



Study on handling multiple suppliers at one connection (such as for prosumers)

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1 Introduction

1.1 About this document

The electricity retail market is increasingly gaining attention in the European Union. On the 30th of November 2016, the European Commission presented the Clean Energy (Winter) Package on the energy market design - Clean energy for all - aiming key promises of the Energy Union, a central one of them being empowering the energy consumers. As part of the new market design the European Union will seek to increase retail competition, engaging energy consumers in the energy transition and ultimately reduce their bills. That means making it easier to switch Balance Supplier, easier to compare prices online, and easier to try out new technologies and services.

Well-functioning and innovative retail markets are prerequisites for developing business models for empowerment of end-customers and for enhancing flexibility and demand response and linking the wholesale and retail market. Furthermore, easy and equal access to consumer data will facilitate a transparent and neutral retail market where consumers can make efficient and informed decisions, and where Balance Suppliers and third parties can develop innovative services.

The introduction of the Prosumer is among others a consequence of the wish from the politicians for more sustainable energy production and the availability of cheap solar panels, wind and hydro production equipment. Further, the politicians want as much choices as possible for the end customers, hence many of the European countries are allowing for different Balance Suppliers and Balance Responsible Parties for consumption and production. This leads to multiple Installations at the same connection to the grid and the need for having more than one Balance Supplier and more than one Balance Responsible Party. Note that there is no demand for changing the assumption that an Installation has at least one Customer.

Common for most countries is that Prosumers get tax exempt benefits for the production as a means of motivating Customers to invest in environment friendly energy production.

Until the introduction of the Prosumer, there has been an understanding that an Installation must have at least one Customer, only one Balance Supplier and only one Balance Responsible Party. An Installation connected to the grid can only have one set of Characteristics. An Installation is (in principle) metered. And finally, an Installation has always a Metering Point Type attribute, which can be of one out of three possible types; consumption, production or combined consumption and production¹.

This document is an ebIX® study for how to handle combined Metering Points (MP), i.e. MPs with both consumption and small scale production. The intention is to describe a logical (modelled) way of handling MPs when there is more than one supplier and/or Balance Responsible Parties (BRP) in a connection. The responsible role for these MPs is in this document called Prosumer. Note that although the eminent example is the prosumer, the construct is not limited to the prosumer and could also be applied to a Consumer and a Producer.

Note that storage of energy is seen as an application of the consumption and production, and something that is on the inside of the connection to grid, hence not part of this document.

¹ The attribute Type of Metering Point can also be “exchange”, but “Exchange Metering Points” is not discussed in this document.

The audience of the study is people working with market or software design on a European, national or company level. The document focuses on Electricity but the solutions should be applicable to Gas as well.

1.2 Conclusion

The conclusion of the study is that the needed flexibility around (splitting energy flows of) Installations and associated Metering Points can be offered by using multiple Metering Points when separation of Installations or multiple Balance Suppliers/Balance Responsible Parties are needed. With this concept in mind all the existing processes and structures can be kept in place, as the processes perform on each of the multiple Metering Points. This means the construction of a Metering Point and that the related market processes are not affected.

1.3 References

- [1] [Universal Smart Energy Framework \(USEF\)](#)
- [2] [An introduction to the Universal Smart Energy Framework](#)
- [3] [Harmonised Role Model](#) (HRM) from ebIX®, EFET and ENTSO-E
- [4] ebIX® model, see www.ebix.org

1.4 Definitions

ESCo (Energy Service Company) (USEF definition)

“The ESCo offers auxiliary energy-related services to Prosumers but is not directly active in the energy value chain or the physical infrastructure itself. The ESCo may provide insight services as well as energy management services.”

Prosumer (USEF definition)

The role of the consumer transforms into that of the Prosumer. Residential end users and small and medium-sized enterprises become active up- and downloaders of energy. Prosumers offer their flexibility, resulting from the Active Demand & Supply they own, to the market. Empowered by insight services provided by an Energy Service Company, they may economically optimize the use of their assets and improve their energy efficiency[2].

Metering Point (MP) (Harmonised Role Model definition)

An entity where energy products are measured or computed.

