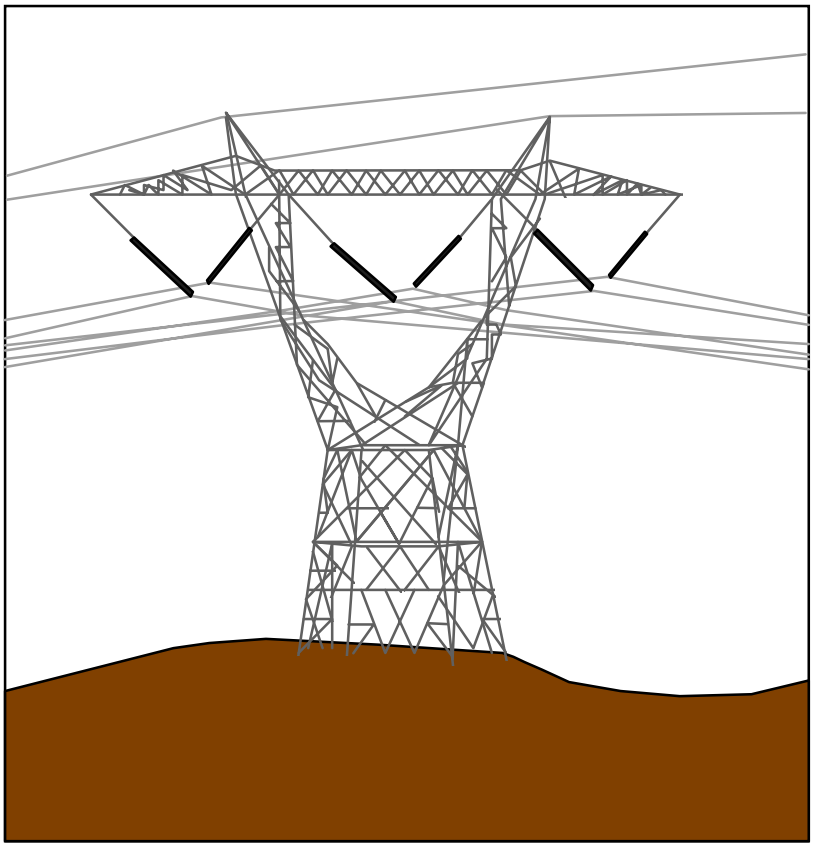
Business process model for **invoicing** in the downstream electricity power market



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C O N T E N T

1 The electricity power market

1.1 Introduction

Ediel and the EAN organisations in Denmark, Belgium, Finland, Germany, Holland, Norway and Sweden have agreed to establish a common project for making common Implementation Guidelines (IG) for the downstream electrical power market. This includes IG's for the EDIFACT messages INVOIC and MSCONS, and also a specification of the use of EAN codes for identification purposes in the electrical power market. The meaning of the term "downstream electrical power market" is communication towards the consumers.

Ediel has today made common IG's for the upstream electrical power market. These IG's are specially designed for the specialities needed for information between different participants in the electrical power market. When these power companies are going to communicate towards the consumers there is a need to harmonise with the standards used in other markets or branches today.

Today EANCOM based IG's are used in most of the European countries and branches, but there are still differences between these IG's. The main goal for this project is to make a common set of IG's that can be used in the same way in all Western European countries between the electrical power sector and consumers in different markets or branches.

This document is describing a business process model for invoicing in the downstream electrical power market. The document will be used as input to common EAN/Ediel Implementation Guidelines (IG) for the EDIFACT messages INVOIC and MSCONS.

1.2 The electrical power market

Presently the power market is going through a change process in most of the European countries. These changes include new legislation and a deregulation of the market. Free trading in electricity is dependent on the establishment of a system for the metering and calculation of how much electricity is bought and sold at all times [1]. An immediate balance between production and consumption is a prerequisite for a power system.

Earlier the participants in the market were in a monopoly situation. Today the participant companies are being split into different companies with different roles, such as grid operators, supplier of energy, balance responsible, trader, broker etc. Further more these new companies are being merged into lager companies, often as international companies with subsidiaries in different countries.

The change in the structure of the market and the new legislation described above has increased the need for EDI tremendously. This includes both transaction data, such as time series with production and consumption between the different parties, master data and more effective communication methods towards the consumers.

In the upstream power market the UTILMD (Utilities master data message) will be used for exchange of master data, or key data, of long validity, between different parties in the power market. The use of the UTILMD message will be related to the change of Supplier of energy

and exchange of master data regarding a metering point or installation. For transactional exchange of data (reporting time series between different participants) the UTILTS message will be used. A time series is a sequence of observations of a single process often taken at equal time intervals. These time series may contain metered values, forecasts, estimates, prices, etc. Connected to each time series there may be technical and administrative information, like characteristics of a meter, exchange rates, etc. In addition there is a need for messages used for bilateral trade and trade at a power exchange (REQOTE, QUOTES, SLSRPT) and invoicing between the participants in the upstream power market.

In the downstream power market the INVOIC and the MSCONS messages will be the main messages, used for communication towards the consumers.

1.3 Description of actors in the power market

Grid operator:	A party that owns one or more net areas and is responsible for the grid services. Also called Net owner.
Supplier of energy:	A party that sells energy to consumers.
Consumer:	A party that consumes electrical power bought from a Supplier of energy. The consumer can be a small household or a large multinational company with one or more subsidiaries in one or more countries.
Metering responsible :	A party responsible for the metering. This may be the Grid operator or a third party.

2 Items to discuss during pilot period

The items below have been discussed in the EAN/Ediel working group, but without any final conclusions. The items will be reviewed after (and during) pilot projects have been carried out. The EAN/Ediel working group would appreciate comments and experiences from all pilot projects implementing the EAN/Ediel invoice. Following the pilot phase these possible solution will be reviewed.

1) For the moment there is not stated any limitations regarding a mixture of time series and meter stands in a consumption report. The working group would like to get comments from pilot project whether a consumption report should be limited to only having time series or meter stands. This might be included as a recommendation in Scenarios A and B.

2) Type of metering (i.e. time series or meter stands) can be signified by incorporating the type in the contract reference or by adding an attribute for type of metering at header level in the model. Do we need an attribute for type of metering in the header level of the Consumption report or will reference to contract suffice?

3) A meter may contain several registers. Different registers are normally used for metering of different meter time frames, such as low-load, high-load or peak-load (nighttime, daytime or peak-time). When sending meter stands the corresponding meter time frame must be identified. The meter time frame may be identified using an attribute for the meter timeframe or by using different product codes for different meter time frames. Both possibilities will be allowed initially and reviewed after pilot projects.

4) Scenario A includes one invoice and consumption report for one metering point. The metering point id and the meter number (optional) are sent in the consumption report. Is it also necessary to include metering point id and meter number in the invoice?

5) The current invoice may include both an invoicee and an invoice recipient party (third party). Normally the role invoicee is used to indicate the invoice address for the buyer in question (irrespective of the factual invoice address (= EAN code) belongs to a third party). If there is a need to identify if the invoice recipient is a subsidiary in the buyer's company or a third party, the recipient may be split in an invoicee (IV) and an invoice recipient (ITO). Is it necessary to separate the roles in case of third parties?

6) Total amounts in the trailer part of the invoice are used different in different countries. The identified amounts will be reviewed during the test phase (pilot phase).

7) Further attributes for services, such as extraordinary meter reading, change of meter, etc. will normally be regarded as a separate line item in the invoice. The use of these services will be reviewed during the test phase (pilot phase).

8) The need for an attribute in the consumption report for "Reason for meter reading" will be reviewed during the test phase (pilot phase). The need for this attribute in the invoice for Scenario C should also be verified during the test phase.

9) The number of decimals in the QTY segments (quantities) will be reviewed during the test phase (pilot phase).

10) Whether or not the energy tax is needed on the line level (to be able to specify VAT on the energy tax) will be reviewed during the test phase (pilot phase).

11) The need for the consumption period start and end dates in the detailed level of the invoice will be reviewed during the test phase (pilot phase). Denmark will test the need for this information.

12) The constant of a meter (only for meter stands) is implemented with different principles in MSCONS (CCI/MEA) and INVOIC (QTY). The need for a constant, especially in the invoice message, will be verified during the pilot phase. Could the constant be skipped in the invoice message (handled as master data)?

3 Principles

3.1 Prepayments

It is advised not to use prepayments when exchanging electronic invoices. If prepayments are to be used the following two methods may be used:

1) Prepayment invoices are sent during a period (e.g. every month in a year). When the time for settlement arrives the Supplier of energy and the Grid operator sends a consumption report (e.g. MSCONS) with metering, one credit note for each prepayment (or a summarised credit note for all the prepayments) and a settlement invoice with the actual consumption for the period.

