before they are used for electronic data interchange with other market players. Energinet.dk defines the required tests and participates, to the necessary extent, with guidance on testing and administration of the test system. The following figure shows the four types of test.



**Figure texts:**

Aktør: Player

Application EDI system Udvekslingssystem: Exchange system

Kommunikationsnet: Communication network

1. Kommunikationstest: Communication test

2. Meddelelsestest: Message test

3. Aktørtest/ 4. Standardssystemtest: Player test/Standard system test

Test system

*8.2.1 Purposes of individual tests*

Market players must generally perform three types of test before the systems are put into operation. The purposes of the individual tests are described below:

1. **The communication test** is designed to test whether communication between the players functions as intended, ie that the specification for the relevant communication protocol is met, for instance the SMTP protocol or web service. The test includes messages sent as well as messages received.
2. **The message test** is designed to ensure that correct syntax is used for the messages sent. This means that the structure and part elements of the message comply with specifications. The test includes testing of messages sent by the player.
3. **The player test** is designed to test whether the individual functions of, and interaction between, the players' IT systems and business procedures operate correctly. One of its purposes is to check whether the players have configured their IT systems correctly. In the test the player checks that the system makes correct registrations and actions on the basis of data received, for instance that the system sends correct verifications, rejections, etc.

System suppliers of jointly developed standard systems must perform a test as defined by Energinet.dk before the systems are installed and tested at the premises of the individual market players. The purpose of this test is described below:

4. **The standard system test** is designed to ensure that the standard systems have been tested before being installed at the players' premises. The test is practically identical to the player test, but has been extended to include additional error test messages.

#### *8.2.2 Test performance in practice*

All tests described are performed by the market player or system supplier against an automated test system established by Energinet.dk. To the necessary extent, Energinet.dk participates in the test performance by providing guidance on and administering the test system. Energinet.dk also makes requirements for the content of the individual tests.

The individual test is performed in the sense that the market player or system supplier:

1. Contacts Energinet.dk and agrees to perform the test.
2. Performs the test against the automated test system.
3. Performs error correction and retesting, if necessary, until all errors have been eliminated.
4. Contacts Energinet.dk to receive a verification message that the test has been approved.

A player needs to have passed both the communication test and message test before initiating the player test, and all three tests mentioned must be passed before the player uses its system for communicating with other players. The message test should be performed as early as possible to identify fundamental errors, if any.

The standard system test is exclusively targeted at suppliers of jointly developed standard systems. The test must be performed before the system is installed at the premises of the market players. Players with an in-house developed system and players where the IT supplier has not been separately approved are subject to a more comprehensive test.

## **9. Security of data interchange**

All player communication must comply with the statutory requirements (including the Danish Act on Processing of Personal Data). Furthermore, Energinet.dk's IT security requirements for player communication must be implemented.

The following examples of information will be regarded as non-confidential:

- Enterprises' metering data for continuous consumption
- Information about suppliers and annual consumption (in the event of a change of supplier)
- General personal data which, according to the Act on Processing of Personal Data, may be sent in non-encrypted form.

Confidential business information is included in player communication in the notifications and schedules submitted in the electricity and gas markets. Energinet.dk will allow data interchange in encrypted form.

When confidential business information is included in the communication, Energinet.dk will offer data interchange in encrypted form. This will take place through the following communication paths:

- Web services
- The SESAM player portal

Energinet.dk will not increase security in connection with SMTP communication.

Regulation F: EDI communication

Appendix report 1:

# Syntax and structure of EDI messages

February 2008

Rev. 1

In case of any discrepancy between the Danish text and the English translation,  
the Danish text shall prevail

## Table of contents

1.	EDIFACT syntax and structure .....	3
1.1	EDIFACT structure and terms .....	3
1.2	EDIFACT syntax.....	4
1.2.1	Character set and structure .....	4
1.2.2	Use of reserved characters .....	4
1.2.3	Avoid superfluous signs .....	4
1.3	Undescribed segments and elements in the message implementation guides .....	5
1.4	Interchange control reference, message ID and interchange version.....	5
1.5	Fixed segments .....	5
1.5.1	UNA – Syntax segment .....	5
1.5.2	UNB – EDIFACT envelope for all documents except CONTRL.....	6
1.5.3	UNH EDIFACT document header .....	8
1.5.4	UNZ .....	9
2.	XML syntax and structure .....	10
2.1	What is XML? .....	10
2.1.1	XML in the electricity market .....	10
2.2	XML syntax .....	11
2.2.1	Well-formness .....	11
2.2.2	Use of attributes and empty tags.....	11
2.2.3	DTD compared with XML schema.....	12
2.2.4	Use of encoding and characters.....	12
2.3	Interchange control reference, message ID and interchange version.....	13
2.4	Core Components .....	13
2.5	Use and structure of XML schemas .....	13
2.6	Versioning for XML schema .....	14
2.7	References.....	15

## 10. EDIFACT syntax and structure

This appendix report describes the technical syntax and structure of the EDIFACT standard. The contents are based on the ‘Common rules and recommendations’ of ebIX.

### 10.1 EDIFACT structure and terms<sup>8</sup>

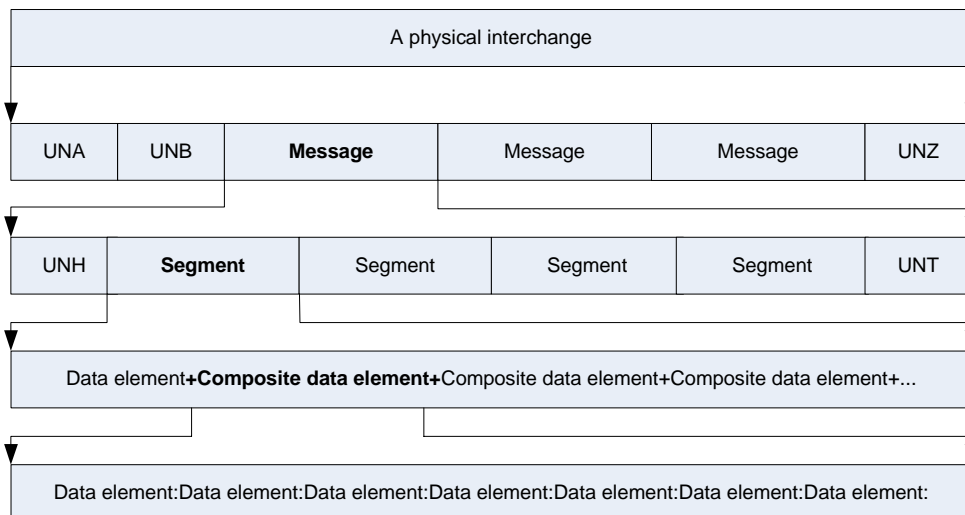
EDIFACT is a United Nations standard (UN/CEFACT) used for interchanging data in structured form. This means that EDIFACT is subject to specific syntax rules, which apply at all times and must always be complied with.

EDIFACT contains the following terms:

- An **interchange** consists of all information in a transmission. A physical interchange can comprise one or more messages. An interchange has one sender and one receiver.
- A **message** is for instance:
  - Metered data
  - Notifications and schedules

In Denmark, the general rule is that only one message per interchange is allowed.

- A **segment** is a group of related data elements/fields. It could, for instance, be an address. In the segment the address is specified by indication of name, road, postcode, town, country, etc.
- A **composite data element** comprises two or more data elements.
- A **data element/field** is the individual information transmitted in a segment. It could, for instance, be an indication of time or a number of kilowatt hours.



The figure above illustrates the interconnected use of the four terms. UNA, UNB and UNZ are segments used for marking the beginning and end of an

<sup>8</sup> The section is based on UN/CEFACT – <http://www.gefeg.com/jswg/>

interchange. UNH and UNT are segments used for marking the beginning and end of a message.

The following characters are used for marking separation, end, etc. in connection with data elements and segments:

- + Marks separation between data elements and between segments.
- ' Marks that a segment is finished.
- : Marks separation between the individual data fields in composite data elements; this means more fields describing the same.