1.5 Change log

Version	Date	Modified by	Changes and comments
Draft for 2.0.A	20170626	gerrit.fokkema@edsn.nl and ove.nesvik@edisys.no	Updated after circulation for comments to ebIX® Forum and MDS
Draft for 1.0.A	20170420	gerrit.fokkema@edsn.nl and ove.nesvik@edisys.no	First draft for approval by ebIX® Forum

1.6 Abbreviations

Abbreviation	Description
BRP	Balance Responsible Party
BS	Balance Supplier
DSO	Distribution System Operator, the distribution grid operator
GAP	Grid Access Provider, a role of the grid operator
MP	Metering Point

2 Problem statements

The Metering Point (MP) is the point for the market processes to where the energy consumed or produced by a Customer is measured and reconciled. Only one energy supplier (Balance Supplier, BS) and only one Balance Responsible Party (BRP) are linked as responsible role to a MP. However, during the last years, it has become more and more normal for Customers to install small scale production equipment, such as solar panels, and it has, in many countries, become possible to have different energy suppliers and BRPs for the consumption and the production. The consumption and production is normally connected via the same physical connection to the grid, but since there may be different suppliers and BRPs for the consumption and the production, there is a need to have different identifications for the logical MPs used for the consumption and production. In other words, there is a need to have at one connection multiple independent contracts with the Customer and more than one identification for settlement and reconciliation purposes.

2.1 Physical vs administrative entities

An Installation is defined here as an independent electrical (electro technically insulated) set up that is connected to the physical (electricity) grid. There will always be a physical connection between the grid, which is the Grid Access Providers (DSO) responsibility, and one or more Installations, which is the Customers responsibility.

Installations “behind” the connection can be in parallel or in series. When the multiple Installations are each metered, the Installations in series have a dependency in their measurements. An example is a connection leading to three Installations where there is one Installation for the household’s consumption, one Installation for charging of electric vehicles and one Installation for production from solar panels. Dependent on the Customer’s needs for the number of different Balance Suppliers and Balance Responsible Parties, this could be contained in one, two or three Metering Points (MP). This is examined more in detail in chapter 3 of this document.

As mentioned above, there can be multiple Installations “behind” the connection to the grid, which are covered by one or more administrative MPs. The MP is the central entity for data exchange between the actors in the European energy market. The MP is the entity where Customers, Balance Suppliers, Balance Responsible Parties and metered data are administratively linked. A MP relates to at least one Installation connected to the grid. The energy transfer to or from the MP can be determined unambiguously, i.e. is metered.

2.2 What is a Prosumer?

A prosumer is a concatenation Producer and Consumer, in other words a consumer that produces energy as well with infeed into the grid. The characteristics of a Prosumer differ between the various European countries. In some countries, a Prosumer must have a continuous meter, i.e. read with hourly or 15 minute intervals, while other countries also permit profiled settled Prosumers. Most European countries have a limit for how much power a Prosumer can produce before it is defined as a traditional Producer. This limit can for instance be based on fuse size or maximum power produced. Examples; the maximum power can be 10 kW in Belgium (5 kW in Brussels), 100 kW in Norway and 40 kW in Poland.

A Prosumer needs a contract with a Balance Supplier for its consumption and a contract with a Balance Supplier for its production (at least for the part fed into the grid). In some European countries, such as Norway and Poland, the Balance Supplier must be the same for the Prosumers

production and consumption, while other countries, such as Denmark, Finland, the Netherlands and Sweden permit different Balance Suppliers for production and consumption.

2.3 Imbalance Settlement

Imbalance Settlement is normally carried out on an aggregated level. I.e. metered data from the MPs in a Metering Grid Area is aggregated for each combination of Balance Supplier, Balance Responsible Party for consumption and for production.

2.4 Billing

End Customer billing is always carried out on a detailed level, i.e. the Customer is invoiced (or credited) based on metered data for consumption and production for each individual MP.

3 Physical considerations

3.1 Common situation

To understand the realm of what needs to be resolved is to look at the physical situation and possible points of concern, that may not necessary have a direct impact in the administrative processes in the market.