2) Prepayment invoices are sent during a period (e.g. every month in a year). When the time for settlement arrives, the Supplier of energy and the Grid operator sends a consumption report and a settlement invoice with the actual consumption and amounts for the period. In the summary section of this invoice the prepaid amount is subtracted from the actual amount to be paid. If the settlement invoice gives a negative total amount, the result should be a negative invoice and not a credit note.

   Note: Using prepayments according to principles in 2) above may make it complicated for the receiver of the invoice to process the invoice automatically (experience from Sweden).

3.2 Connections between metering points, invoices and consumption reports

It is advised to only invoice one metering point in Scenario A and Scenario C (see furter down in the document).

There shall only be one invoice connected to a consumption report and vice versa.

The invoicing period in the header of a consumption report must be the same as the invoicing period in the corresponding invoice. This is how the consumption report will be related to the invoice.

3.3 Grid operator invoicing through the supplier

If the grid operator is invoicing through the supplier, the supplier is advised to send separate consumption reports and invoices (one for the transport and one for the electricity).

3.4 Payment terms

Payment terms should be agreed in a contract and not a part of the invoice message.

3.5 Net price

If prices are sent in the invoice, net prices shall be used. Net prices are exclusive all taxes, including both allowances and charges.

3.6 Amounts

If prices are sent in the invoice, net prices times quantity is equal to line item amount. Allowances and charges should be a part of a contract and not specified in the invoice.

Line item amount = Quantity x net prices (Excluding all taxes, Including all allowances and charges)

3.7 Rounding and sign

The following number of decimals shall be used:

- Amounts shall be rounded up to a maximum of two decimals.
- Prices shall be rounded up to a maximum of four decimals.
- Quantities shall be rounded up to a maximum of three decimals.

All decimal number shall be rounded using normal-rounding rules, e.g.:

0,9701 rounded to 0,97
0,9749 rounded to 0,97
0,9750 rounded to 0,98

A zero should have no decimals and no sign (it's not aloud to send –0 or 0.000).

3.8 Use of time zones in the consumption report

When exchanging consumption reports (e.g. MSCONS) with time series (e.g. hourly based metering) the Time Zone shall be used.

For the EDIFACT MSCONS message the time zone shall be specified in a separate DTM segment with the following codes:

C507 2005	735, Offset from Coordinated Universal Time (UTC) - Number of hour's offset from Coordinated Universal Time (UTC).
C507 2379	406, ZHHMM - Offset from Coordinated Universal Time (UTC) where Z is plus (+) or minus (-).

It is advised to use the following principles:

- It is recommended that the start and stop time for the invoicing period should cover a hole day and night in local time.
- If the same offset to UTC is used the whole year, the following principles apply; In the day when changing from winter time to summer time there should be 23 hours in the day and night. In the day for changing from summer time to winter time there should be 25 hours in the day and night.

Note: It is not permitted to send two different time zones within one message.
Note: All dates in a message shall be given with the same time zone. E.g. both "Consumption report date" and "invoice period start/end date" should be given with the same time zone.
Note: The time stamp, as given in composite S004 of the UNB segment for an interchange, is not affected by the time zone.

3.9 Control totals

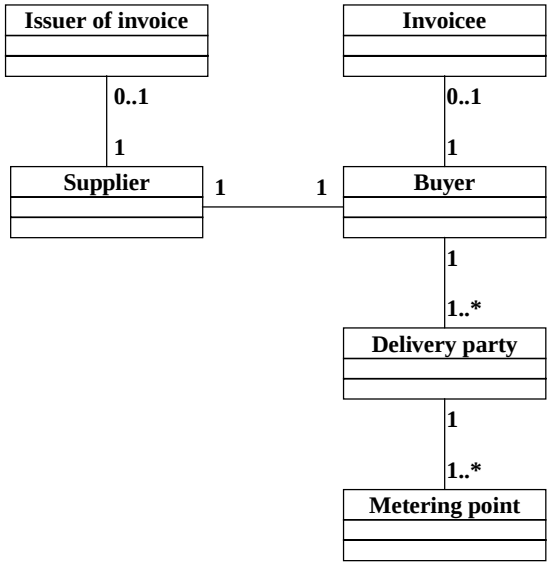
If control totals are used in the invoice the following values may be sent in the data element C270 6069, control qualifier, in the CNT segment:

1) Algebraic total of the quantity values in the detailed section in a message. This is a net sum for the quantity in the QTY segment. Positive quantities are added while negative quantities are subtracted.
2) Number of line items (LIN segments) in a message.

3.10 Parties

Supplier:	Party that manufactures or otherwise has possession of goods, and consigns or makes them available in trade, i.e. Grid operator (supplier of transport services) and Supplier of electricity.
Buyer:	Party to which merchandise is sold, i.e. Customer.
Issuer of invoice:	Party issuing an invoice, e.g. the Supplier of electricity if he invoices on behalf of the Grid operator.
Invoicee:	Party to whom an invoice is issued, e.g. the Customers accounting department.
Delivery party:	User defined physical (premise) or logical location aggregating one or more metering points.

Relationship between parties and locations in a transaction:



1 One, and only one occurrence
1..* At least one occurrence, but there may be more.
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4 Invoicing in the downstream electrical power market

4.1 Different scenarios

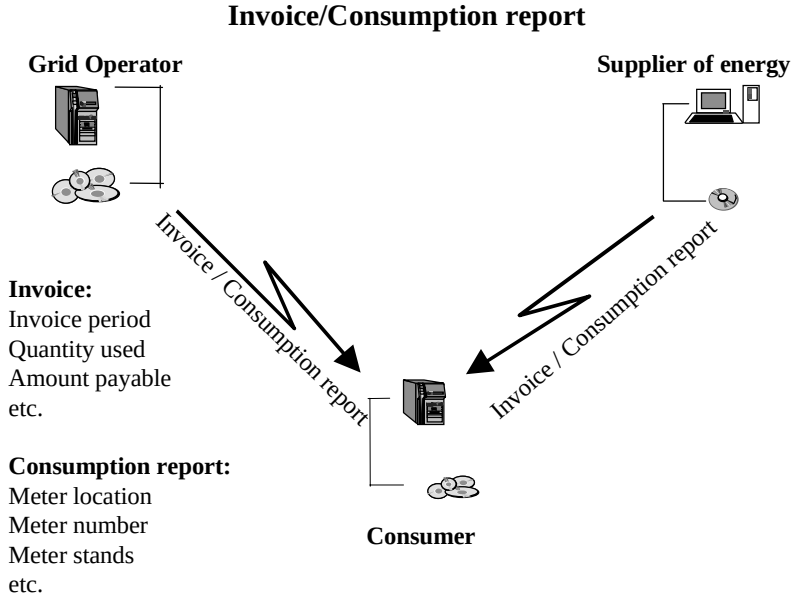
4.1.1 Scenario A

The consumer receives both invoice and consumption report – Each invoice and consumption report concerns one and only one metering point.

The Grid Operator and the Supplier of energy send a consumption report with information about meter stands or time series with metered values in the consumption report, including reporting period, article number, quantity etc.

The Grid Operator and the Supplier of energy send invoices to the consumer. The invoice will contain information about invoice period, invoice quantity, amount payable, product code (GTIN), price etc. The Supplier of energy can also send an invoice on behalf of the Grid Operator.

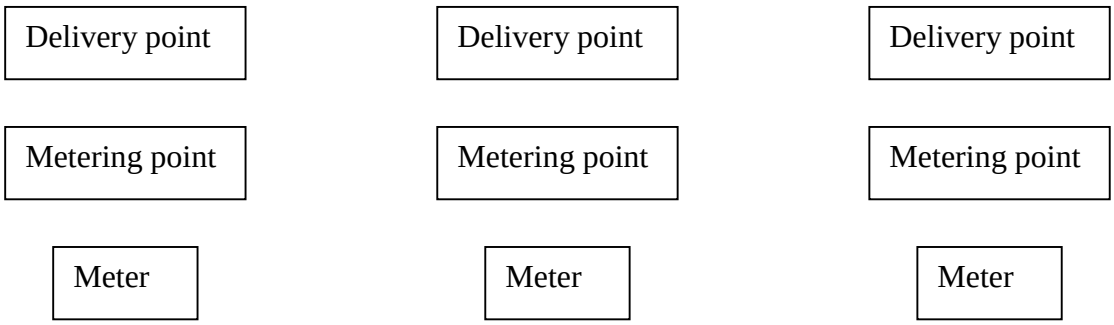
Normal use of the consumption report will be the matching of the invoice. This scenario will typically be used where the consumer is also using the consumption report for energy calculations and/or statistical purposes.