## 10.2 EDIFACT syntax

Basic rules for messages used in the electricity and gas markets:

### 10.2.1 Character set and structure

- Send EDIFACT interchanges as one long string without changing lines.
- Always send interchanges in the ISO 8859-1 character set, also known as UNOC.
- Completely fill in yymmdd and hhmm in the UNB. Hence, it is insufficient to send, for instance, 645 to indicate the hour. To be correct, it should be 0645.
- Always write message names and segment names in UPPERCASE when they are transmitted.
- EDIFACT version 3 is used in Denmark.

### 10.2.2 Use of reserved characters

The UNA segment describes the separators (reserved characters) used in the transmitted EDIFACT. The standard is: UNA: +.? '

If one of the reserved characters (+, :, ') is used, it should be preceded by a question mark (?). Thus, for the addition of two numbers (eg 10 + 20), write 10?+20. If a question mark is needed, write two question marks (??). The first question mark restores the normal meaning of the next one. If a release character is used, it is not included in the determination of the field length. If a field allows 20 alphanumeric characters and 2 release characters are needed, the field may be up to 22 characters long.

### 10.2.3 Avoid superfluous signs

- Delete trailing plus signs (+) throughout the segment.
- Delete trailing colons in each individual data. Do not delete leading plus signs (+) or colons (:).
- Data elements (fields) can be excluded by omitting the field 'values', eg 24500+45++25600, where the field value between 45 and 25600 has been omitted. In the event of a composite data element, it can, for instance, be 3650:3575::3400, where the field value between 3575 and 3400 has been omitted.

### 10.3 Undescribed segments and elements in the message implementation guides

EDIFACT messages must meet all rules set out in the regulation. If a player receives EDIFACT messages containing additional segments and elements not described in the relevant guidelines, these must be ignored. It must therefore not give rise to an error message report to the sender as long as the message complies with the basic structure of the EDIFACT message in question (eg UTILMD or UTILTS).

### 10.4 Interchange control reference, message ID and interchange version

The interchange control reference is found in the S004.0020 element of the UNB segment, which must be unique over time for the sender, as defined in S002. If this is not the case, the last received message must be rejected automatically. Message ID is found in the C002.1204 element of the BGM segment and is used for the unique identification of a message. Message ID must be unique over time for each player. Interchange version is not used in EDIFACT.

### 10.5 Fixed segments

Below follows a description of selected service segments (UN segments). UNA and UNB are used for the interchange header and can be regarded as the envelope of the interchange. UNB is used by the receiving EDI system for identification of sender and receiver.

#### 10.5.1 UNA – Syntax segment

**UNA** Service String advice  
**Function:** For specification of notation in the EDIFACT interchange  
**Classification:** Conditional, (1)  
**Comments:** The examples below are default. Used in Denmark.  
 UNA UNA: +.? '

Ref.	Name	Cl.	Form.	Description
	COMPOSITE DATA ELEMENT, SEPARATOR	M	an1	":" (colon)
	DATA ELEMENT, SEPARATOR	M	an1	"+" (plus sign)
	DECIMAL NOTATION	M	an1	"." (full stop)
	RELEASE CHARACTER	M	an1	"?" (question mark)
	RESERVED FUTURE USE	M	an1	" " (blank)
	SEGMENT TERMINATOR	M	an1	"'" (apostrophe)

10.5.2 UNB – EDIFACT envelope for all documents except CONTRL

**UNB** Interchange header  
**Function:** For identification and addressing of the interchange, specification of an acknowledgement request as well as test indication.  
**Classification:** Mandatory (M1).  
**n:**  
**Comments:** The use of the UNB segment must be agreed in the interchange contract.  
**Example:** UNB+UNOC:3+5790000395620:14+5790000432752:14+070120:1606+31929++DK-TIS-MET++1+DK

Ref.	Name	CI	Form.	Description
S001	SYNTAX IDENTIFIER	M		
0001	Syntax identifier	M	a4	<b>Code:</b> UNOC (ISO 8859-1)
0002	Syntax version number	M	n1	<b>Code:</b> 3 Version 3 of EDIFACT syntax must be used if syntax identifier is "UNOC"
S002	INTERCHANGE SENDER	M		
0004	Sender identification	M	an..35	GLN or EIC number.
0007	Partner identification code qualifier	R	an..4	<b>Code:</b> 14 GLN (Global Location Number) 305 EIC (European Identification Code)
0008	Address for reverse routing	O	an..14	Only if bilaterally agreed.
S003	INTERCHANGE RECIPIENT	M		
0010	Recipient identification	M	an..35	GLN or EIC number.
0007	Partner identification code qualifier	R	an..4	<b>Code:</b> 14 GLN (Global Location Number) 305 EIC (European Identification Code)
0014	Routing address	O	an..14	Only if bilaterally agreed.
S004	DATE AND TIME OF PREPARATION	M		
0017	Date	M	n6	Date of interchange creation (YYMMDD)

0019	Time	M	n4	Local time of day when interchange was created (YYMMDD)
0020	INTERCHANGE CONTROL REFERENCE	M	an..14	Unique reference assigned to the interchange. Must match data element 0020 in UNZ. Must be unique over time for sender, as defined in element S002.0004, otherwise the interchange must be rejected.
S005	RECIPIENTS REFERENCE, PASSWORD	X		
0022	Recipient's reference/ password	X	an..14	
0025	Recipient's reference/ password qualifier	X	an..2	
0026	APPLICATION REFERENCE	O	an..14	BPI is used, see national rules or "ebIX Business information models".
0029	PROCESSING PRIORITY CODE	X	a1	
0031	ACKNOWLEDGEMENT REQUEST	O	n1	<b>Code:</b> 1 Acknowledgement is sent blank No acknowledgement
0032	COMMUNICATION AGREEMENT ID	O	an..35	<b>Code:</b> DK Danish communication provisions.
0035	TEST INDICATOR	D	n1	<b>Code:</b> 1 Is used if the interchange is a test. Must be bilaterally agreed. blank The message is in production.

### 10.5.3 UNH EDIFACT document header

The UNH segment has been described as Danish practice for element 0068 differs from ebIX.

**UNH** Message header  
**Function:** UNH is sent once per document in an interchange, identifying the message, version number and code of the interchange cooperation.  
**Classification:** Mandatory (M1).  
**Comments:**  
**Example:** UNH+1+UTILMD:D:02B:UN:E5DK02+DK-BT-001-002'

Ref.	Name	CI	Form.	Description
0062	MESSAGE REFERENCE NUMBER	M	an..14	<i>A unique reference assigned to the message.</i>
S009	MESSAGE IDENTIFIER	M		
0065	Message type identifier	M	an..6	Identifies the message used (eg UTILMD)
0052	Message type version number	M	an..3	
0054	Message type release number	M	an..3	EDIFACT message version
0051	Controlling agency	M	an..2	The agency controlling the message.
0057	Association assigned code	C	an..6	MIG version number. See MIG. Mandatory.
0068	COMMON ACCESS REFERENCE	C	an..35	Business Combined id
S010	STATUS OF THE TRANSFER	C		
0070	Sequence message transfer number	M	n..2	
0073	First/last seq. mess. transfer. Indicator.	C	a1	

10.5.4 UNZ

**UNZ** Interchange trailer  
**Function:** For termination of interchange and specification of total number of messages in interchange  
**Classification:** Mandatory (M1).  
**Comments:** Data element 0020 must be identical to 0020 in UNB  
**Example:** UNZ+1+358765298'

Ref.	Name	CI	Form.	Description
0036	INTERCHANGE CONTROL COUNT	M	n..6	Number of messages in interchange
0020	INTERCHANGE CONTROL REFERENCE	M	an..14	Must match data element 0020 in UNB segment

## 11. XML syntax and structure

This section provides support to players in the Danish electricity market that are going to use XML messages. As XML is not a standard, the electricity market uses a methodology made up of a number of basic components from which the messages are created. The individual messages are not described in the same way as EDIFACT messages.

### 11.1 What is XML?

XML<sup>9</sup> is a language used for describing data in a structured and general way. Data are described in XML by means of pure text organised as a tree structure. The tree structure is specified by using *tags*, which are a data markup as shown in the following example:

```
<person>
  <name>Per</navn>
  <postcode>5000</post>
</person>
```

When data are marked up, it enables the structured interchange between two or more partners. In XML everyone is free to define an arbitrary markup language. In most contexts it is therefore necessary to define a standardised markup language for the data interchange.

