



Policy Guidelines on Grid Integration of Prosumers

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1. Empowered consumers drive the energy transition



Study: “Distributed Generation for self-consumption, key aspects and Recommendations Of Good Practice”

- focus on recommended practice for small installation of “prosumers” connected to distribution network.

https://www.energy-community.org/dam/jcr:78a1b5d0-9df7-41f4-9691-553d2c813437/WSEL052017_Muratovi%C4%87_Key_aspects.pdf

2015 “Best Practices on Renewable Energy Self-consumption” working document of European Commission

https://ec.europa.eu/energy/sites/ener/files/documents/1_EN_autre_document_t_ravail_service_part1_v6.pdf

2016 “Position Paper on Renewable Energy Self-generation”, CEER

<https://www.ceer.eu/documents/104400/-/-/3f246c2a-d417-2a29-d8eb-765bd6579581>

2. Definitions

“prosumer” - an electricity consumer that produces part of his/her electricity needs from his/her own power plant and uses the distribution network to inject excess production and to withdraw electricity when self-production is not sufficient to meet his/her own needs.

“Self-consumption” is the consumption of an electricity consumer with an installed distributed generation system intended for his/her own or on-site consumption and entitled to receiving remuneration for the non-consumed electricity fed into to the grid.

“Value of excess energy” is the value the prosumer receives for electricity injected into the grid.

“Net metering” is a regulatory framework under which the excess electricity injected into the grid can be used later to offset consumption in the period when onsite renewable generation is absent or not sufficient, where the excess energy value is equal to the retail electricity price.

“Net billing” is a regulatory framework under which the excess electricity injected into the grid can be used later as a monetary credit to offset the costs of electricity withdrawn in the period when onsite renewable generation is absent or not sufficient, where the excess energy value is lower than the retail electricity price.

“Energy credit” is a quantity of excess energy surplus which remains after a regular billing period, given as a positive difference between injected and withdrawn electricity.

“Monetary credit” is a monetary value of excess energy surplus which remains after a regular billing period, given as a positive difference between the monetary values of injected and withdrawn electricity.

3. Key areas



#1 – Legal and regulatory framework

#2 – Technology and capacity criteria

#3 – Self-consumption schemes

#4 – Treatment of excess energy

#5 – Grid Costs

#6 – VAT and other related taxes and levies

#7 – Imbalance settlement

#8 – Grid connection

LEGAL AND REGULATORY FRAMEWORK

General principles	<ul style="list-style-type: none"> - legal framework to allow self-consumption schemes; - secondary legislation to amended to include this customer category , provide for flexible tariff design, billing and reporting system
Consumer categories	<ul style="list-style-type: none"> - households and small commercial consumers should be treated separately from industrial and large commercial consumers
Subsequent legislative changes	<ul style="list-style-type: none"> - no retroactivity when amending the legislative framework to ensure legal certainty and ensure investment stability - changes of unit price of excess energy, grid tariffs or other taxes and levies are not considered as a change of legislative framework
VAT legislation	<ul style="list-style-type: none"> - enabling VAT legislation for self-consumption schemes and in particular for netting schemes
Support	<ul style="list-style-type: none"> -support for energy from renewable sources injected in the grid is granted, it should be explicitly provided, having taken into account the market wholesale or retail price; - any hidden subsidies should be avoided, particularly through the grid costs exemption, since they result in cross-subsidization among network users
Commercial arrangement	<ul style="list-style-type: none"> - the commercial arrangement between suppliers, a grid operator and prosumers has to be adjusted to allow for the implementation of the selected netting schemes
Energy statistics	<ul style="list-style-type: none"> - the share of self-consumption at the power system level should be established via a reporting system and key statistical indicators defined in a comprehensive manner

TECHNOLOGY AND CAPACITY CRITERIA

Technology criteria	<i>- all types of DG technologies should be allowed for self-consumption purposes.</i>
Installed capacity criteria	<ul style="list-style-type: none"> <i>- the installed capacity eligible for self- consumption schemes shall not exceed the requested connected capacity of the customer</i> <i>- the network operators might impose overall capacity limits in the system until the regulatory framework on setting the tariffs for access to the distribution grid is revised</i> <i>- these overall capacity limits shall be revised and set annually</i>
Capacity limitation for households and small commercial consumers	<ul style="list-style-type: none"> <i>- it is appropriate to apply the general capacity threshold per single installation and the individual DG capacity limit depending on the consumer's capacity and annual consumption</i> <i>- annual electricity should be lower than the customer's consumption in the preceding year, if the netting scheme is applied</i> <i>- in case of new, first time connecting consumers, planned consumption might be applied as a reference value</i>
Capacity limitation for industrial and large commercial consumers	<ul style="list-style-type: none"> <i>-the general capacity threshold per single installation is not recommended, provided that electricity fed to the grid is subject to other support schemes</i> <i>- technology-based capacity limits might be determined on a case-by-case basis, depending on the consumer's annual consumption and using constraints from grid connection criteria, if relevant</i>

