BEUC The European Consumer Organisation

The Consumer Voice in Europe

A WELCOME CULTURE FOR CONSUMERS' SOLAR SELF-GENERATION

Policy recommendations

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Summary

In the Commission work programme, President Jean-Claude Juncker underlined that Europe should become the "world number one in renewable energies".[1] And in its 2015 summer energy package, especially in a New Deal for energy consumers,[2] the European Commission highlights that consumers are still prevented from self-generation and self-consumption of renewable energy sources.

New opportunities may arise for consumers from playing an active role in the ongoing energy transition. While active consumer participation is seen as important and consumers may engage in the market provided there are right incentives, it should always be born in mind that energy services are essential for people. Therefore, all EU energy consumers should have access to secure, sustainable and reliable energy at affordable price. While this paper shows how small-scale self-generation for household consumers can contribute to this aim, consumers who cannot afford or are not willing to invest into self-generation technologies should not be charged with inadequate costs.

BEUC's project on renewable energies has been focusing on facilitating access for consumers to electricity from renewables. This can reduce household energy bills but also improve energy security in Europe, prevent further global warming and to keep energy affordable for consumers in the long term. However, those consumers who are interested in producing their own electricity often face difficulties to identify the right technology and offer. Frequent policy revisions, undue charges or sharp cuts can reduce the indispensable remuneration of generating your own electricity to a level which is not sufficient to pay off consumers' investment. Consumers are confronted with procedures that were designed for established power plant operators – but not for private households. This lack of a "Think Small First" approach entails disproportionately high administrative and investment costs for self-generators.

In this paper, BEUC analyses the existing legislation as regards self-generation as well as the current situation, focussing on small-scale solar photovoltaics (PV) for household consumers. Based on BEUC's detailed mapping report on current practices,[3] the paper provides a set of policy recommendations and calls on the EU policy makers and regulators to take these into account when designing future legislation, in particular the Renewable Energy Directive and the Market Design Initiative:

- Member States should develop a **dedicated long-term strategy** for self-generation technologies that facilitates consumers' access, for instance through simplified rules and one-stop shops. It should address the distributional impacts of deployment support as well as the transparency of network costs that are passed onto consumer groups that do not use such technologies. **Cost distribution has to be balanced and fair**.

[1] "I strongly believe in the potential of green growth. I therefore want Europe's Energy Union to become the world number one in renewable energies." Jean-Claude Juncker: A new start for Europe: My agenda for jobs, growth, fairness and democratic change. Political guidelines for the next European Commission. Strasbourg, 15 July 2014.

[2] European Commission: Delivering a New Deal for Energy Consumers, COM(2015)339 final, July 2015; European Commission: Best practices on renewable energy self-consumption, SWD(2015)141 final. Accompanying COM(2015)339 final. For a more general view on all aspects of the Energy Union, see BEUC position paper "Building a consumer-centric Energy Union", 8 July 2015, .

[3] BEUC: Current practices in consumer-driven renewable electricity markets. BEUC mapping report, 6 January 2016, BEUC-X-2016-003.

- The economic viability of consumers' self-generation projects depends on the possibility to sell excess electricity. Therefore, a **priority access to the grid** is key. With regard to network fees, more differentiated schemes should foster flexibility of self-generators and involve all electricity producers and consumers in a fair way. But **in-house electricity generation and self-consumption should not be burdened with undue charges**.

- Given the deficiencies of current wholesale markets, it is indispensable to provide a **reliable remuneration scheme for excess electricity** sold to the grid by small-scale self-generators. They should be enabled to act on par with other powerful market participants. Thus, a specific support scheme is justified to facilitate consumers' engagement into self-generation, just like dedicated bike-lanes in urban traffic enable bicycles to use the streets while following the same traffic rules like cars should do.[4]

1. Self-generation - what's in for consumers?

This policy paper is based on BEUC's analysis of current practices in small-scale renewable solar PV self-generation and provides policy recommendations aimed at establishing a 'welcome culture' for consumers' self-generation projects. BEUC's detailed mapping report assessed how EU Member States (and Norway) regulate non-commercial solar PV installations run by private household consumers. An evaluation overview of all Member States' performance is provided in the annex of this document with the help of a traffic lights scale.