Various bodies and associations in the electricity market have agreed on a common standard for XML interchanges, which standardises the data markup language. This ensures that the data content of the interchanges is interpreted in the same way by sender and receiver.

The XML interchange in itself is pure text stored in a text file. It must therefore also be decided what method should be used for transmitting the interchange to the receiver. This can, for instance, be done through a web service or by e-mail.

#### 11.1.1 XML in the electricity market

The electricity market uses a standardised markup in XML, based on ETSO's XML standards. In connection with interchanges related to the handling of notifications and schedules, it is particularly ETSO's ESS standard that provides the basis for the standardisation.

ESS has been introduced as a pan-European standard for the interchange of data between transmission system operators and between transmission system operators and balance responsible parties (BRPs). ESS comprises a number of standard messages and core components, which enable the design of new messages by making use of the framework included in the core components.

ESS does not resemble earlier XML messages used in the Danish electricity market, such as Eltras XML-DELFOR, which was a direct translation of EDIFACT into XML.

<sup>9</sup> eXtensible Markup Language

## 11.2 XML syntax

XML (eXtensible Markup Language) is composed of *tags* that surround and, in that manner, mark the type of data. A postcode could, for instance, be marked by a start tag `<postcode>` and an end tag `</postcode>` (see example below).

```
<postcode>5000</postcode>
```

In the example above, the value 5000 now makes sense as it is defined as a postcode. Alternatively, the value could symbolise anything.

Start tag is defined by: `< tag name>`  
End tag is defined by: `</ tag name>`

Together, the start tag, end tag and the content between the tags define an element. Hence, in the example above, the “postcode” tag thus defines the element.

A tag can also contain attributes, which provide additional information and, therefore, value in relation to the content of the tag besides the name. Attributes are declared within the start-tag by name, as shown in the example below.

```
<postcode countrycode="DK">5000</postcode>
```

In the example above, for instance, the `countrycode="DK"` provides information that the content of the tag (5000) is a Danish postcode.

Attributes are defined in the start-tag by: `attribute name="attribute value"`

The alternative could be a following tag for the country code (see example below).

```
<postcode>5000</postcode>  
<countrycode>DK</countrycode>
```

### 11.2.1 Well-formedness

A well-formed XML document must contain W3C's XML specification in such a way that the document has exactly one root element. All elements must be surrounded by a start-tag and an end-tag. If the element is empty, tags must be used as described in section 2.2.2. See an example of the use of tags below.

```
<root element>  
  <name>Per</name>  
  <postcode>5000</post>  
</root element>
```

The example above is well-formed according to the specification described.

### 11.2.2 Use of attributes and empty tags

A tag can contain any number of different attributes.

An attribute is defined by: `<tag name attribute name="attribute value">`

A tag need not necessarily contain data, in which case it is an empty tag. An empty tag can be defined by either a start and end tag without any content in between or as shown in the example below.

`<postcode/>`

An empty tag is defined by either: `<tag name> </tag name>`  
or by: `<tag name/>`

### 11.2.3 DTD compared with XML schema

Document Type Definition (DTD) and XML Schema Definition (XSD) are two methods to describe content, structure and type definitions for an XML document. DTD used to be in fairly widespread use in connection with the definition of the content of the XML message directly in the XML document. Today, however, the trend is moving towards separate schema files (XSD) for defining the XML document content.

XSD makes it easy to:

- describe the content, if applicable
- validate the correctness of data
- define data facets (restrictions on data content)
- define data patterns (data formats)
- convert data between different data types (by use of redefine)

Moreover, the development and validation of XSD are supported by various XML editors, parsers and other tools.

An XML document is validated in relation to the data definition (either DTD or XSD).

### 11.2.4 Use of encoding and characters

The standardised XML standard uses the UTF-8 encoding form, which is backward compatible with ASCII. UTF-8 is a 2-bytes-per-character encoding, which is a compressed version of Unicode. Encoding is specified at the beginning of the XML file as follows:

`<?xml version="1.0" encoding="UTF-8"?>`

The XML syntax contains a number of reserved characters, which are not allowed to appear in the content of elements or attributes.

Reserved character	Alternative notation
<	Can be written as “&lt;”
>	Can be written as “&gt;”
&	Can be written as “&amp;”
”	Can be written as “&quot;”
'	Can be written as “&apos;”

The XML notation is case sensitive (does not apply to the content of an element).

The element `<Identification></Identification>` is not the same as `<identification></identification>` because of the difference between upper- and lowercase I/i.

### 11.3 Interchange control reference, message ID and interchange version

An XML message has no interchange control reference, but a unique message ID, which is obtained by combining the elements “MessageIdentification” and “MessageVersion”. The version number is consecutive, starting with 1. Is placed in the element “MessageVersion”.

### 11.4 Core components

Core components are defined by UN/CEFACT (United Nations Centre for Trade facilitation and Electronic Business). Core components are syntax neutral and technology neutral in their basic form and can be used for data modelling. CCTS (Core Component Technical Specification) ensures a high degree of reuse across messages and improves interoperability between IT systems.

The purpose of these components is to make them so generic that they become suitable for a variety of messages. The components define the role concept, date/time stamps and message types, to mention a few examples. The components are used several times in connection with different message types.

These core components should be used wherever possible, and candidates for core components should also be considered in conjunction with the development of new message types.

### 11.5 Use and structure of XML schemas

XML schemas are used for validating the XML message when the message is sent and received. If the XML message does not comply with the schema definitions, the message is not valid and should therefore be rejected. This is done with an acknowledgement document.

XML schemas must be structured in such a way that it offers strong data binding internally in the schema and the possibility of reuse. Strong data binding means that an element of a schema must have a relation to the residual schema elements. If elements can be reused in other schemas, however, these must generally be extracted to separate schemas (generalisation).

Each XML schema must be structured to ensure that child nodes are embedded in parent nodes, which means that only one main element is defined in each schema (see example below).

```
<element name="Address" type="AddressType"/>

<complexType name="AddressType">
  <xsequence>
    <element name="Streetname" type="string"/>
    <element name="Number" type="integer"/>
    <element name="Postcode" type="PostcodeType"/>
  </sequence>
  <attribute name="id" type="string"/>
  <attribute name="version" type="string"/>
</xs:complexType>

<simpleType name="PostcodeType">
  <restriction base="integer">
    <pattern value="\d{4}"/>
  </restriction>
</simpleType>
```

### 11.6 Versioning for XML schema

XML schemas developed for communication between Energinet.dk and external partners use a target name space with the following structure:

**"<http://www.energinet.dk/schemas/>" + <subnamespace> + "/" + <document> + "/v" + <version>.**

The example below shows what the naming of a namespace can look like for the XML schema concerning BRPs' exchange of notifications:

**<http://www.energinet.dk/schemas/BalResp/XML/MarketScheduleDocument/v2>**

The XML schemas are versioned by use of the file name. The name is built on the basis of the XML schema root element combined with the version number. The combination of the two parts is separated by - (hyphen) as shown below:

**<rootelementname> + "-" + <version> + ".xsd"**

The example below shows the naming of the first version of an XML schema where the root element is named "MarketScheduleDocument":

**MarketScheduleDocument-1.xsd**

Besides the version number, the "version" attribute in the schema element must also reflect the release number separated by a full stop. The following example is used for version 2, release 4:

**version="2.4"**

A change in the version number will be due to structural changes in the schema. Structural changes can be the addition or removal of elements, name changes of elements or attributes or changes in the element structure. A

change in the release number can be due to minor changes. Minor changes can be the addition of optional elements, changes in the rules for attribute content (other than restrictions) and the like. This means that elements are not removed from the structure.

It will therefore be possible to use different releases of a version of an XML schema without causing conflict between the releases (in other words, they must be backward compatible). An earlier version of an XML schema will conflict with a newer version, however. Energinet.dk takes steps to ensure that it is capable of handling the latest version released and its predecessor. Thus, two different versions are always available, comprising two or more releases within each version.