A Grid Access Provider (GAP) gives a Customer access to the (public) grid in order to transfer energy to or from the Customer's (electrical) Installation. This connection to the grid may exist in one or more lines, pipes or cables that together form one "connection". In principle, the energy transfer will be metered, by putting a meter somewhere in the interface of the connection to the grid and the private Installation. At the interface of the connection to the grid and the private installation is the formal transfer of responsibilities (and energy) between the GAP and the Customer. The GAP needs to be able to electrically disconnect the installation from the grid, which may be executed in different ways, preferably without the need of entering the Customer's premises. The GAP will charge the Customer (it may be through the Balance Supplier in a supplier centric model) one or more fees for his services as for transport, connection capacity and dependent on the market model for metering. There may also be national constraints from tax rules around this setup. For the market players and market processes there is a Metering Point (administratively) assigned to this set up, where for example a Balance Supplier and Balance Responsible Party are linked for supplying energy to the Customer.

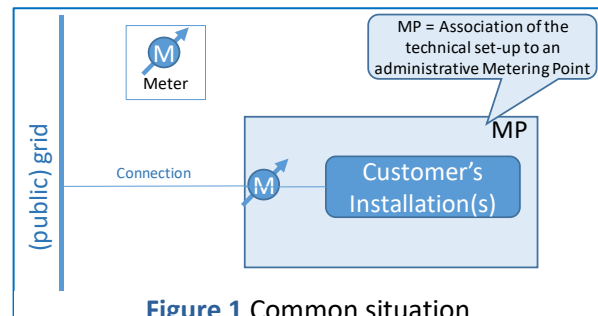


Figure 1 Common situation

3.2 Multiple Installations

If a Customer decides to have multiple independent installations for his own purpose this is still regarded as "one connection" from the grid perspective, with one measurement (although that may consist of a setup of multiple meters for industrial installations). For the market processes this is assigned to one Metering Point.

If a Customer has multiple independent installations he could ask for multiple connections, as for example a set of apartments in a building block or multiple companies on an industrial estate or a prosumer with a set of solar panels. There are commonly three options for this:

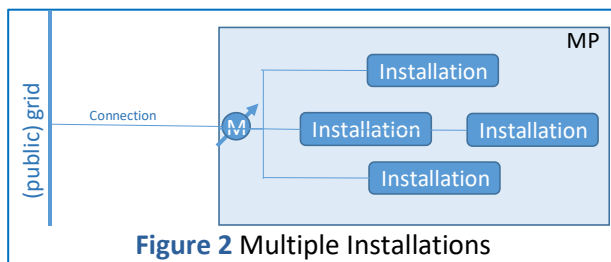


Figure 2 Multiple Installations

1. The GAP makes multiple independent connections to his grid (this will require extra connection wiring and installation work) and treats each installation as an independent metered installation

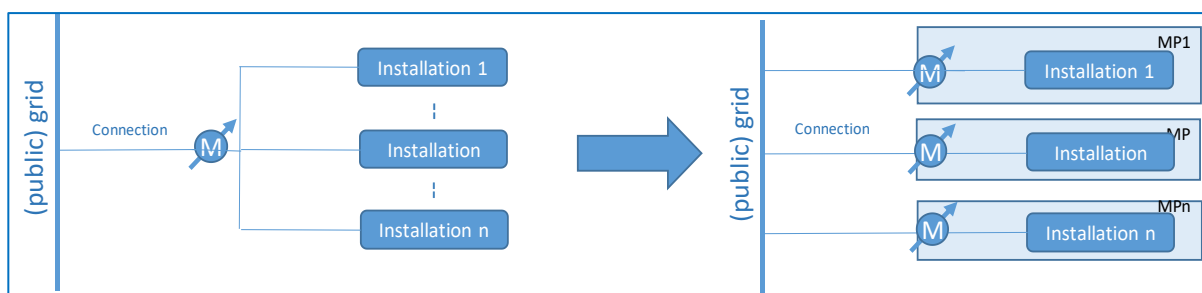


Figure 3 Multiple independent connections to grid

that can be connected/disconnected from the grid as described in the common situation. This may be the case for the apartment block where each apartment will have a “normal” (disconnectable) connection and is associated with a Metering Point for the market.

2. The Gap will regard the connection as a connection to a private grid, where the Customer assumes the role of private grid operator. Depending on national rules this may be forbidden or the private grid operator may be forced to allow his Customers access to the liberalised market, i.e. assigning Metering Points and having a Metering Point Administrator.