4.1.2 Scenario B

Scenario B is similar to Scenario A, but gives the possibility to include several metering points in both the invoice and the consumption report. A typical scenario can be where the consumer is a supermarket chain. The supermarket chains head office receives a consolidated invoice (including all metering points from the chain stores). The head office also receives a consumption report containing meter stands or time series with metered values, from all the chain store metering points.

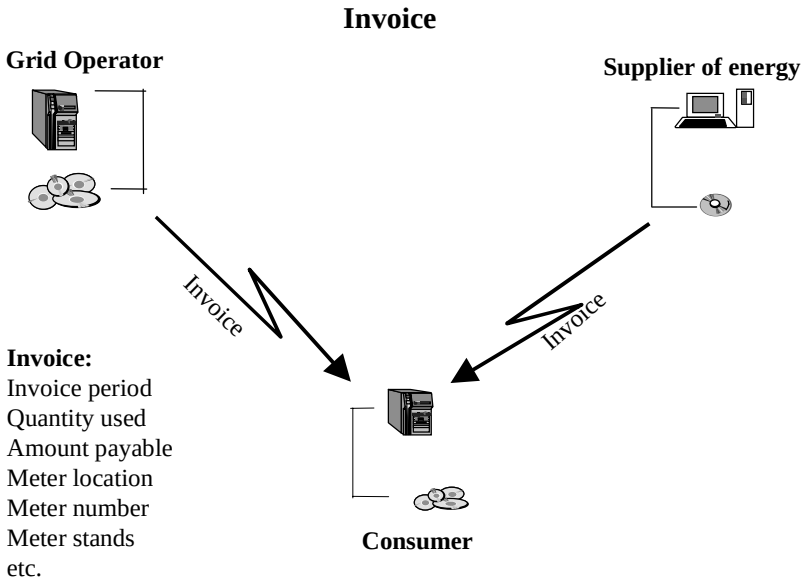
Consumption report:



4.1.3 Scenario C

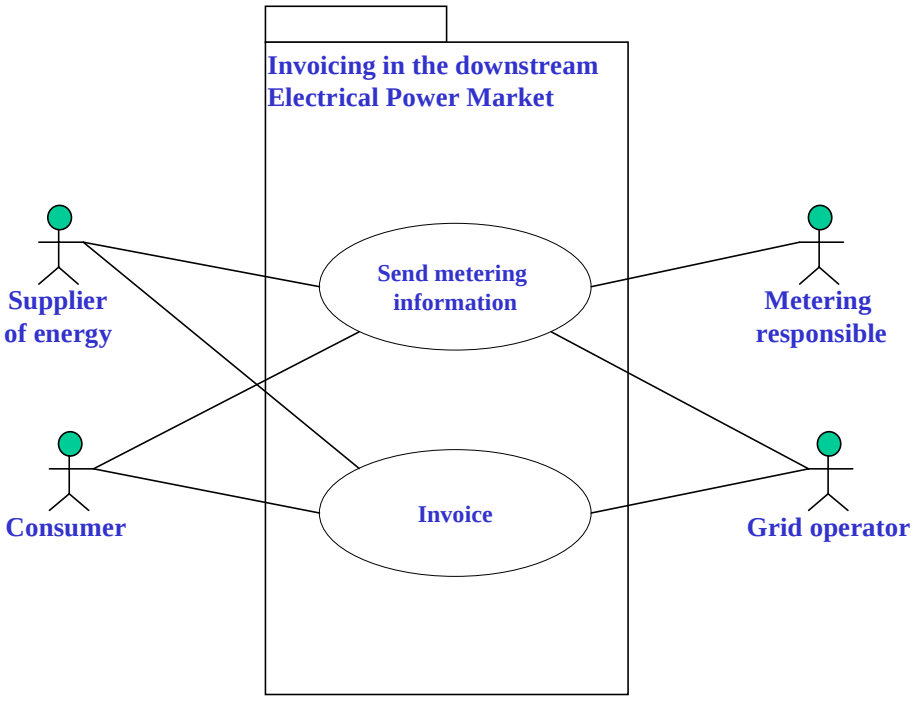
The consumer receives invoices without separate consumption report. The invoice includes meter stands with metered values, for one or more metering points, for one place of consumption.

The Grid Operator and the Supplier of energy sends an invoice message to the consumer. The invoice includes invoice period, metering point identification, invoice quantity, amount payable, meter stands, product code (GTIN), price etc. The consumption report is not used in this scenario.



4.2 Use Case Diagram for invoicing

Below is shown a Use Case for invoicing in the downstream electrical power market.



The use case describes the actors participating in the invoicing process in the downstream electrical power market and the interaction between them.

The following scenario can describe the interaction between the actors:

- The actors exchange partner information, product information and prices.
- The Metering responsible collects metering information from the Consumers.
- The Metering responsible sends metering information (e.g. MSCONS) to the Grid operator.
- The Grid operator sends metering information to the Supplier of energy.
- The Grid operator sends invoice and consumption report (e.g. MSCONS) to the Consumer. This could be done through the Supplier of energy.
- The Supplier of energy sends invoice and consumption report to the Consumer.
- If the Consumer complains over the consumption report or invoice the Grid operator and the Supplier of energy must exchange corrections and send a correction invoice or a credit note, new invoice and consumption report to the Consumer.

Alternative scenarios for the upstream market:

- The Metering responsible sends metering information both to the Grid operator and to the Supplier of energy
- The Supplier of energy is sending invoices on behalf of the Grid operator

Alternative scenarios for the downstream market:

- The Customer receives both invoice and consumption report (e.g. MSCONS) for each metering point - **Scenario A.**
- The Customer receives both invoice and consumption report (e.g. MSCONS) for several metering point - **Scenario B.**
- The Customer receives only invoice, including meter stands for one place of consumption (premises) with one or more metering points – **Scenario C.**

4.3 Master data

Before the exchange of information starts it is required that the parties exchange master data necessary for the communication to take place. The master data includes both technical and administrative information, such as:

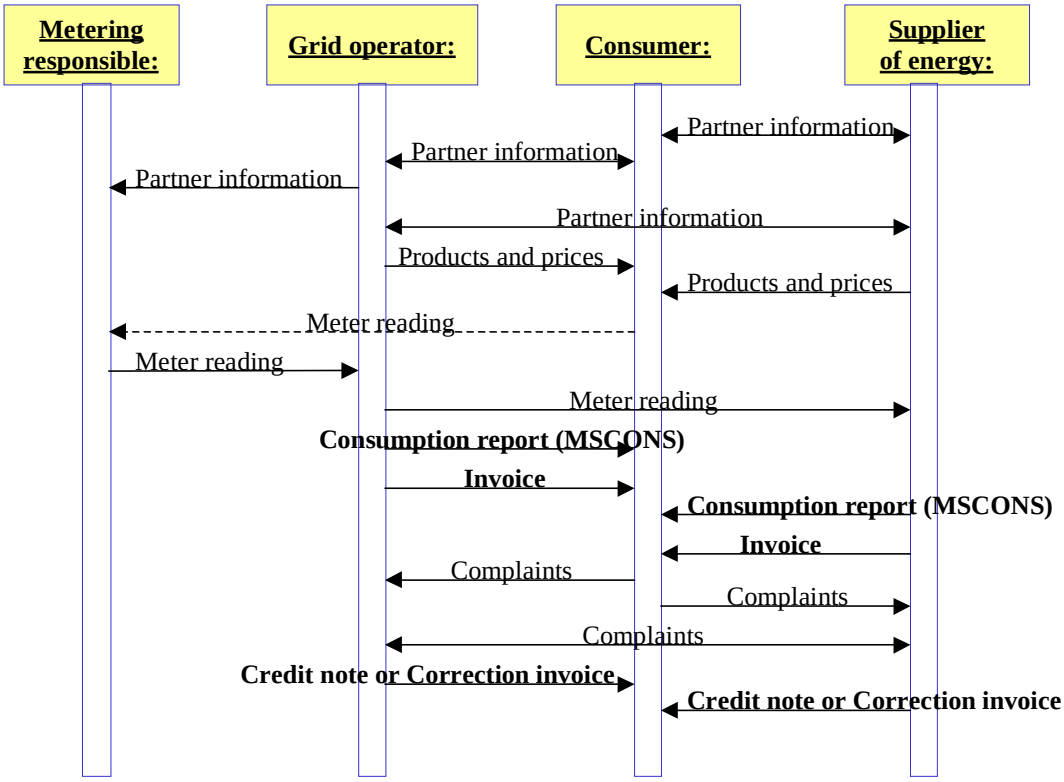
- ✓ Contract parties (buyer/seller)
- ✓ Company registration number
- ✓ VAT registration number
- ✓ Bank account number (seller/buyer)
- ✓ Contact persons/department (technical/administrative)
- ✓ Addresses
- ✓ Telephone, fax, e-mail
- ✓ Terms of payment
- ✓ Tariffs
- ✓ Identification of metering points
- ✓ Tax type, tax rate, etc per metering point
- ✓ Characteristics of the meter/register, such as the constant and number of digits.