Recommendation Set #3

SELF-CONSUMPTION SCHEMES

Scheme selection	<ul style="list-style-type: none">- to apply the net billing scheme, preferably with monthly invoicing, one year optimal credit compensation period - HHs and SMEs- any monetary credit surplus remaining after the annual compensation should be annulled.- standard commercial schemes should be applied with separate invoicing of the electricity supplied by the supplier and of the electricity injected by the prosumer respectively - IC
Overall impact assessment	<ul style="list-style-type: none">- when netting is evaluated as a support scheme, overall social welfare of access to electricity at low cost for small customers has to be considered, in particular those in remote and less developed areas, taking into account the life cycle cost of DG in line with energy efficiency requirements, avoided network costs and contribution to social cohesion objectives
Net billing advanced arrangements	<ul style="list-style-type: none">- netting schemes allowed even if the generation and consumption locations are different, making the arrangement also known as “virtual net metering (billing)”. In addition, netting might be applied in multi-apartment buildings, where the net production on one site is split between several consumers
Net billing gradual implementation	<ul style="list-style-type: none">- introduce the net billing schemes in two steps, thus avoiding over-complexity in the phase-in period- in the initial phase, it should be permitted only for installations at the same location, which are connected to the grid via the same electricity meter- in the second phase, the regulatory framework might allow net billing schemes in multi-apartment buildings or in a situation when generation and consumption locations are different
Third party ownership	<ul style="list-style-type: none">- third party ownership of DG installations should be allowed under the net billing-scheme
Monetary credit treatment in specific situations	<ul style="list-style-type: none">- the final settlement should also include the value of outstanding monetary credit, when supplier switching occurs- prosumers should be allowed to transfer the monetary credit surplus to the grid operator or to other consumers.

Recommendation Set #4

TREATMENT OF EXCESS ENERGY

Excess energy remuneration	<ul style="list-style-type: none"> - ensure fair remuneration of excess energy and ‘no compensation’ option should be excluded - adequate remuneration is expected to promote consumers’ market empowerment, aggregation and further integration into the balancing market
Valuation method	<ul style="list-style-type: none"> - set the excess energy value at the level of the energy component of the retail electricity price, also taking into account incurred reasonable costs of energy transactions and distribution system operators’ (DSOs) benefits related to network losses reduction assuming that the energy component of the retail electricity price properly reflects the market value of electricity to the consumer - the excess energy unit price should equal the energy component of the retail electricity price increased by the network losses contribution unit price and decreased by the supplier’s energy transaction unit price
No double incentives for prosumers	<ul style="list-style-type: none"> - feed in tariff or feed in premium, as the administratively set unit price, which also includes a certain level of subsidy, should not be used to value excess energy fed into the grid by a prosumer.
Time of use price differentiation	<ul style="list-style-type: none"> - time of use (ToU) price differentiation should be applied for excess energy valuation provided that the supplier includes time of use of the retail price differentiation - ToU tariffs enhance demand side response, but also bring more proper market valuation of PV production during the daily periods of high prices
Excess energy counterparty	<ul style="list-style-type: none"> - phase I - the supplier or other corporate body (e.g. system operator, market operator, specific support system operator, etc.) should purchase the excess energy under predefined conditions - phase II - higher degree of liberalization - to leave the excess energy purchase and valuation to market mechanisms. If a net billing scheme is applied, the prosumer’s supplier is by default in charge of purchasing the excess energy fed from households and small commercial prosumer installations