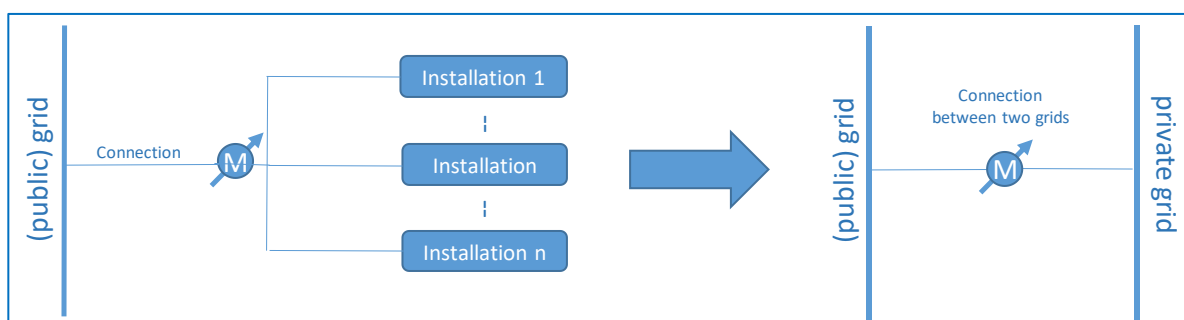


Figure 4 Connection to a private grid

In this case the connection to the public grid becomes a transfer between two grids. This may be the case with the example of the industrial estate.

3. There is only one connection used for connecting the independent installations and the GAP² adds meters to the independent installations (without extra connection wiring) and assigns a Metering Point to each Installation. This solution will depend on national legislation whether or not it is allowed and under what conditions.

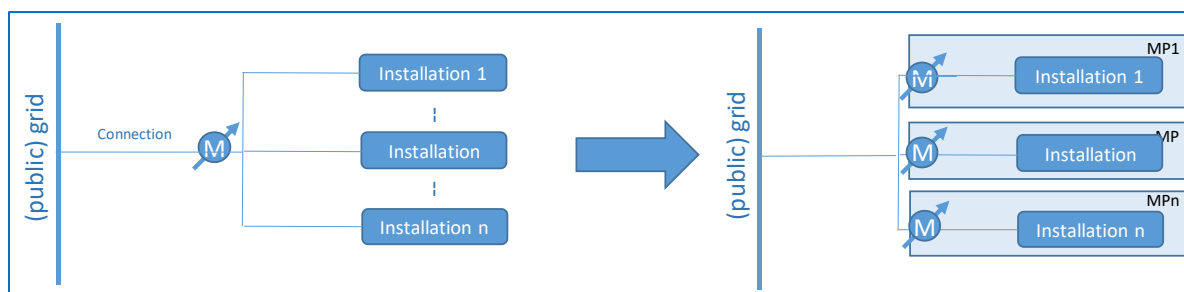


Figure 5 One connection for connecting the independent installations and the GAP

Usually all the independent installations (and therefore the associated Metering Points) are metered. For the Grid Access Provider, there is still one connection, that is having one responsible Customer (that will be charged with the grid (connection) fees). Also, there is only one connection to disconnect, and with it all installations and no possibility to disconnect the individual installations (without entering the premises of the Customer, as that is the responsibility area of the Customer). For the market processes, there are multiple independent Metering Points, that in the example shown do not necessarily need to be linked. When it is allowed (based on national rules) to have Installations in series with each other in such a

² In some countries, the metering market is liberalised, hence another role (Meter Operator) will install meters.

construction there may be extra constraints in order to ensure the right measured data for each MP.

There may be a need to link all the Metering Points for one connection, and depending of national rules one of the Metering Points may be assigned as the “main” or “master” Metering Point (with the grid-responsible Customer attached to it).

3.3 Some practical examples of a possible Prosumer set up

We visualize a situation of a Prosumer with three Installations for his household consumption, for charging his electrical vehicle and for the production of his solar cells.