Parts of the master data may be implemented as electronic transactions in a later phase.

4.4 Sequence diagram for invoicing

The sequence diagram below shows the information exchanged between the different players in the downstream power market.

The actors identified in the sequence diagram can have different "sub-roles", such as buyer, seller, invoice issuer, invoicee etc. and a physical company may act as more than one actor.



Comments to the sequence diagram:

- The consumption report (e.g. MSCONS) is included in the invoice message in Scenario C.
- The data flows shown as non-bold text are not a part of this model
- A party may outsource the invoicing function to a third party; e.g. the Supplier of energy may invoice on behalf of the Grid operator.
- The Grid operator is responsible for collecting meter readings. This could be placed at a third party (meter reading company). For the reason of simplification this role is left out of the rest of this document.
- The "Partner information" could be implemented as the EDIFACT message PARTIN in a later phase.
- The "Products and prices" could be implemented as the EDIFACT message PRICAT in a later phase.
- The consumption report is necessary for larger customers that have continuos meter reading (e.g. hourly metering). For smaller consumers the meter stands may be a part of the invoice – Scenario C.
- Complains may occur anywhere in the time line, all complains will normally give implications for the invoice.

- If a consumer disagrees to the meter reading it should be enough to complain to one of the parties (i.e. the Supplier of energy or the Grid operator), according to the sequence diagram. The party contacted by the consumer should inform the other party (e.g. the Supplier of energy should contact the Grid operator).
- In the upstream market the Ediel MIG's will cover the consumption report.
- All types of data flows may be updated (changed) at any time. If an invoice is to be changed a credit note and a new invoice or a correction invoice will have to be sent. This is subject to national legislation.

4.5 Corrections

In correcting the data in an invoice national differences exist. One procedure uses credit notes to annul an invoice in total (see 4.5.1.), another procedure uses correction notes to change an invoice on line level (see 4.5.2.)

4.5.1 Corrections using credit notes

Corrections regarding metering, scenario A or B:
- A credit note, using references to the previous invoice and consumption report, cancels the original invoice.
- A new invoice and a consumption report are sent. The new invoice should reference the new consumption report. The new consumption report should have the status "replace" and have a reference to the previous consumption report.
- The new consumption report and the new invoice should be complete (cover all data earlier transferred).

Corrections not connected to the metering (e.g. price corrections), scenario A or B:
- The original invoice is terminated by a credit note referencing the original invoice.
- The new invoice should reference the original consumption report. The new invoice should be complete (cover all data earlier transferred).

Corrections, scenario C:
- The original invoice is terminated by a credit note.
- The new invoice should reference the original invoice. The new messages should be complete (cover all data earlier transferred).

4.5.2 Corrections using correction notes

Corrections regarding metering, scenario A or B:
- A new consumption report is sent. The new consumption report should have the status "replace" and have a reference to the previous consumption report. The new consumption report should be complete (normally 24 hours).
- A correction invoice is sent, using references to the previous invoice and the new consumption report.

Corrections not connected to the metering (e.g. price corrections), scenario A or B:

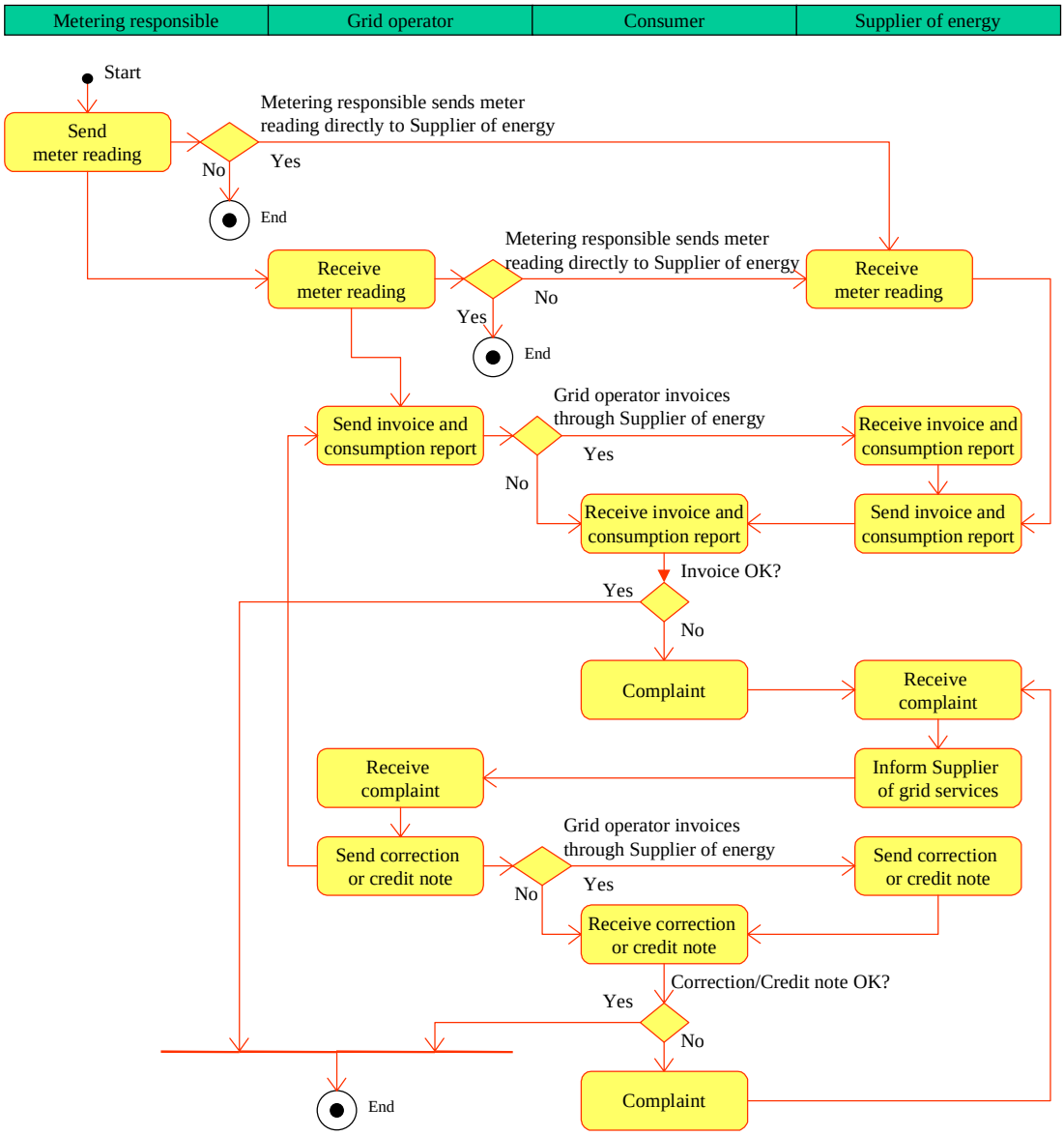
- The original invoice is changed using a correction note.
- The correction note should refer to the original invoice.

Corrections, scenario C:

- The original invoice is changed using a correction note (changes may regard both quantities and/or prices).
- The correction note should refer to the original invoice.

4.6 Activity diagram for invoicing

Below is shown an activity diagram for invoicing in the electricity power market. The activity diagram shows the functional sequence of the invoicing process. Decision points are used to show alternative flows.