### 11.7 References

- **ETSO TASK FORCE 14 EDI**  
[www.edi.ets-net.org/](http://www.edi.ets-net.org/)
- **ETSO Scheduling System**  
[www.edi.ets-net.org/schedulev3r0/documentation/ess-guide-v3r0.pdf](http://www.edi.ets-net.org/schedulev3r0/documentation/ess-guide-v3r0.pdf)
- **The ETSO CORE COMPONENTS v.4.0R0**  
[www.edi.ets-net.org/core/ecc-v4r0.pdf](http://www.edi.ets-net.org/core/ecc-v4r0.pdf)

Regulation F: EDI communication

Appendix report 2:

# Principles and rules of acknowledgement

February 2008

Rev. 1

In case of any discrepancy between the Danish text and the English translation,  
the Danish text shall prevail

## Table of contents

1.	Principles and rules of acknowledgement.....	3
1.1	Terms .....	3
1.2	Description of acknowledgement and error message levels .....	4
1.3	Generic principles of acknowledgement .....	6
1.3.1	Step 1 – General.....	7
1.3.2	Step 2 – Is the sender a known player?.....	7
1.3.3	Step 3 – Are the syntax and structure OK? .....	7
1.3.4	Step 4 – Positive acknowledgement? (only EDIFACT) ...	7
1.3.5	Step 5 – Processing the message .....	8
1.3.6	Step 6 – Error?.....	9
1.3.7	Step 7 – Is the deadline observed?.....	9
1.3.8	Step 8 – Error processing.....	10
1.4	EDIFACT acknowledgement .....	10
1.4.1	CONTRL.....	11
1.4.2	APERAK.....	11
1.4.3	Negative APERAK.....	12
1.4.4	A positive APERAK.....	14
1.5	XML acknowledgements .....	14

## 12. Principles and rules of acknowledgement

The general principle of using EDI in Denmark is that the receiver of data must send a reply in the form of an acknowledgement or an error message (report). To ensure that electronic messages are sent and received correctly and that any errors are found and processed, players must comply with the rules for using acknowledgements and errors messages as described in this document.

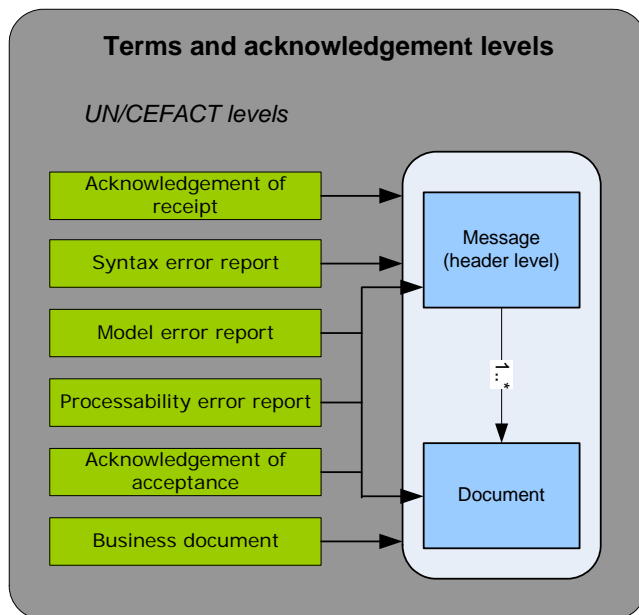
UN/CEFACT specifies three overall levels of acceptance:

- Acknowledgement of acceptance (sent from communications software/EDI converter)
- Acceptance of EDI messages (sent from an EDI and/or business application)
- Message reply (sent from the business application).

Message replying is used only in accordance with a business scenario and so not for simple messages. Message replying will not be addressed any further in this document, but is described in the individual business scenarios. Furthermore, there are several levels of error messages sent when an error occurs at the counterpart's end. Generally, the purpose of acknowledgements and error messages is to notify the message sender of the receiver's response.

### 12.1 Terms<sup>10</sup>

The following figure describes the connection between terms used in the principles of acknowledgement.



**Message:** Describes general information (header information) applying to all underlying documents such as sender and receiver.

<sup>10</sup> See Appendix report 1 'Syntax and structure in EDI messages' for a more specific description of individual terms.

**Document:** Repeated message information such as one time series out of all message time series.

### 12.2 Description of acknowledgement and error message levels

The following tables specify the principles of and rules for using acknowledgements. The principles are identical irrespective of the data format used. However, the detail rules differ for XML and EDIFACT. The following sections are therefore divided into specific rules for EDIFACT and XML.

#### Acknowledgement of receipt

Description	Message type
<p>An acknowledgement of receipt is used only if required by a business scenario or in critical processes. The purpose of using this type of acknowledgement, which is sent from the EDI converter, is to verify that the syntax is correct.</p> <p>An acknowledgement of receipt can also be used for testing purposes.</p>	<p><b>EDIFACT:</b> Positive CONTRL</p> <p><b>XML:</b> Not used</p>

#### Syntax error report

Description	Message type
<p>A syntax error report is sent from the EDI converter and is used in cases where a message has reached its receiver, but the syntax used is incorrect.</p>	<p><b>EDIFACT:</b> Negative CONTRL</p> <p><b>XML:</b> Acknowledgement document on the basis of an XML schema validation</p>

#### Model error report

Description	Message type
<p>A model error report is syntax-neutral and is used for validating a message against a business information model (class diagram, etc., described in the business transactions). One purpose is to verify the correct use of attributes.</p> <p>At document level, a model error report refers to a business document (such as a notification, regulating power bid or regulating power order), if possible. If no reference can be made to the underlying document level, the entire message will be rejected.</p>	<p><b>EDIFACT:</b> Negative APERAK</p> <p><b>XML:</b> Acknowledgement document on the basis of an XML schema validation</p>

### Processability error report

Description	Message type
<p>A processability error report is syntax-neutral and is used for acknowledging the content at document level (such as the validation of a metering point ID). The content of this report depends of the content of the message acknowledged. The rules governing when and how to use a processability error report are described in the business transactions in which this type of report is included.</p>	<p><b>EDIFACT:</b> Negative APERAK</p> <p><b>XML:</b> Acknowledgement document</p>

### Acknowledgement of acceptance

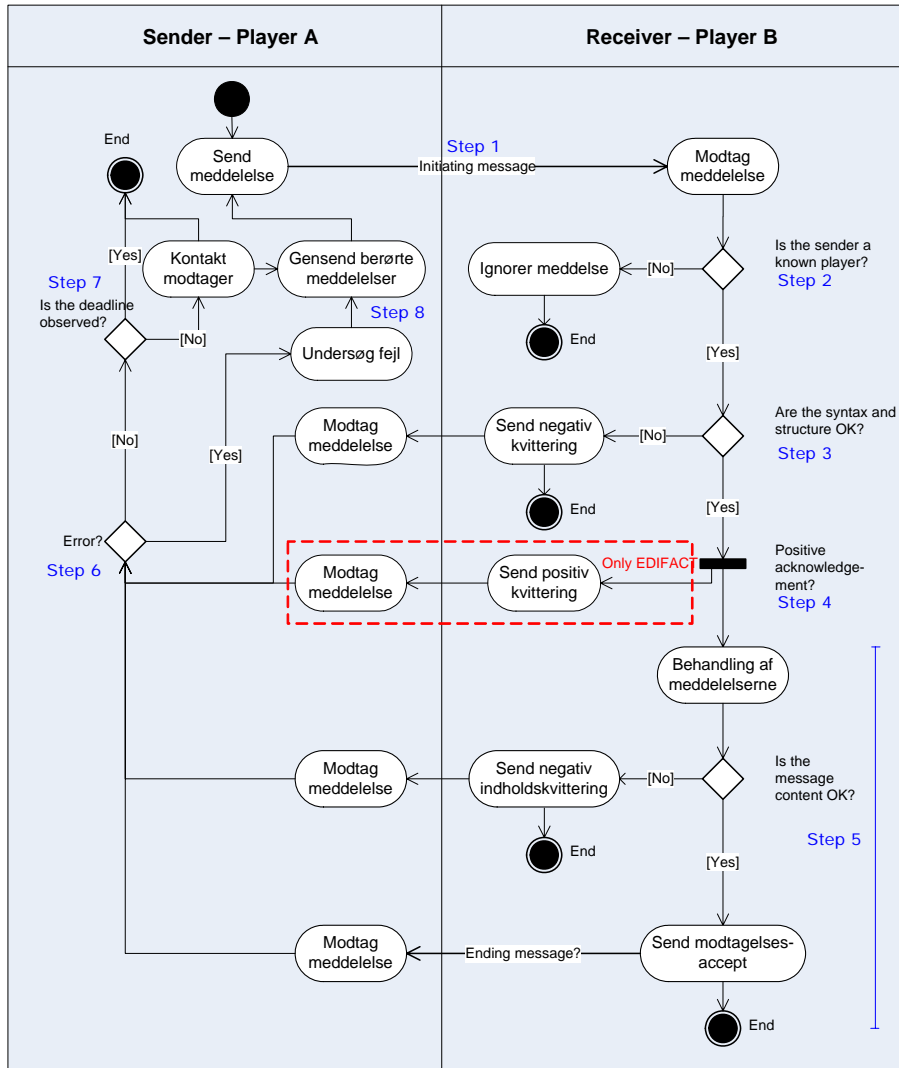
Description	Message type
<p>An acknowledgement of acceptance must always be sent at document level. Having acknowledged acceptance means that the receiver has received, validated (syntax) and processed the content positively. Acceptance covers the full message received.</p>	<p><b>EDIFACT:</b> Positive APERAK</p> <p><b>XML:</b> Positive acknowledgement document</p>