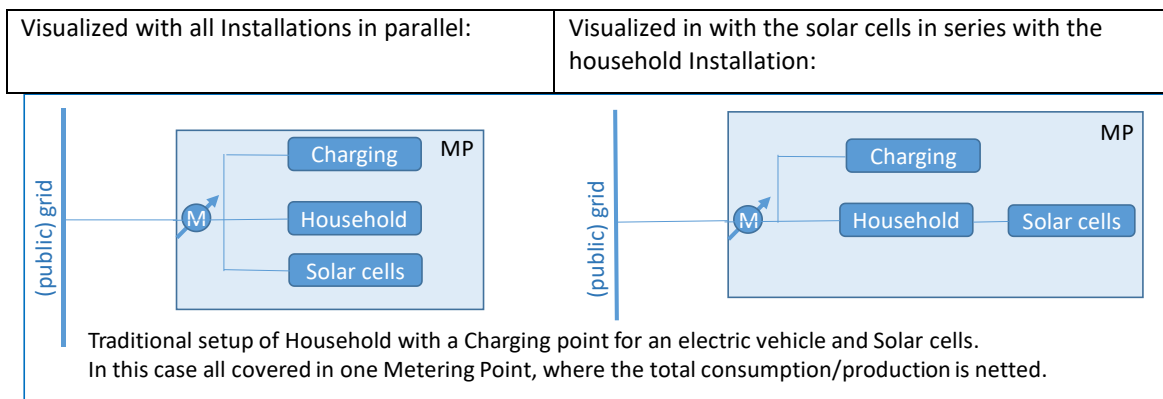


Figure 6 Charging pole or solar cell - traditional setup

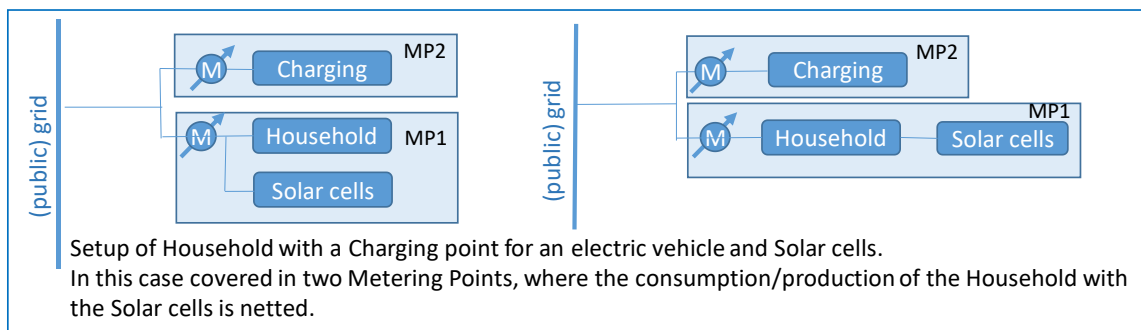


Figure 7 Charging pole or solar cell – two MPs

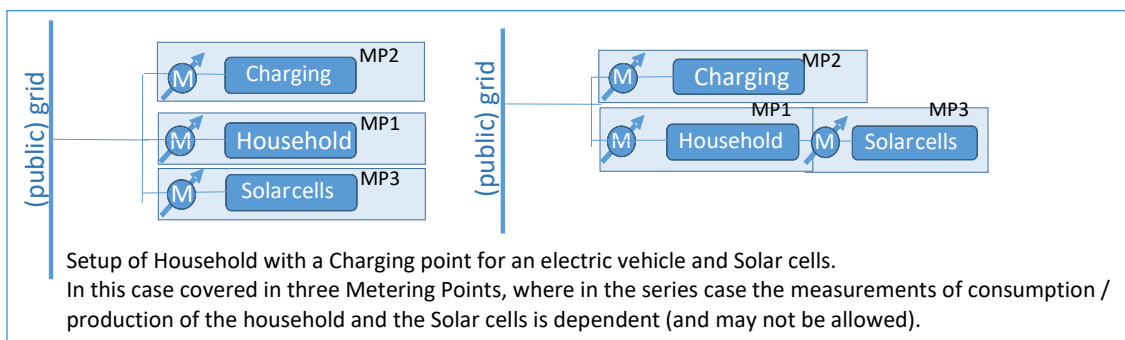


Figure 8 Charging pole or solar cell – three MPs

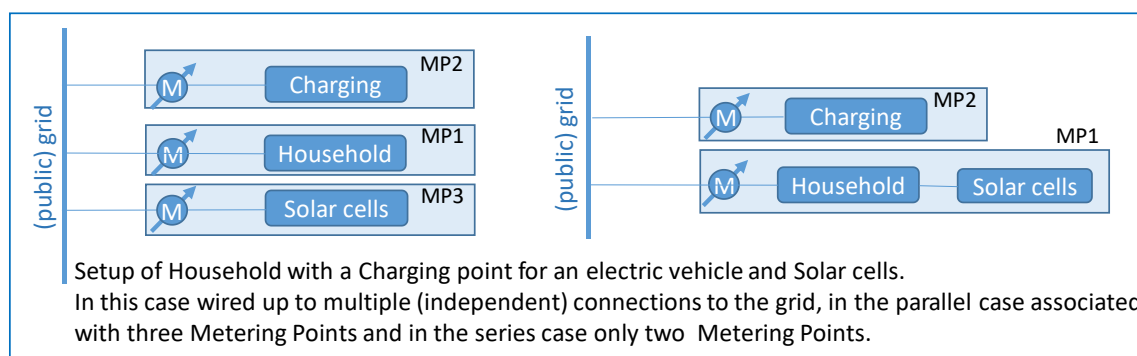


Figure 9 Charging pole or solar cell – multiple connections

4 Possible market configurations

The market processes and structures are not changed for handling the situations arising around prosumers as sketched above. The market processes are centred around the Metering Point and metered data for this Metering Point. As long as Metering Points are unambiguously assigned to the different situations, the market processes can be performed. It may be that for some cases it is important to link Metering Points to each other, as for denominating a main or master and a slave or primary and secondary Metering Points. This is sketched below, where the switch and move processes, etc., will be left unaffected.

4.1 Assumptions

- I. There is a need to have unambiguously clear roles and responsibilities for the parties acting in the energy market;
- II. There is a need to maintain a register with unique Metering Points (MPs), where responsible parties (Customer, Grid Access Provides (GAP), Balance Supplier (BS), Balance Responsible Party (BRP) and some (most technical) characteristics of the MP are kept. The metered data for a MP is linked to this register;
- III. The MP register will be run by a Metering Point Administrator;
- IV. There can only be one Balance Supplier and one Balance Responsible Party responsible in a Metering Point;
- V. A Metering Point will have one responsible Customer, that however may be more than one person, such as husband and wife;
- VI. The Grid Access Provider will keep an asset register where he links the connections to his grid to the administrative Metering Points³;

³ In case of multiple Installations with one connection from the Grid Operator's perspective, there must be somebody responsible for that one connection and the associated costs. If there are multiple Metering Points associated to the multiple Installations, there may have to be one *Main Metering Point*, with a (Grid wise) responsible Customer, despite the fact that the multiple MPs each may have different Customers, Balance Suppliers, Balance Responsible Parties, etc.

- VII. The energy transferred into or from a MP must be unambiguously determined, i.e. a MP is (in principle) metered;