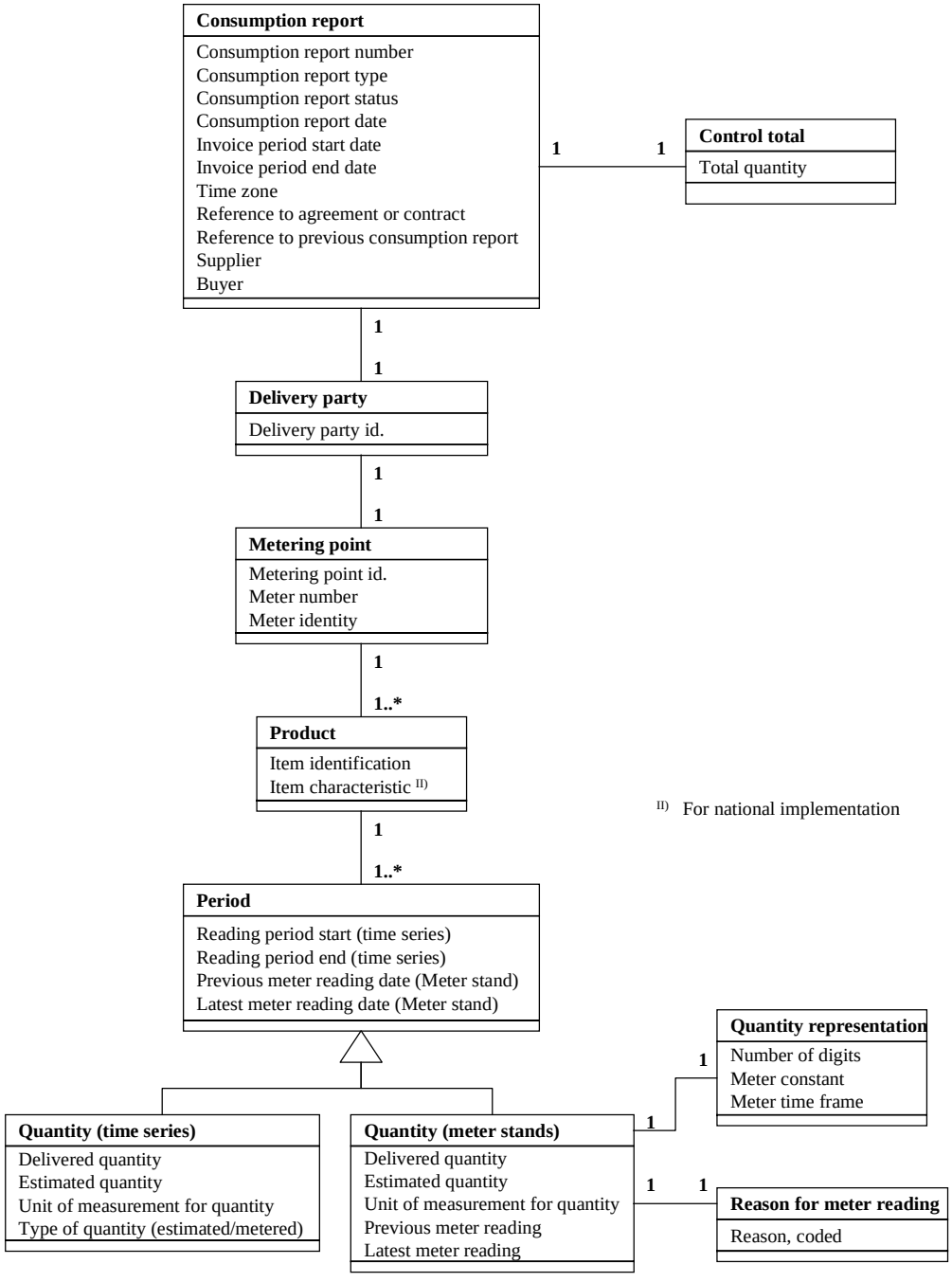


For simplification the customer always complains to the Supplier of energy in the activity diagram above. It will also be possible for the consumer to complaint to the Grid operator. In this case the Grid operator has to send information regarding the complaint to the Supplier instead.

If a complaint regards financial information only (prices etc.), just the invoice has to be updated. If a complaint regards metering data, both the consumption report and the invoice shall be updated.

4.7 Class diagram for consumption report – Scenario A

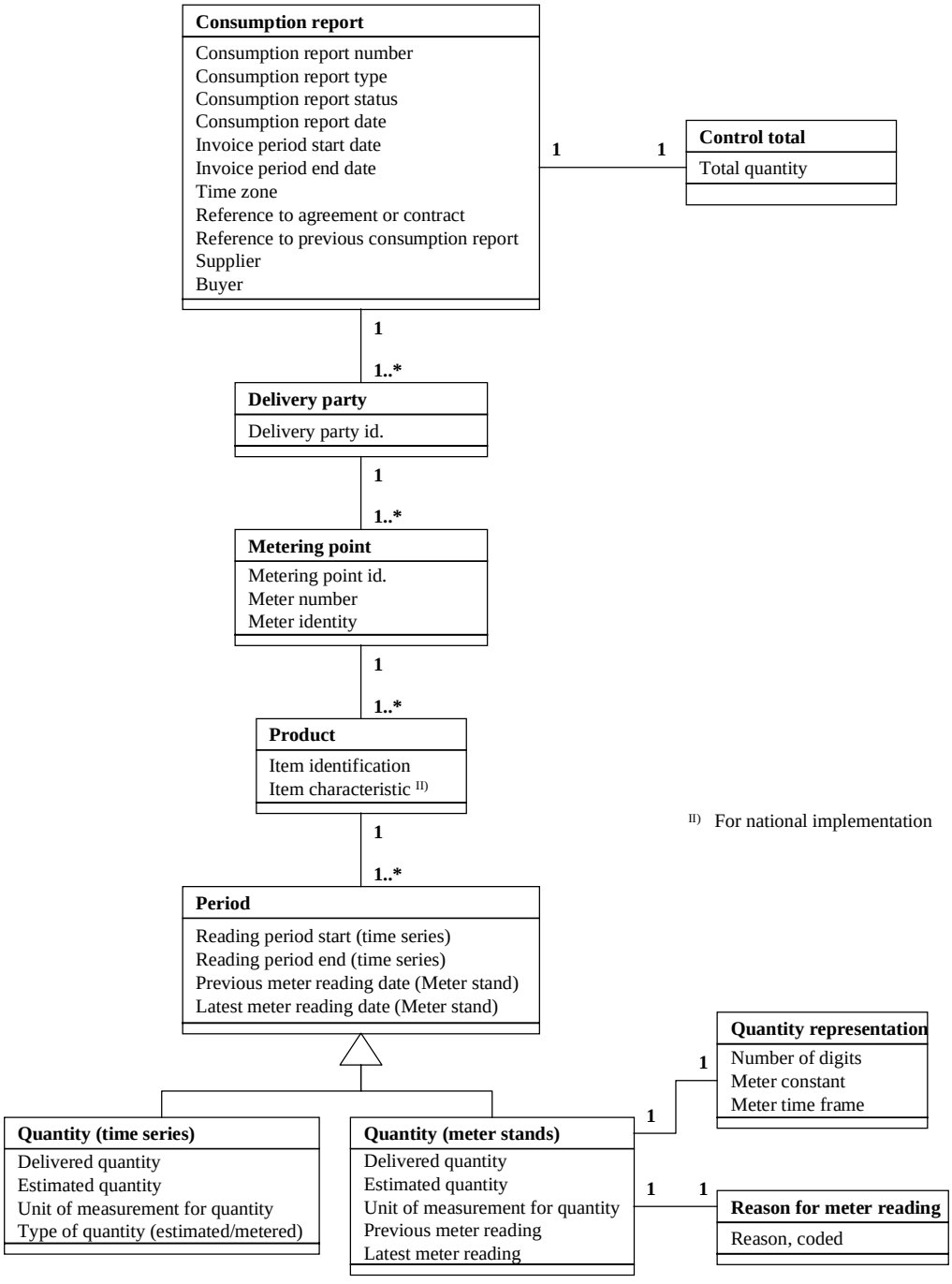
This scenario includes separate invoices and consumption reports concerning only one metering point each. The invoice will be summarised for each product and will not contain any metering point id. The product may be repeated for different prices.



1 One, and only one occurrence
1..* At least one occurrence, but there may be more.
0..1 Zero or one occurrence

4.8 Class diagram for consumption report – Scenario B

This scenario includes separate invoices and consumption reports. The consumption report may include several metering points. The invoice will be summarised for each product and will not contain any metering point id. The product may be repeated for different prices.