### Responding business document

Description	Message type
<p>A responding business document is a reply to a request for business transaction and modelled as a business document. The acknowledgement completes the entire business transaction.</p>	<p>The current business transaction specifies the business documents used.</p>

### 12.3 Generic principles of acknowledgement

The following figure describes the generic principles of exchanging messages and acknowledgements. The tables in the following sections list requirements and recommendations in respect of the individual steps in the figure.



**TRANSLATION:**

- Kontakt modtager = Contact receiver
- Send meddelelse = Send message
- Gensend berørte meddelelser = Resend affected messages
- Undersøg fejl = Check errors
- Modtag meddelelse = Receive message
  
- Ignorer meddelelse = Ignore message
- Send negativ kvittering = Send negative acknowledgement
- Send positiv kvittering = Send positive acknowledgement
- Send negativ indholdskvittering = Send negative processability error report
- Modtag meddelelse = Receive message
- Behandling af meddelelserne = Processing messages
- Send modtagelsesaccept = Send acknowledgement of acceptance

12.3.1 Step 1 – General

All acknowledgement processes begin with an initiating message. A message can also be an acknowledgement.

12.3.2 Step 2 – Is the sender a known player?

The receiver (player B) must be capable of identifying the sender (player A) and validating that party against the valid senders contracted with. The validation process has the following two possible outcomes:

- The sender (player A) is invalid or unknown. In this case, the process will end.
- The sender (player A) is valid. In this case, the process will continue.

2.1	The receiver must validate the sender.
2.2	The sender and the receiver must keep an updated index of valid players.

12.3.3 Step 3 – Are the syntax and structure OK?

The receiver (player B) validates the syntax and structure of the received message and its content. The validation process has the following two possible outcomes:

- The syntax and structure are incorrect. The receiver (player B) sends a negative acknowledgement (syntax error report/model error report). This negative acknowledgement should refer to the initiating message of the sender (player A) to allow that party to identify the incorrect message without problems.
- The syntax and structure are correct and the process will continue.

Req. 3.1	The EDI system of the receiver (player B) must be capable of automatically validating a message on the basis of the following criteria: 1. Basic structure (UN/CEFACT message for EDIFACT, schema for XML) 2. Syntax
Req. 3.2	In case of errors, the receiver (player B) must be capable of sending a negative acknowledgement that refers to the initiating message.
Req. 3.3	The sender of the initiating message <b>must</b> regularly check incoming negative acknowledgements.
Rec. 3.4	If the syntax and structure validation process generates an error, the receiver (player B) must reply within five minutes of receipt.
Req. 3.5	Only one acknowledgement may be sent per message (positive or negative).

12.3.4 Step 4 – Positive acknowledgement? (only EDIFACT)

A positive acknowledgement (acknowledgement of receipt) can be used in two circumstances: For example, during a test process or if the practice is that the

acknowledgement of acceptance is sent at a much later time than the acknowledgement of receipt.

Two situations are involved:

- The sender does not want an acknowledgement of receipt. In this case, such acknowledgement must not be sent.
- The sender wants an acknowledgement of receipt. In this case, this must appear from the initiating message. The acknowledgement of receipt must refer to the initiating message.

Rec. 4.1	Do not use an acknowledgement of receipt unless at least one of the following conditions is present: 1. The sender and the receiver participate in a test process. 2. The time difference between sending the acknowledgement of receipt and the acknowledgement of acceptance is considerable.
Req. 4.2	The receiver (player B) must be capable of sending an acknowledgement of receipt that refers to the initiating message.
Req. 4.4	The receiver must return an acknowledgement within five minutes.
Req. 4.5	An acknowledgement must be sent for each message.
Rec. 4.2	If player A asks for an acknowledgement, that party must regularly check whether the acknowledgement has in fact been received.

#### 12.3.5 Step 5 – Processing the message

Once the syntax of a message has been validated, the EDI system can forward the contained documents to the current applications for message and document validation. Content validation may be performed in part by the EDI converter, depending on the EDI system used. The validation process has the following two possible outcomes:

- The data content is not correct. In this case, the receiver (player B) must send an acknowledgement of receipt containing a reference to the initiating message and the specific document. The acknowledgement of receipt must specify the error and its location in the message/documents. The level of the acknowledgement must enable the sender of the initiating message (player A) to identify and correct the error without having to contact the sender of the error message (player B).
- The message/documents have been validated positively (no data content errors). In this case, the receiver (player B) must send a positive processability error report. The application processes the message and the process of exchanging acknowledgements will end.

Req. 5.1	<p>The application (or EDI system) of the receiver (player B) must be capable of automatically validating a message with relevant documents on the basis of the following criteria:</p> <ol style="list-style-type: none"> <li>1. Class diagrams and code lists for the current business transaction.</li> <li>2. General data format rules for the entire market.</li> </ol> <p>This will ensure that the sender can always expect the same validation.</p>
Req. 5.2	<p>The receiver (player B) must be capable of sending a processability error report at an information level enabling the sender (player A) to identify the initiating message/document and to find the cause of a negative processability error report, if any.</p>
Rec. 5.3	<p>Unless otherwise specified by the business transactions of the individual message/document, the receiver (player B) must send a processability error report within two hours of receipt of the message/document.</p>
Req. 5.4	<p>Only one processability error report may be sent per document.</p>

#### 12.3.6 Step 6 – Error?

Step 6 performs the same procedure as steps 2-4. This means that the individual type of acknowledgement received (acknowledgement of receipt, syntax error report, model error report or processability error report) or the acknowledgement of acceptance will be validated in relation to syntax and structure. The difference in relation to steps 2-4 is that an acknowledgement cannot be verified by another acknowledgement.

Replies to an initiating message are as follows:

- The reply is negative. In this case, efforts must be made to find the reason for the negative reply.
- The initiating message has been approved, and the process will continue.

Req. 6.1	<p>An acknowledgement cannot be verified by another acknowledgement.</p>
----------	--

#### 12.3.7 Step 7 – Is the deadline observed?

All messages must be replied as specified by the relevant business transaction. The receiver (player A) is under an obligation to ensure that all messages sent are replied in due time.<sup>11</sup>

Replies are as follows:

- No reply is sent. In this case, the sender (player A) must check its own systems before contacting the receiver (player B).

<sup>11</sup> This can be ensured, for example, by using a 'timer' in the application capable of adjusting the time from dispatch

- A reply is sent in due time. If the reply is sent before the deadline expires, the process will end.

Rec. 7.1	All messages sent should be monitored. If no reply is given in due time, the relevant player must respond, see Regulation F, section 8.1.
Rec. 7.2	If the deadline is not observed, the sender (player A) should check its own systems for errors before contacting player B.

#### 12.3.8 Step 8 – Error processing

Player A must look into and correct the error in question.

Req. 8.1	Efforts must be made to look into the error and correct it within a time frame that allows transmission of changes in due time.
----------	---

### 12.4 EDIFACT acknowledgement

Generally, there are two types of reply to an EDIFACT message:

1. **CONTRL** approves or rejects the entire message. The structure and syntax of the message will be validated according to current rules.
2. **APERAK** (Application Error and Acknowledgement Message) approves or rejects the message at message and/or document level. The business content of the message and its underlying documents will be validated on the basis of the rules specified in the current business transaction.
  - In the event of a header error, the entire message, including any underlying documents, will be rejected.
  - In the event of no header error, a reply must be sent to each individual document.