- VIII. If a Customer has two or more electrically independent Installations at one connection to the grid, he can choose to have set up multiple MPs, with one (or more) Installation(s) per MP, where each MP is metered;
- IX. An administrative or physical disconnect is the responsibility of the Grid Access Provider and may be triggered by one of the parties responsible for and linked to the Metering Point. A physical disconnect involves all Installations at the connection to the grid and therefore to the associated Metering Points. In this perspective, the statement is made that the disconnection is governed by the Main MP;
- X. In case of multiple MPs associated to Installations with one connection the common characteristics for these MPs may be registered in the Main MP only, or may be duplicated from those in the Main MP.

4.2 Possible Market Configurations

The Market processes act on “independent” Metering Points. In some of the setups described above, there may be a link between different MPs. This link may then be used to link market processes.

Below are shown two configurations in the Metering Point administration:

- A. One MP with one BS and BRP for all consumption and production at the associated connection;
- B. Two (or more) MPs and different BS and BRP at the associated connection, as for consumption and production.

Also, a third configuration has been considered, where there are different Balance Suppliers and Balance Responsible Parties for consumption and production, where the Balance Suppliers and the Balance Responsible Parties are linked to the Metering Point via *contracts*, instead of Metering Points. However, this configuration was skipped since the only entity to link metered data to is the Contract ID, which means a restructuring of all metered data processes used today.

4.2.1 [Configuration A: The same BS and BRP for consumption and production](#)

In this simple configuration, the Balance Supplier and the Balance Responsible Party are responsible for all consumption and production in all Installations at a connection to the grid, by associating one Metering Point to it. This configuration will work for Prosumers in countries where the Balance Supplier and Balance Responsible Party must be the same for the Prosumer’s production and consumption, such as Norway and Poland. It will also work in other countries as long as consumption and production belongs to one MP and the Customer, Balance Supplier and Balance Responsible Party are the same for consumption and production in the total setup of Installations at a connection to the grid.