Recommendation Set #5

GRID COSTS

General	<ul style="list-style-type: none"> - DSO grid capacity is dimensioned to deliver the requested demand at any time during the year as if there are no self-consumption installations - regulated revenues to cover the fixed costs and variable costs of grid operation with an increasing level of self-consumption as the revenues covering the fixed costs of grid operation shall increase
DSO's cost recovery	<ul style="list-style-type: none"> - specific tariff rates for prosumers, as a separate subclass(es) of network users, to be a proper solution to mitigate DSO's risk related to cost recovery, due to decreased consumption
Cost reflectiveness	<ul style="list-style-type: none"> -there is no difference between the prosumer and the standard consumer requiring the same capacity - prosumers are expected to contribute to grid cost recovery in the same way as other consumers, and comply with the principle of cost reflectivity - preserve the principle of cost reflectivity and prosumers should pay the appropriate share of grid costs as the other non-producing consumers of the same category >>> avoidance of cross-subsidization - tariffs modified to introduce specific prosumer subclasses of network users corresponding to the non-producing consumers of the same categories
Grid tariffs for prosumers	<ul style="list-style-type: none"> - introduce capacity and volumetric tariffs for the network use by prosumers - increase the capacity tariff's weight in total grid costs as it reflect fixed network and system costs to deliver the requested capacity at the prosumer's connection point - the volumetric tariffs should be proportionally decreased to reflect variable network and system costs, - the proposed principles of tariff design are envisaged to exempt prosumers only from payment of the variable network and system costs for the self-consumed electricity
Grid tariffs for prosumers with storage systems	<ul style="list-style-type: none"> - the grid tariffs for prosumers with integrated storage systems shall be set-up after load profile analysis - the prosumers with a storage system would have lower peak demand as a result of enhanced demand side response

VAT AND OTHER RELATED LEVIES

General	<ul style="list-style-type: none">- HHs empowered to take a more active role and contribute to power system sustainable development and other energy policy goals - the netting scheme shall be allowed
VAT	<ul style="list-style-type: none">- VAT legislation should not prevent invoicing based on the net difference between energy delivery and injection- environmental and social benefits can be accrued from properly designed self-consumption schemes
Other taxes and levies	<ul style="list-style-type: none">- prosumers not entirely exempted from the payment of other taxes and levies for the self-consumed electricity- prosumers' bill savings, which are the result of self-consumption, therefore include the energy component of the retail electricity price, volumetric grid tariff, VAT and other taxes and levies for which exemption on self-consumption is granted.

Recommendation Set #7

IMBALANCE SETTLEMENT

Balance responsibility	<ul style="list-style-type: none">- the supplier or other energy purchasing body has balance responsibility and must take into account the changed load profile and injected energy, implicit balance responsibility of prosumers- the influence on power system operation and balancing is proportionally growing with the increase number and capacity of prosumers.
Exemption criteria	<ul style="list-style-type: none">- prosumers with installed capacity below 500 kW should not have balance responsibilities- these costs should be borne by the prosumer's supplier or other corporate body in charge of purchasing the excess energy
Standardized profiles	<ul style="list-style-type: none">- a set of standardized prosumer load profiles should be established to properly reflect DG production patterns (if feasible), consumers' load profiles, existence of storage facilities, etc.
Standard balance responsibility	<ul style="list-style-type: none">- prosumers with installed capacity above 500 kW should be subject to standard balance responsibilities and should be liable for imbalances regarding the excess energy, as any other DG installation of the same capacity.
Imbalance settlement	<ul style="list-style-type: none">- energy or monetary credits should not interfere with the imbalance settlement, which should be performed within the billing period on the basis of physical energy flows in that period, if netting schemes are applied

GRID CONNECTION

Electricity metering	<ul style="list-style-type: none">- an electricity bi-directional meter at the connection point should register both the energy withdrawal and injection- the metering interval should be aligned with the trading interval at the wholesale electricity market to facilitate self-consumption rate optimization, imbalance settlement, generation forecasting and excess energy valuation based on the wholesale electricity prices- an additional electricity meter should be installed to register the total electricity generated by the renewable installation, otherwise the state of progress in achieving renewable energy targets could only be estimated
Single phase installations	<ul style="list-style-type: none">- capacity limits for single phase installations should be used to avoid voltage and current imbalances in low voltage distribution networks
Connection procedure and DSO authorization	<p>A streamlined and simplified connection procedure should be established to shorten connection time and decrease administrative costs. Nevertheless, all technical and safety criteria must be fulfilled and DG installation and connection must be subject to DSO authorization.</p>

The background is a satellite-style image of the Earth at night, showing city lights. Overlaid on this are numerous glowing blue lines that represent energy transmission or a network, connecting various points across the globe.

*Thank you
for your attention!*

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