If the EDIFACT message submitted contains two or more documents (such as time series), the receiver may choose to send separate APERAKs for the individual documents or to send one overall APERAK for all documents.

The EDIFACT data format uses the following types of acknowledgement:

Level	Type of acknowledgement	Covers the following steps from section 1.3
Message level (acknowledgement of receipt/syntax error report/ model error report)	CONTRL	1-4
Message level (processability error report)	APERAK	5

Document level (processability error report)		
---	--	--

#### 12.4.1 CONTRL

A CONTRL acknowledgement specifies whether a given message has been approved or rejected in relation to the indicated syntax and structure. A CONTRL message is a standard EDIFACT message capable of acknowledging all EDIFACT messages.

The converter generates the CONTRL message on receipt of an EDIFACT message, and CONTRL messages always have the same structure. The acknowledgement can be positive or negative. The standard EDIFACT syntax rules apply to CONTRL acknowledgements. These are described in CONTRL – Syntax and Service Report Message – Danish Ediel Message Implementation Guide<sup>12</sup>.

#### Example of a CONTRL acknowledgement

```
UNA: +.? '
UNB+UNOC:3+5790000432752:14+5790001062231:14+070124:0725+6649
'
UNH+1+CONTRL:2:2:UN:EDIEL2'
UCI+M2865462+5790001062231:14+5790000432752:14+1'
UNT+3+147'
UNZ+1+6649'
```

#### 12.4.2 APERAK

An APERAK serves two general purposes:

1. Inform the sender that the target application has received the individual message or parts of the message and rejected the content because of an error.
2. Inform the sender that the message or parts of the message have been successfully received and processed.

- An APERAK will be sent only if the EDIFACT syntax is valid.
- An APERAK will always be sent to acknowledge a message if this appears from the business transaction. This is the case even if the sender requests an APERAK in BGM segment element 4343 in the original message.
- Partly generated in the application layer, an APERAK can thus verify the content of a message.
- An APERAK indirectly accepts the EDIFACT syntax as it will be sent only if the message has been processed by the application and so has been positively validated in syntax terms. For this reason, positive CONTRL acknowledgements should not be used.

As described in section 1.4, the receiver may choose to send one overall APERAK in reply to the entire message and all underlying documents or to send separate APERAKs for the individual documents. Each document must be

<sup>12</sup> [http://www.ediel.dk/ny/elmarked/dok/levskift\\_dok\\_146.pdf](http://www.ediel.dk/ny/elmarked/dok/levskift_dok_146.pdf)

acknowledged by an APERAK message that, irrespective of level, must refer to the original message. Text indicating the cause of an error in the negative APERAK must be clearly worded and help find and correct the error quickly.

The standard EDIFACT syntax rules apply to APERAK acknowledgements. These are described in APERAK – Application Error and Acknowledgement Message – Danish Ediel Message Implementation Guide<sup>13</sup>.

#### 12.4.3 Negative APERAK

A negative APERAK will be sent if the EDIFACT message received is erroneous. Acknowledgement can be made in various ways, depending on whether the header section or the document contains errors.

#### Errors at header level

The following conditions will be validated at header level:

- The message ID has not previously been received.
- The required attributes as specified in the business transaction are present, including UNB attributes.
- The business transaction and the version are supported (UNH/0068). Must also be used if the receiver has not implemented the business scenario initiating the message.
- The version of the implementation guide (UNH/S009) matches the business transaction.
- The message function is consistent with the business transaction.
- The receiver is capable of processing documents for 'interchange recipient'.
- The time zone is UTC unless otherwise bilaterally agreed.
- The encoded value is included in the list of accepted values.

In the event of header-level errors, processing will stop and the negative APERAK will be generated and sent according to the following rules:

Segment group. segment.element	Value	Description
BGM.4343	27	Rejected.
SG3.ERC.C901.9321	Error code (see the above table)	The error code must appear from the element in the ERC segment.
SG3.FTX.C108.4440	Text description	Error description in Danish and English separated by a slash ('/'). The name of the element containing an error (for example, a start date).
SG1.RFF.C506.1154	Message ID	Contains a reference to the message ID from the message validated.

#### Example of APERAK specifying a header error

```
UNA: +.? '
UNB+UNOC:3+5790000701278:14+5790000432752:14+070118:1447+4471+
+DK-TIS-MET++1+DK'
UNH+1+APERAK:D:96A:UN:E2DK02+DK-BT-008-002'
```

<sup>13</sup> [http://www.ediel.dk/ny/elmarked/dok/levskift\\_dok\\_146.pdf](http://www.ediel.dk/ny/elmarked/dok/levskift_dok_146.pdf)

```

BGM+++27'
DTM+137:200701181445:203'
RFF+ACW:7179'
NAD+FR+5790000701278::9'
NAD+DO+5790000432752::9'
ERC+42::ZZZ'
FTX+AAO+++Forkert meddelelsesnavn / Wrong Message Name'
UNT+9+1'
UNZ+1+4471'
    
```

### Errors at document level

Messages containing a number of repeated documents such as time series in MSCONS and UTILTS must be acknowledged individually in the form of one overall APERAK or separate APERAKs for the individual documents. A valid header level is required in order for documents to be validated. The following conditions will be validated:

- The required attributes as specified in the business transaction are present.
- The encoded value is included in the list of accepted values.
- The values are correctly formatted as specified in the implementation guide.
- The attributes observe the number of repetitions.

Irrespective of the number of errors, all documents will be validated, and an APERAK will subsequently be sent, providing detailed information about such errors, according to the following rules:

Segment group. segment.element	Value	Description
BGM.4343	34	Approved with comments.
SG1.RFF.C506.1154	Message ID	Contains a reference to the message ID from the message validated.
SG3.ERC.C901.9321	Error code (see the above table)	The error code must appear from the element in the ERC segment.
SG3.FTX.C108.4440	Text description	Error description in Danish and English separated by a slash ('/'). The name of the element containing an error (for example, Start date).
SG1.RFF.C506.1154	Transaction ID, series ID or metering point ID	The business transaction specifies the data requested in relation to the message referred to in the APERAK.

The receiver of a negative APERAK is under an obligation to respond to the acknowledgement.

#### 12.4.4 A positive APERAK

Acceptance will always be sent at document level and must meet the following rules:

Segment group. segment.element	Value	Description
BGM.4343	34	Approved with comments.
SG1.RFF.C506.1154	Message ID	
SG3.ERC.C901.9321	100	The object has been approved.
SG3.FTX.C108.4440	Text description	Use the description only if the business transaction (BT) says so. If this is the case, include the description in Danish and English separated by a slash ('/').
SG1.RFF.C506.1154	Transaction ID, series ID or metering point ID	The business transaction specifies data requested in relation to the message referred to in the APERAK.

An APERAK can contain both positive and negative replies to documents from the same message.

#### 12.5 XML acknowledgements

This section contains a specific description of the rules for XML acknowledgements used in connection with XML messages.

The following two types of acknowledgement are used for XML messages:

Level	Type of acknowledgement	Covers the following steps from section 1.3
Message level (syntax error report/ model error report)	Acknowledgement document	
Document level (syntax error report/ model error report)		

Only one type of acknowledgement is used in an XML context, reflecting the use of ETSO's Acknowledgement Document<sup>14</sup>. The message will be validated on receipt compared with an XML schema and furthermore with content validation. An acknowledgement document will subsequently be returned. This document will be positive or negative depending on the outcome of the validation.

All messages/documents must thus be acknowledged by one and only one acknowledgement document referring to the original message.

<sup>14</sup> <http://www.edi.etso-net.org/acknowledgement-v4r0/acknowledgement-document-v4r0.zip>

When a player calls an Energinet.dk web service, the XML message received will be validated according to the XML schema related to the current web service. The validation process will check whether the XML message is well formed, ie whether its content complies with the W3C standard for XML message structure. A check will also be performed to see whether the elements making up the XML message are permitted according to the XML schema. Furthermore, the schema may also define rules for the content of the individual elements.