1 One, and only one occurrence
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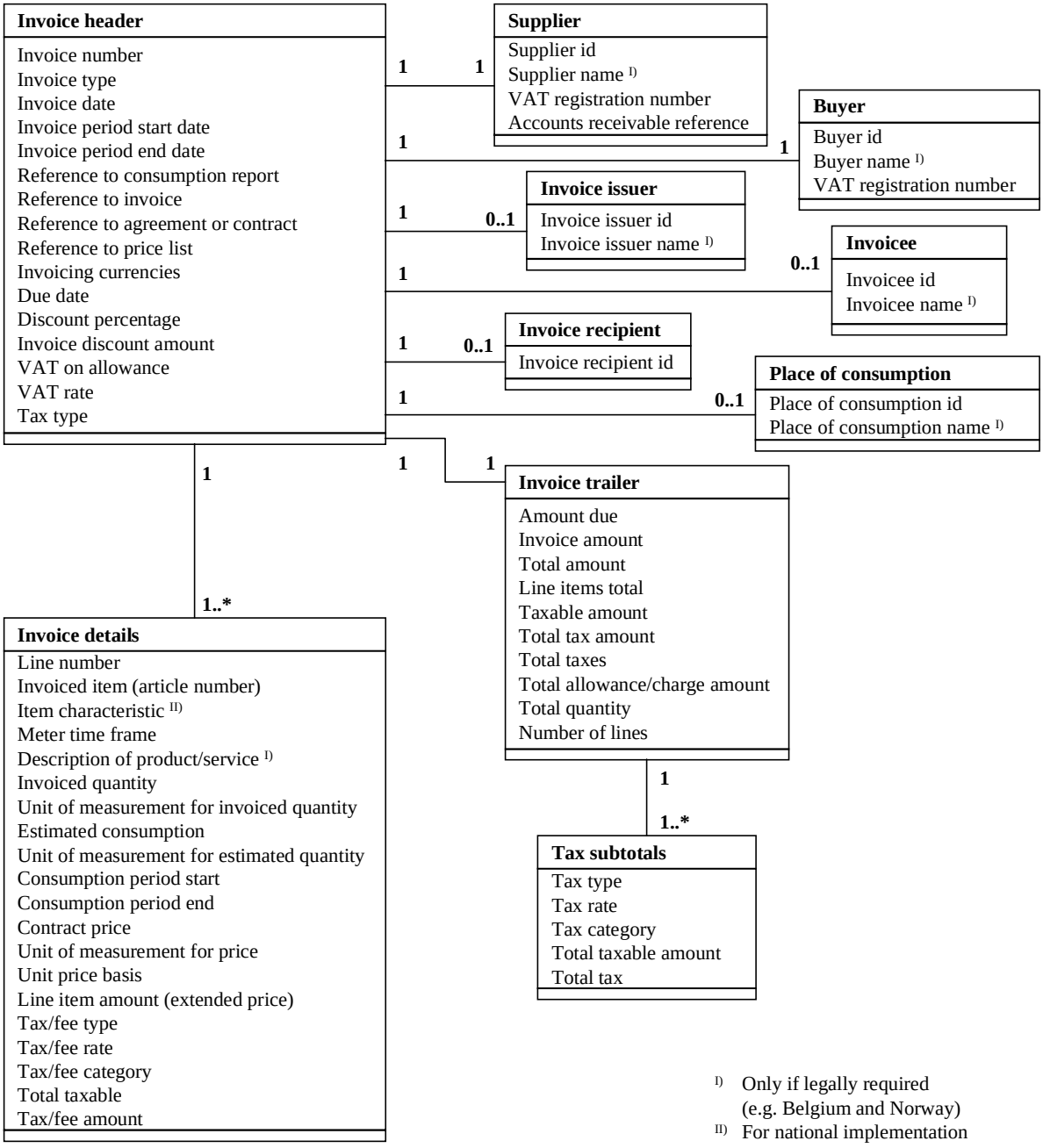
0..1 Zero or one occurrence

4.9 Class diagram for invoice – Scenario A and B

Scenario A includes separate invoices and consumption reports concerning only one metering point. Scenario B includes also separate invoices and consumption reports, but the consumption report may include several metering points.

The invoice will be summarised for each product and will not contain any metering point id.



1 One, and only one occurrence
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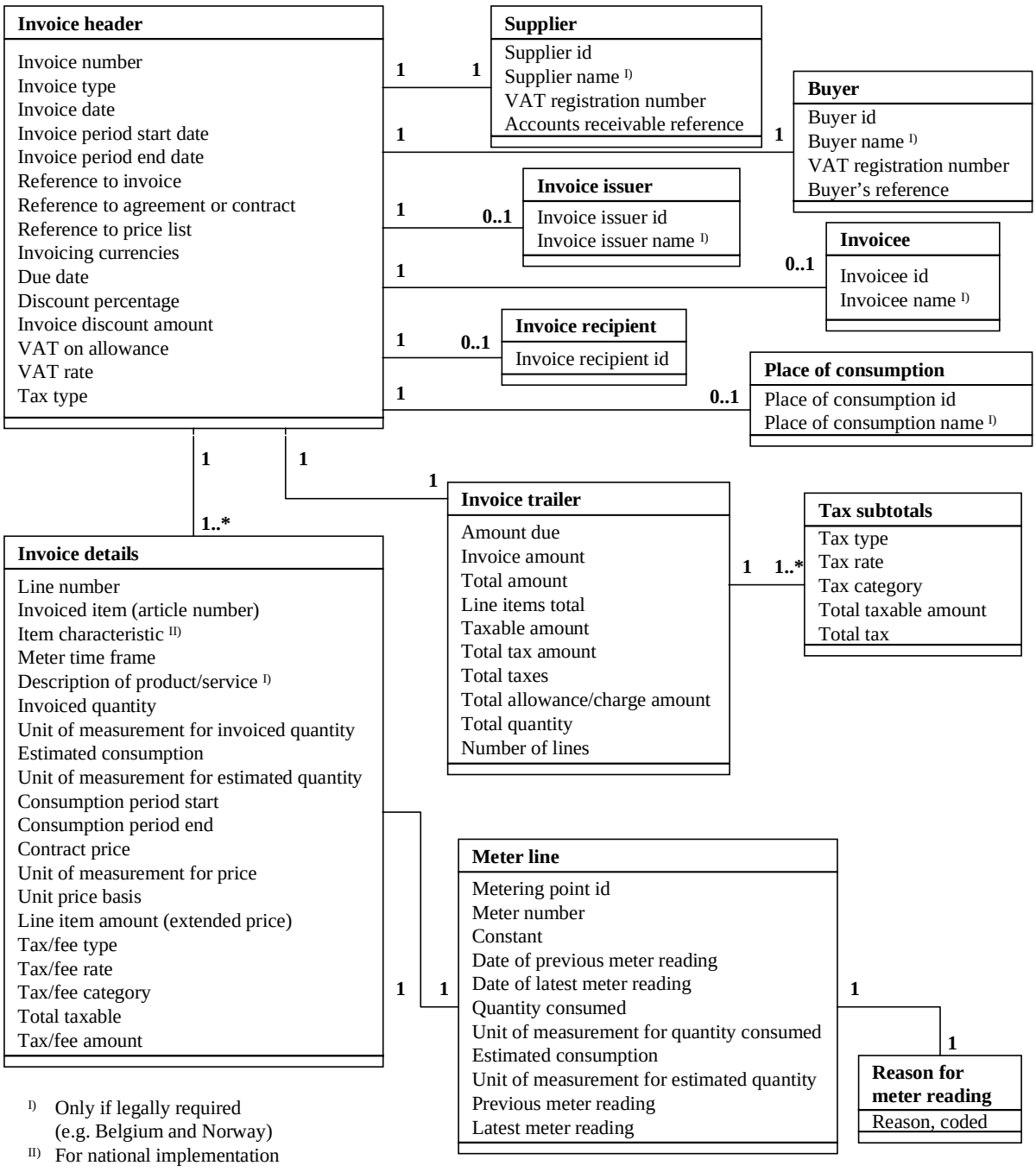
0..1 Zero or one occurrence

4.10 Class diagram for invoice – Scenario C

In this scenario the meter stands for each metering point are included in the invoices. There is no separate consumption report. There may be several metering points in the invoice. Scenario C can not be used if time series (e.g. hourly metered values) are to be sent.



1 One, and only one occurrence
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0..1 Zero or one occurrence

Appendix A Scenario description

Scenario 99.2 Invoicing one metering point, details in consumption report (Scenario A)

This scenario includes invoicing of metered products and services for one metering point for one place of consumption. The invoice may be used for invoicing from both Suppliers of grid services (Grid operators) and Suppliers of energy. The basis for the invoice (meter reading) will be the same for both the suppliers.

Before the exchange of invoice information can be started it is required that the parties exchange master data. Master data for different objects are required. For example is the item description needed for the products/articles and services in the receiving system. Concerning pricing agreements the pricing information must be available in the receiving system in order to make automated controls of received invoices. Information about each business part (connected to Global Location Numbers) has to be registered in advance in the sending and receiving systems. Also information about each place of consumption and the related metering points have to be registered in advance. If master data, prices or information about parties involved is changing, this information has to be exchanged before invoicing can take place.

The supplier of grid services (Grid Operator) and the supplier of energy may send separate invoices and consumption reports to the customer (consumer). The supplier of energy can alternatively send an invoice on behalf of the supplier of grid services.

A place of consumption (premises) can have more than one metering point. Each invoice will contain information about the supply of power and metered services related to one single metering point at one place of consumption (premises). The two suppliers refer to the same place of consumption and metering point.