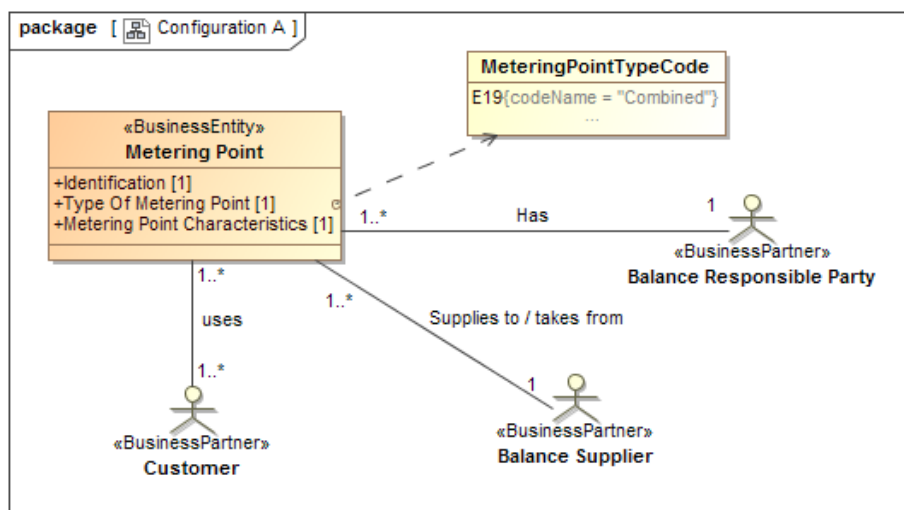


Figure 10 Configuration A: The same BS and BRP for consumption and production at one MP associated to all Installations in one connection to the grid

4.2.2 Configuration B: Different BS and BRP for consumption and production

In this configuration, the Balance Supplier and the Balance Responsible Party may be different for consumption and production in the (multiple) Installations at one connection to the grid, such as in Denmark, Finland, the Netherlands and Sweden. There are associated multiple MPs to the different Installations at the connection. It may be needed to have a link between the different MPs, in this case indicated as one Main MP linked to one or more Sub MPs. The link is typically used for dependent metering and grid fee billing. The link could also be used when there is one Customer for all MPs and he moves out from all MPs linked to this Customer at this connection to the grid.

Note that there may be more MPs than the two shown in the class diagram below.

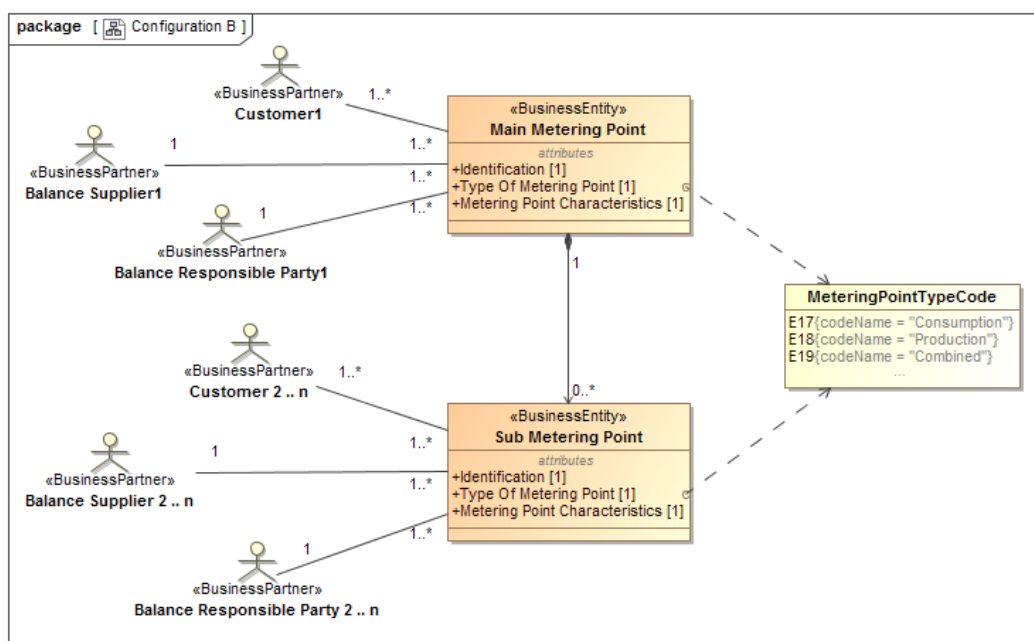


Figure 11 Configuration B: Multiple linked MPs associated to Installations at one connection to the grid, allowing different Customers, BSs and BRPs for consumption and production