If the XML content is not consistent with the related XML schema, a negative acknowledgement will be returned, and the acknowledgement process will end.

If schema validation generates no problems, the next step will be to validate the semantics (the outcome of application validation). The result is a negative acknowledgement if the application check or the content somehow does not comply with the rules specified for semantics (see the validation table for the current business scenario).

At message level, the acknowledgement will contain general information about the message (message ID, sender and receiver) as well as a reason consisting of a code and a relevant description. When an acknowledgement document is used as a positive acknowledgement, the reason will be attached with reason code A01 (message fully accepted).

The acknowledgement thus serves three purposes:

- Inform the sender that the message content has been rejected because of a syntax error (message level).
- Inform the sender that the message has been successfully received and that processing the entire message will continue (message and document level).
- Inform the sender that the target application has received the individual message or parts of the message and provide details of content errors, if any.

Regulation F: EDI communication

Appendix report 3:

## The Danish role model

January 2007

Rev. 1

In case of any discrepancy between the Danish text and the English translation,  
the Danish text shall prevail

**Table of contents**

- 1. The Danish role model..... 3
- 2. ETSO roles ..... 4
- 3. Danish players ..... 6
- 4. Danish domains..... 8

### **13. The Danish role model**

The purpose of this appendix report is, via the model on page 12, to help all stakeholders in the electricity market gain an improved and more precise understanding of the roles and relationships of a player. This will, for instance, contribute to reducing the number of misunderstandings that may arise in relation to the defined roles and in relation to the allocation of responsibilities in the market. When defining new players and roles in the future, Energinet.dk can immediately include them in the model along with their relationships with the rest of the market.

The model visualises the players and areas of the Danish role model. The players are connected to the areas by virtue of the roles they assume. Moreover, the players are interconnected by virtue of their mutual relationships as can be seen from the communication flow. In the interests of clarity, more roles have been combined into one player, and not all relationships appear from the model.

The Danish role model is based on the ebIX, EFET and ETSO methodologies, which describes the European role model. The Danish terminology is determined on the basis of the terms used within these three frameworks. This is followed by a diagram illustrating the Danish role model. It is therefore possible to relate the Danish terms to the European model. It is Energinet.dk's ambition that the model should always reflect the latest version of the ebIX, EFET and ETSO role models.

In connection with the maintenance of the role model, there will be situations when roles approved by, for instance, ebIX are included although they are not included in the official European model.

The role model is divided into the following sections:

- Translation of the international roles from English into Danish
- Definitions of the Danish players based on the translated roles
- Description of current domains
- Illustration of relationships between the Danish players and domains

## 14. ETSO roles

The table below lists and defines the identified ETSO roles. The table comprises two columns:

- **ETSO/ebIX role:** Refers to the English terms defined by ETSO and ebIX. In some cases a Danish player covers two or more ETSO and ebIX roles.
- **Description:** A description of the role and, if relevant, responsibility.

ETSO/ebIX role	Description
Balance responsible party	Buys and sells electricity in the wholesale market and settles with the "imbalance settlement responsible". The role as balance responsible party is a collective term for the balance responsibility found in the market (production, trade and consumption responsible parties). It is not a role in itself.
Production responsible party	Responsible for any imbalance between electricity sold and produced for all associated metering points. May have a contract with a balance supplier to buy electricity from a "party connected to grid".
Trade responsible party	Buys and sells electricity. Must ensure balance before the notification and schedule phase ends.
Consumption responsible party	Responsible for any imbalance between electricity bought and consumed for all associated metering points. May have a contract with a balance supplier to supply electricity to a consumer.
Balance supplier	A player supplying/buying electricity to/from a consumer/producer. Has a contract with a balance responsible party.
System operator	Has overall responsibility for creating balance in the market and for handling transmission grid operation and ensuring stable electricity supply.
Transmission capacity allocator	Manages the allocation of transmission capacity between the defined areas where the balance responsible parties operate. Transmission capacity between market balance areas is allocated separately.
Market operator	The market operator determines the market energy price for a market balance area after applying the technical possibilities and constraints given by the responsible system operator. Trading notifications from balance responsible parties are also included in the price determination.
Metering point administrator	Responsible for the relationship with players connected to the meters. Is also responsible

ETSO/ebl X role	Description
	for creating and terminating metering points and for the contractual relationship to the “party connected to grid”.
Metered data aggregator	Responsible for qualifying metered data from the metered data responsible.
Metered data responsible	Responsible for keeping and validating metered data based on collected data from the metered data collector.  The meter reading data are forwarded to the balance supplier, who uses the data for billing electricity.
Metered data collector	Responsible for reading meters.
Grid operator	A player that operates one or more physical electricity grids.
Grid access provider	Responsible for providing access to the grid for a “party connected to grid” and for securing power supply. Applies to both producers and consumers.
Meter operator	Responsible for installing, maintaining, testing and decommissioning meters.
Party connected to grid	“Party connected to grid” is a general term for all players connected to the grid. It is not a role in itself. In practice, it is the producer and the consumer.
Producer	A producer that owns one or more electricity producing facilities.
Consumer	A consumer of electricity.
Settlement responsible	A player responsible for settling the difference between contractual obligations and actual production/consumption.
Imbalance settlement responsible	Responsible for settling the difference between contractual obligations and actual consumption/production for the balance responsible parties in a market balance area.
Reconciliation responsible	Responsible for reconciling the imbalance between consumption according to balance settlement and metered consumption for a profile-settled metering point in a grid area. The statement is submitted to the parties that are “reconciliation responsible” for the given metering area.
Reconciliation accountable	Financially responsible for settling the energy volume supplied to a local metering point according to the reconciliation.

## 15. Danish players

The table below shows the definitions of the Danish players in the form of the roles filled by each player.

Danish players		Roles (ETSO/ebIX)	
<b>Electricity consumer</b>	Consumer		
<b>Balance responsible party (BRP)</b>	Balance responsible party		
<b>BRP for production</b>	Production responsible party	A balance responsible party has one or more types of duties. The three roles of a balance responsible party are mentioned on the left.	
<b>BRP for trade</b>	Trade responsible party		
<b>BRP for consumption</b>	Consumption responsible party		
<b>Electricity supplier</b>	Balance supplier		
	Reconciliation accountable		
<b>Transmission company</b>	Grid operator	A transmission company, as a player, is not responsible for system operation and has no direct customer connection. The player's responsibility is best compared to that of a grid company, yet without direct contact with the electricity consumer.	
	Meter operator		
	Metered data collector		
	Metered data responsible		
	Metered data aggregator		
<b>Transmission system operator (TSO/Energinet.dk)</b>	System operator	The transmission system operator is also a transmission company and therefore has the same roles. The roles are therefore not shown under the transmission system operator.	
	Responsible for balance settlement		
<b>Transmission capacity allocator (Performed by E.ON - Transmission system operator/ Transmission company south of the Danish-German border)</b>	Transmission capacity allocator		

Danish players	Roles (ETSO/ebIX)	
<b>Meter operator (may be part of grid company)</b>	Metered data collector	In rare cases, some of the grid company's duties are delegated to a meter operator. In these cases, the meter operator's duties include collecting, storing and qualifying metered data. The meter operator takes over the duties – responsibility remains with the responsible grid company. The ETSO/ebIX roles of the two players therefore overlap.
	Metered data responsible	
	Meter operator	
	Metered data aggregator	
<b>Grid company</b>	Grid operator	
	Grid access provider	
	Metering point administrator	
	Meter operator	
	Metered data collector	
	Metered data responsible	
	Metered data aggregator	
	Reconciliation responsible	
<b>Public service obligation (PSO) company</b> <b>Electricity supplier (with special obligations).</b> The operation of the PSO company is restricted to electricity sales within its own supply area.	Balance supplier	
<b>Electricity producer</b>	Producer	

In addition to the Danish players listed above, consumption, production and trade are billed and settled on a continuous basis. This role is defined by ETSO as 'Billing agent'. The role will not appear as a separate player in the Danish role model as it already forms an integral part of many of the players' duties. The role is, to a greater or smaller extent, included in the other players' roles.

## 16. Danish domains

ETSO and ebIX use the word "domain"<sup>15</sup> in their terminology. A domain falls into two sub-categories:

- **Area:** A physical or logical area – for instance a balance area or a grid area.
- **Point:** A physical or logical point where energy is metered.