The supplier of grid services invoices different grid services according to the agreement with the customer (consumer). Subscription fee and the fee for the actual use of the power distribution net are common services that are invoiced. The supplier of energy invoices the supply of energy to the metering point.

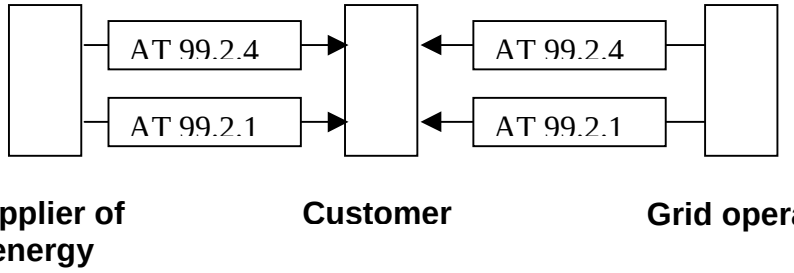
Per line item and article number (GTIN) the invoices include summary information about quantity, and amount. If possible also the price should be included. If the price changes frequently, such as if the price is connected to a spot market price, the prices or bases for the price may be sent separately.
Information about the details of the supply to the metering point is included in the consumption report.
The supplier of grid services and the supplier of energy sends separate consumption reports with information about consumption per metering point (meter and register), reporting period, article number, quantity etc

The invoicing period shall be the same in the invoice and the consumption report.

It is advised to invoice non-metered products and services separately.

The scenario consist of the transactions:

- AT 99.2.4 Consumption report
- AT 99.2.1 Invoice, single metering point



Scenario 99.4 Summery invoice, details in consumption report (Scenario B)

This scenario includes invoicing of metered products and services for more than one metering point and place of consumption. The invoice may be used for invoicing from both Suppliers of grid services (Grid operators) and Suppliers of energy. The basis for the invoice (meter reading) will be the same for both the suppliers.

Before the exchange of invoice information can be started it is required that the parties exchange master data. Master data for different objects are required. For example is the item description needed for the products/articles and services in the receiving systems. Concerning pricing agreements the pricing information must be available in the receiving system in order to make automated controls of received invoices. Information about each business part (connected to Global Location Numbers) has to be registered in advance in the sending and receiving systems. Also information about each place of consumption and the related metering points have to be registered in advance. If master data, prices or information about parties involved is changing, this information has to be exchanged before invoicing can take place.

The supplier of grid services (Grid Operator) and the supplier of energy send separate invoices and consumption reports to the customer (consumer). The supplier of energy can alternatively send an invoice on behalf of the supplier of grid services.

The invoicing period shall be the same in the invoice transaction and the consumption report. Each invoice may contain a summery of the supply of power and services to several places of consumption. The supplier of grid services and the supplier of energy sends separate consumption reports with information about consumption per place of consumption or entity within an organisation, metering points (meter and registers), reporting period, article number, quantity etc

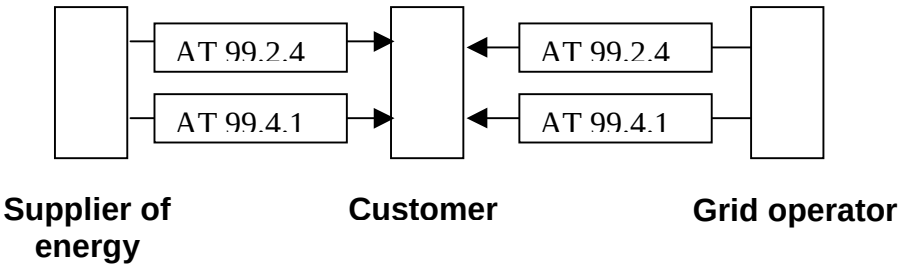
The supplier of grid services invoices different grid services according to the agreement with the customer (consumer). Subscription fee and the fee for the actual use of the power distribution net are common services to be invoiced. The supplier of energy invoices the supply of energy.

Per line item and article number (GTIN) the invoices include summary information about quantity, and amount. If possible also the price should be included. If the price changes frequently, such as if the price is connected to a spot market price, the prices or bases for the price may be sent separately.
Information about the supply per place of consumption (premises) and metering points and periods are included in the consumption report.

This scenario can for example be used in agreement with a supermarket chain. The head office of the supermarket chain receives a summery invoice. The consumption report contains information of the consumption to several places of consumption (premises) and related metering points.

The scenario consist of the transactions:

- AT 99.2.4 Consumption report
- AT 99.4.1 Summery invoice



Scenario 99.3 Invoicing with consumption details and meter stands in the invoice (Scenario C)

This scenario includes invoicing of metered products and services for more than one metering point, but only for one place of consumption. The scenario can only be used for meter stands and not for time series (e.g. hourly based metering. The invoice may be used for invoicing from both Suppliers of grid services (Grid operators) and Suppliers of energy. The basis for the invoice (meter reading) will be the same for both the suppliers.

Before the exchange of invoice information can be started it is required that the parties exchange master data. Master data for different objects are required. For example is the item description needed for the products/articles and services in the receiving system. Concerning pricing agreements the pricing information must be available in the receiving system in order to make automated controls of incoming invoices. Information about each business part (connected to Global Location Numbers) has to be registered in advance in the sending and receiving systems. Also information about each place of consumption and the related metering points have to be registered in advance. If master data, prices or information about parties involved is changing, this information has to be exchanged before invoicing can take place.

The supplier of grid services (Grid Operator) and the supplier of energy send separate invoices to the customer (consumer). The supplier of energy can alternatively send an invoice on behalf of the supplier of grid services.

A place of consumption (premises) can have more than one metering point. It is permitted to have several metering points in each invoice. The invoice may only reference one place of consumption. It is however recommended sending separate invoices for each metering point. The two suppliers refer to the same place of consumption and metering points.

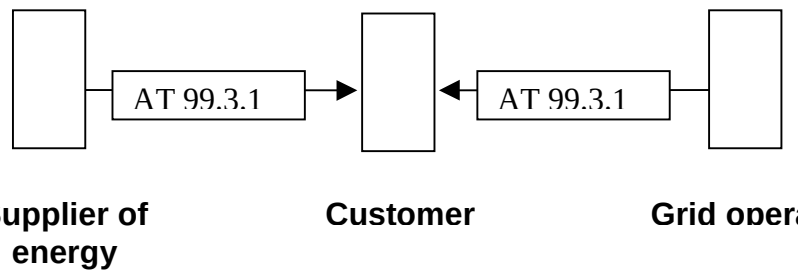
Information about the details of the supply to the place of consumption (premises) and the related metering points are included in the invoice.

The supplier of grid services invoices different grid services according to the agreement with the customer (consumer). Subscription fee and the fee for the actual use of the power distribution net are common services to be invoiced.

Per line item (GTIN) the invoices include information about quantity, price, meter stands and amount.
By using the invoice issuer party the supplier of energy can send an invoice on behalf of the supplier of grid services.

The scenario consist of the transaction:

- AT 99.3.1 Invoice including meter stands



Appendix B Generic product codes

The following generic product codes are fore the moment available:

8716867000016	Power active (e.g. W)
8716867000023	Power reactive (e.g. var)
8716867000030	Energy active (e.g. Wh)
8716867000047	Energy reactive (e.g. varh)

Appendix C Definitions

Meter number:	A meter number is the identification of a meter given by the producer of the meter or the Grid operator. The meter number can normally be read on the meter. For identification in an invoice the Metering point id should be used. This is a more stabile number (the meter may be changed, but the Metering point id should be unchanged).
Meter identity:	A worldwide unique meter number given by EAN (Global serial asset identification, an..30).
Metering point:	A location where consumption, production or exchange of electrical power is metered. Metering points will normally have one meter, but it may be a logical location where the volume is calculated (e.g. telephone kiosks or streetlights). A meter in a metering point may have several registers (e.g. for metering of day and night periods). For identification of metering points the GSRN (Global service relation number, n18) from EAN shall be used.
Meter time frame:	Identification of the time-period a register in a meter with several registers is active.
Register:	A device presenting the quantity of the power or energy used, produced or exchanged in a metering point. One meter may have several registers.

For definitions of the EDIFACT terms see www.ean.se (downloads).

Appendix D The Standard EAN•UCC Numbering Structures

This appendix is a modified extract from the EAN/UCC general specification, customised to the situation in the power market.

The EAN•UCC system provides standard numbering structures for different applications. The application will determine how the number is to be used, but regardless of application each number must be used in its entirety and not broken down into constituent parts. The numbering structure guarantees worldwide uniqueness within the relevant area of application.

The main idea is that the identification of parties and locations are unique and as stable as possible over time. This is not only important for the issuer of the identifications, but also for his relations (trading partners).