Appendix A National handling of prosumers in some ebIX® member countries

Country	Comment
BE	<ul style="list-style-type: none"> • Depends on installed production, below 10kVA only one MP and one BS. • Use netted metering per time frame. • All MPs below 10kW are profiled metered. • Above 10kW (5 kW in Brussels) there must be two MPs and may be different BS for production and consumption. • When the HUB goes live there will be offered new services for the Prosumers from the DSOs.
DE	<ul style="list-style-type: none"> • Currently no special rules for Prosumers, MPs with combined production and consumption are treated according to the normal rules for production and consumption. • There is a “traditional Measurement Point” and in addition one or more “Market Locations”: <ul style="list-style-type: none"> ○ How to identify the “Market Locations” is under discussion; ○ If there are both production and consumption, there will be two “Market Locations”.
DK	<ul style="list-style-type: none"> • Consumption and production must have different MPs. • There can be different BSs for production and consumption. • The same processes are used for production and consumption. • To get a higher price for the renewable production Energinet.dk must be the BS. • If hourly settled Consumer the production and consumption can be netted and you have to pay grid fee for the full consumption obtained from the grid: <ul style="list-style-type: none"> ○ If netted, each of the “Market MPs” are linked to two “Technical MPs” in addition to the two “Market MPs”. • There is a special closed group for profiled settled prosumers (85.000) that are netted on annual basis, and only pay the grid fee for the consumption (and not for production).
FI	<ul style="list-style-type: none"> • Consumption and production must have different MPs. • There can be different Balance Suppliers for production and consumption. • The same processes are used for production and consumption.
NL	<ul style="list-style-type: none"> • The normal configuration is having one MP also for combined MPs with both production and consumption. • The possibility to have multiple MPs, on request from Customers, has been introduced (not necessarily for production and consumption). • Can have smart-meter allocation on request (15 minutes metering).
NO	<ul style="list-style-type: none"> • Prosumers are called “Plus Customers”. • MPs must be hourly metered and infeed to the grid must be below 100 kW. • There is always one common MP for consumption and production. • The production and consumption is netted. • The production is exempt for fees, except for the infeed fee to the grid. • If the Customer invests in a separate meter for the production, he may receive EI-certificates. • An exception is cooperatives, where a common small scale production can be split on the households in the cooperative.

PL	<ul style="list-style-type: none"> • There can only be one Balance Supplier. • The consumption and production are netted. • A Prosumer can produce up to 40 kW. • A DSO must connect a Prosumer within 30 days. • There are special requirements for the Meter.
SE	<ul style="list-style-type: none"> • There can be different BSs for production and consumption. • The same processes are used for production and consumption. • All production is hourly metered and settled. • The normal configuration is having one MP also for combined MPs with both production and consumption.
SI	<ul style="list-style-type: none"> • There are standard grid connection schemas and calculation published and in use for prosumers. • Relation between metering point and prosumer MP is 1:1. It is a metering point with Type of Metering Point Code Combined or Nett metering. • There is only one meter with 2 or 4 registers on Combined Type of Metering Point and Nett metering. • Prosumer MP can have supplier for consumption and other supplier for production. • Some exceptions exist, that party for consumption is different as party for production on MP, but not for Nett metering MPs. • There are separate rules for handling prosumers with Nett metering with special requirements for the meter, connection and billing. • Nett metering Type of Metering Point can have only one supplier and one customer • Quantities for Nett metering are netted on yearly bases. • Balance settlement for production is on the hourly meter reads. Some exceptions are profiled. Handling the prosumers for balance settlements is the same as it is for other production. For the prosumers, according Nett metering regulations, quantities are used for balance settlement as are measured (not netted). • Sub metering behind MP on one connection to the grid in primary installation is allowed with special connection schemas. Quantity of that energy is not used for the energy market, grid use fee billing and balance settlement. It is metered just for purpose of subsidising renewables.