Throughout this section, the term "area" will be used for both of these categories.

The table below provides a list of the identified Danish areas and points as well as appropriate definitions. The table comprises three columns:

- **Danish term:** The Danish name for the area.
- **ETSO/ebIX terms:** This refers to the domains ETSO and ebIX have defined to cover the European market. In some cases a Danish area covers two or more ETSO and ebIX areas.
- **Description:** A description of the area and, if relevant, Danish conditions. If a Danish area is matched by two or more ETSO and ebIX areas, the descriptions combined will cover the Danish term (for instance, there are three ETSO/ebIX terms which collectively cover the Danish term "UCTE-begreber").

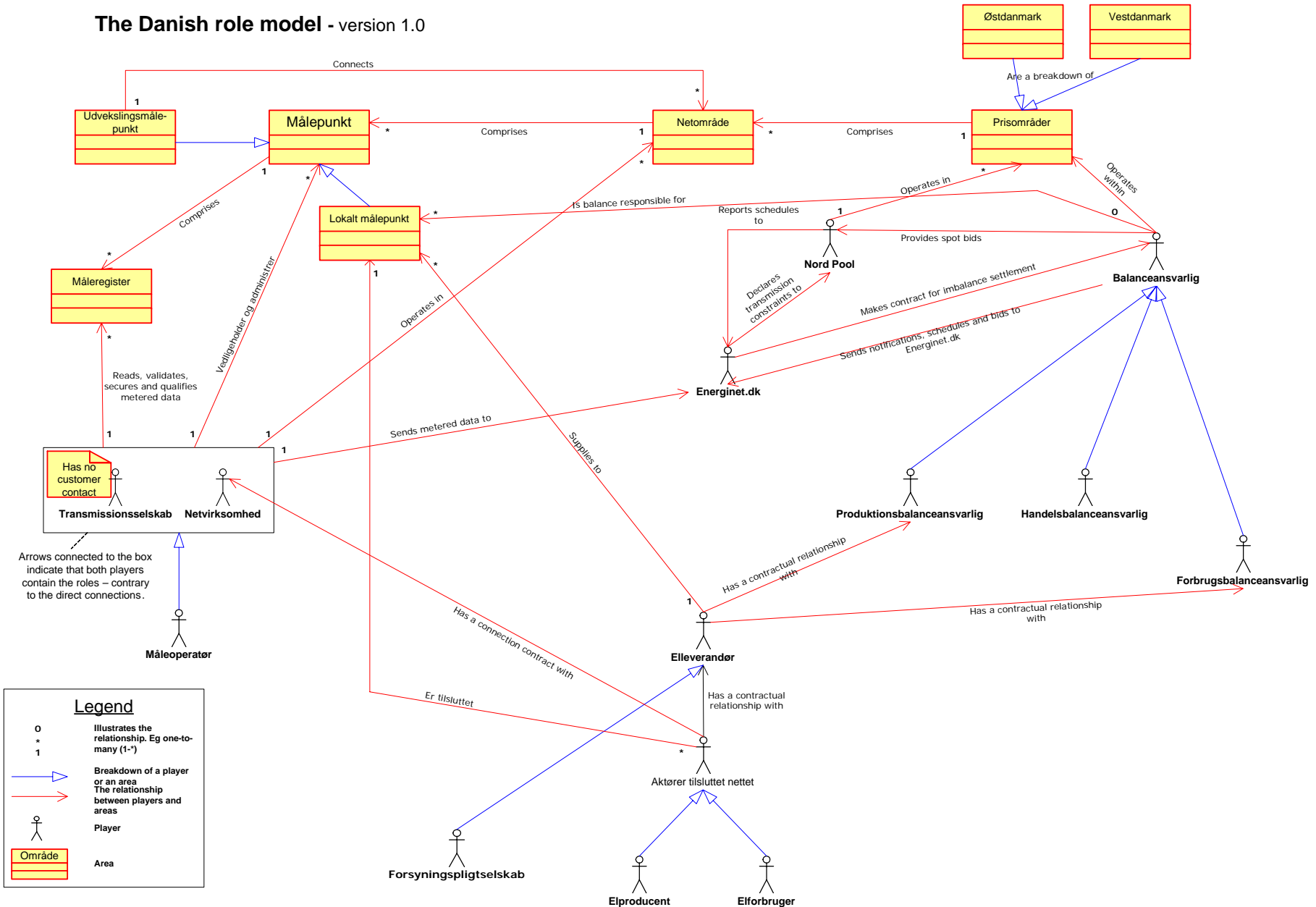
Danish term	ETSO/ebIX terms	Description
Denmark is divided into two price areas. <ul style="list-style-type: none"> <li>• Western Denmark, comprising Jutland and Funen</li> <li>• Eastern Denmark, comprising Zealand, the Archipelago and Bornholm.</li> </ul> Both balance areas refer to Energinet.dk, which has the national responsibility for ensuring that the areas are in balance.		
<b>Prisområde (Øst/Vest)</b>	Market balance area	A geographical area comprising one or more metering grid areas. The balance responsible parties are required to create balance, and imbalances are settled at the same price throughout the area.
<b>UCTE-begreber</b>	Coordination centre zone	The amalgamation of one or more "control blocks". Western Denmark belongs to Zone North.
	Control block	The amalgamation of one or more "control areas". Western Denmark is expected to become a control block in 2007.

<sup>15</sup> ETSO's description of "domain": A domain represents a delimited area that is uniquely identified for a specific purpose and where energy consumption, production or trade may be determined.

Danish term	ETSO/ebl X terms	Description
	Control area	The amalgamation of one or more price areas under the same technical load frequency.
<b>UCTE</b>	UCTE	International body coordinating and developing the European transmission grid with focus on TSOs. One of its objectives is to develop the European transmission grid for improved stability, price, exchange of electricity and coherence.
<b>Nord Pool-område</b>	Common capacity area	A market area where the transmission capacity between the balance areas has been transferred to Nord Pool. Covers Norway, Sweden, Denmark, Finland as well as the Kontek Link and the Danish-German border.
<b>CBT område (ITC område fra 2007)</b>	CBT area	An alliance between the European TSOs, designed to ensure uniform compensation for cross-border energy flows. ETSO is responsible for invoicing.
<b>Netområde</b>	Metering grid area	Delimited physical area where consumption, production and exchange of electricity can be metered.
<p>A metering point is a general term for a physical or logical point where energy is measured. A metering point can be broken down into more specified metering points, see the following hierarchy.</p> <ul style="list-style-type: none"> <li>▪ Metering point</li> <li>▪ Exchange metering point</li> <li>▪ Local metering point</li> <li>▪ Production metering point</li> <li>▪ Consumption metering point</li> </ul> <p>Below follows a description of how the metering points are used in the Danish model.</p>		
<b>Målepunkt</b>	Metering point	Metering point where energy is measured.
	Local metering point	The smallest unit that needs to be in balance.
	Production metering point	Metering point for one or more production facilities.
	Consumption metering point	Metering point for one or more consumption units.

Danish term	ETSO/eIX terms	Description
<b>Udvekslings- målepunkt</b>	Exchange metering point	Metering point measuring energy exchanges with other metering grid areas.
<b>Elmåler</b>	Meter	A physical device for the registration of energy consumption.
	Register	The physical register where the metered data can be read. One or more registers make up one metering point.

### The Danish role model - version 1.0



Følgende tekst kan ikke indsættes i figur:

Målepunkt = Metering point

Udvekslingsmålepunkt = Exchange metering point

Lokalt målepunkt = Local metering point

Transmissionselskab = Transmission company

Netvirksomhed = Grid company

Måleoperatør = Meter operator

Er tilsluttet = Is connected

Forsyningspligtselskab = PSO company

Elleverandør = Electricity supplier

Aktører tilknyttet nettet = Players connected to the grid

Elproducent = Electricity producer

Elforbruger = Electricity consumer

Østdanmark = Eastern Denmark

Vestdanmark = Western Denmark

Netområde = Grid area

Prisområde = Price area

Balanceansvarlig = Balance responsible party (BRP)

Produktionsbalanceansvarlig = BRP for production

Handelsbalanceansvarlig = BRP for trade

Forbrugsbalanceansvarlig = BRP for consumption

Område = Are