Definitions:

Company prefix: is assigned to each system user by a numbering organisation or UCC. The umber of digits representing the company prefix may vary.

Item reference: is assigned by the system user. Rules for its allocation depend on the particular application.

Check digit: is used to check that the number is correctly composed.

Application identifier 8018: indicates that the data field contains a Global Service Relation Number.

Service reference: is assigned by the service provider (Grid operator). The structure and content of the service reference number is at the discretion of the particular service provider.

Note: These standard numbering structures guarantee unique identification within a particular area of application. Please note, for example, that trade items may have the same identification numbers as locations, and each system user must be able to control how data is used.

D.1 Global Location Number (GLN) in the power market

In the power industry the GLN will be used to identify the actors (parties).

The EAN•UCC Global Location Number (GLN) makes possible the unique and unambiguous identification of physical or functional or legal entities. The EAN/UCC-13 standard numbering structure is used for this purpose and the represented numbers are non-significant. There is no restriction for the allocation of the same EAN/UCC-13 identification number to a trade item and to a location.

Each company or organisation holding an EAN•UCC company prefix may assign EAN•UCC Global Location Numbers to its own locations. It is the responsibility of a company using GLNs to keep business partners informed of all numbers issued and its name and address details. Special care is needed if the ownership of the company changes.

The use of location numbers is a pre-requisite for efficient Electronic Data Interchange (for example EANCOM). Special procedures may be applied to provide EAN•UCC Global

Location Numbers for small companies or businesses that have not been assigned an EAN•UCC company prefix.

EAN•UCC company prefix and Location reference												Check digit
N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

Note: The GLN uses the same structure as EAN/UCC-13 numbers for GTINs, but must be treated as a separate series of numbers.

D.2 Global Service Relation Number (GSRN) in the power market

In the power industry the GSRN will be used to identify metering points.

The Global Service Relation Number (GSRN) may be used to identify the recipient of services in the context of a service relationship. It provides a unique and unambiguous identification number for the service provider to store data relevant to service(s) provided to the recipient. The GSRN is the key to access information stored on computer systems or reference information transferred via EDI.

The GSRN is a non-significant number used to identify a data base entry for recording recurring services. These services are considered activities carried out by a service provider for a service user, based upon a bilateral agreement. Consequently, the GSRN identifies a particular service arrangement with reference to a particular service provider and to a particular user. It may in some instances identify the user as a participant (member) in a programme or scheme. However, it never constitutes a person's personal identification number because it is always related to a given service arrangement.

It should be noted that the GSRN is not meant to identify a single service as a trade item. Neither is it used to identify a physical unit as a trade item but it may identify a physical unit for service purposes (for example a computer with a service agreement).

The GSRN is used to identify the recipient of services in the context of a service relationship.

EAN•UCC company prefix and Service reference																Check digit
N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}	N_{14}	N_{15}	N_{16}	N_{17}	N_{18}

D.3 Global Trade Item Number (GTIN) in the power market

In the power industry the GTIN will be used to identify product codes.

The GTIN is used for the unique identification of trade items worldwide. A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced or ordered or invoiced at any point in any supply chain. This includes individual items as well as all their different configurations in different types of packaging. The GTIN is defined as a 13-digit number to accommodate all the different structures.

The following numbering structures provide unique number:

EAN/UCC-13 structure

EAN•UCC company prefix and Item reference												Check digit
N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

Note: This is the file format for the GTIN which is used in all business transactions, especially electronic data interchange, e.g. orders, invoices, price catalogues. All numbers must be right justified in this 13-digit field.

D.4 Global Individual Asset Identifier (GIAI) in the power market

In the power industry the GIAI will be used to identify meters (serial number) and other components in the net.

The EAN•UCC Global Individual Asset Identifier is used as an identification number of an individual asset (GIAI).

This element string may be used for the unique identification of assets to provide a means to store relevant data.

Note: This element string must never be used to identify the entity as a trade item or logistic unit. If an asset is transferred between parties the GIAI cannot be used for ordering the asset. However, the asset identification may be exchanged between parties for the purpose of tractability.

The GIAI may be up to 30 characters long. It may be alphanumeric.

Format of the element string					
Individual asset number					
EAN•UCC company prefix			Individual asset reference		
N_1 ...	N_i	X_{i+1} ...		variable length	X_j (j<=30)

D.5 Allocating Global Location Numbers in the power market

General rule

EAN•UCC Global Location Numbers can be used to identify anything that can be addressed. Some examples of this would include companies, departments, functions, rooms, factories, shelves, delivery points, EDI network addresses, etc. A separate unique number is required to identify each different location. Once assigned at source, i.e. in general by the party owning the location, the EAN•UCC Global Location Number becomes a unique and universal reference that can be used by all.

Location changes
From time to time the details related to an EAN•UCC Global Location Number may change. The location identified by the EAN•UCC Global Location Number may change ownership or the address may close and the business carried out at that address may be transferred to a new address. The following are general cases on the use (re-use) of location numbers due to a change in the circumstances in which the number was originally set up.

If a function identified by an EAN•UCC Global Location Number changes, the details associated with the EAN•UCC Global Location Number should be changed by the party responsible for the location number on the related computer file record.

A location number which has stopped being used should remain so for at least three years before being reallocated. The delay must allow time for all references of the old location number to be removed from trading partners' files. When the location number is re-used, the details relating to the new party and/or location must be retransmitted (for example, using a PARTIN EANCOM message).

Recommendation on allocating Global Location Numbers
The exact method used to allocate the EAN•UCC Global Location Number is at the discretion of the issuing organisation. The GLN must be unique for each individual location being identified.

For ease of administration, EAN International and UCC recommend that GLNs are allocated sequentially and do not contain ‘classifying’ elements.

Information associated with a Global Location Number
The characteristics of a party or location should be established on a computer file using the EAN•UCC Global Location Numbers as the key to the information.

An example of the type of information held would be the full name and address of the party, bank details and account number, sales department dealing with the party, profile of a company, etc.

D.6 Allocating Global Service Relation Number (GSRN) in the power market

General rule
The Global Service Relation Number can be used to identify any service relationship. A separate unique number can be issued, normally by the service provider, to identify any given service relationship. Once assigned the GSRN becomes a unique and universal reference that can be used by all.

Changes in a service relationship
From time to time the details related to a GSRNs may change. The following are general cases, which may occur if the circumstances under which the GSRN was originally set up change:

- If the activity covered by the GSRN is transferred, the new service provider may continue to use existing GSRNs, but should allocate further GSRNs from their own number bank.

- If the range of services identified by a GSRN changes, the service provider should change the details associated with the GSRN on the related computer file record. The assignment of a new GSRN is not required in this case.
- A GSRN used to identify a particular service relationship that has terminated should not be reallocated for a period well beyond the lifetime of the relevant records.

Recommendation on allocating Global Service Relation Numbers
The exact method used to allocate the GSRN is left to the discretion of the issuing organisation. However, the GSRN must be unique for each individual service recipient and remain unique for a period well beyond the lifetime of the records relevant to the service relationship.

For ease of administration, EAN International and UCC recommend that GSRNs be allocated sequentially and do not contain 'classifying' elements.

Information associated with a Global Service Relation Number
The GSRN is a standalone element string. All information required by the service provider should be established on a computer file using the GSRN as the key to access the information. The type of information stored will be determined by the nature of the service relationship. Typical information would include the service recipients: full name and address, details on services rendered, etc.

D.7 Check Digit Calculations

Standard Check Digit Calculations of EAN•UCC Numbering Structures

	Digit positions																	
EAN/ UCC-13						N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}
18 digits	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}	N_{14}	N_{15}	N_{16}	N_{17}	N_{18}
	Multiply value of each position by																	
	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	
	Accumulated results = ***Sum***																	
	Subtract ***sum*** from nearest multiple of ten = ***Check digit***																	

Example of a check digit calculation for the 18 digit field

Positions	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}	N_{14}	N_{15}	N_{16}	N_{17}	N_{18}	
Number ***without*** check digit	3	7	6	1	0	4	2	5	0	0	2	1	2	3	4	5	6		
Step 1: Multiply by	x 3	x 1	x 3	x 1	x 3	x 1	x 3	x 1	x 3	x 1	x 3	x 1	x 3	x 1	x 3	x 1	x 3		
Step 2: Add up results to ***sum***	= 9	= 7	= 18	= 1	= 0	= 4	= 6	= 5	= 0	= 0	= 6	= 1	= 6	= 3	= 12	= 5	= 18		= 101
Step 3: Subtract ***sum*** from nearest multiple of ten (110) = Check digit (9)																			
Number ***with*** check digit	3	7	6	1	0	4	2	5	0	0	2	1	2	3	4	5	6	**9**	