Self-generation includes self-consumption and feeding electricity in the grid

We approach self-generation mainly from the point of view of households being homeowners while tenants living in multi-storey dwellings could and should be able to adopt self-generation as well. Self-generation policies limited to private homeowners fall short of addressing different types of households that require each a specific approach. Benefits of solar PV installations should be accessible to all consumers, independent of owning a detached house. Especially for consumers living in social housing, cheap solar electricity from the rooftop could contribute to combat energy poverty. However, BEUC's mapping report and the following recommendations mainly apply to self-generation installations run by homeowners since this market segment currently dominates.

Self-generation…

…is power and/or heat generation on the premises of a private consumer who uses self-generated heat, or electricity, to cover his/her own demand to a certain degree ("self-consumption"). On top of that, it entails feeding excess electricity production into the public grid or eventually storing electricity.

At the moment, solar PV electricity represents the most common self-generation technology in the EU and bears one of the most important renewable energy potentials. For these reasons, BEUC's analysis and policy recommendations mainly focus on solar PV.

[4] This position paper does not reflect the view of Arbeiterkammer Wien.

While other devices such as micro-wind turbines or biomass cogeneration units also can play an important role in households' self-generation, their divergent stage of market development in relation to solar PV complicates a conjoint analysis. Their relevance as self-generation technology for consumers will not be assessed in this paper.

Prosumer…

…is another term for consumers that self-generate and self-consume electricity on the premises. In this paper, we prefer to describe the role of consumers as self-generators. Regardless of the term, the household always remains connected to the grid.

Similarly, renewable heating will also fall outside of the scope of this paper, although it is very important in view of the share of heating costs in consumers' energy bills. But against the backdrop of Member States' highly diverse conditions (building stock, climate, renewable energy sources potentials) a separate approach is needed, taking into account local demands and specificities.

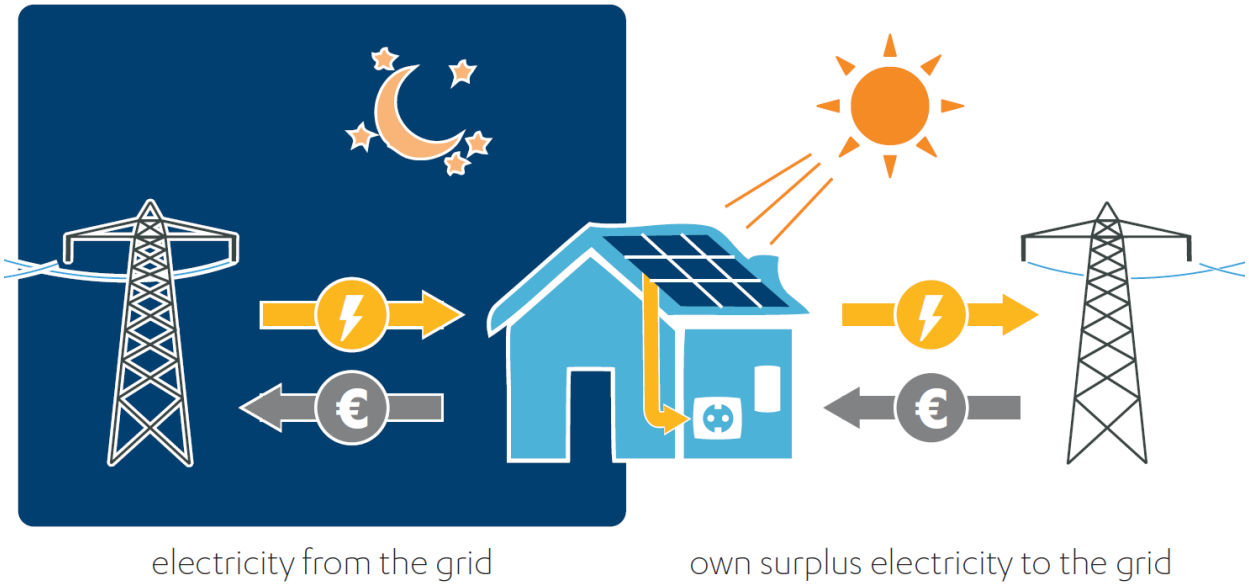
How consumers can benefit

The following infographic shows how a consumer household benefits from self-generation during a normal day. The consumer's role necessarily changes in the course of the time of day. Depending on the consumption pattern, on the solar irradiation and on the technical equipment, a household might change from being an importer of electricity from the grid before dawn to become a self-consumer with the sun rising. In case the own solar electricity generation exceeds the household's demand, it finally becomes a net exporter of surplus electricity to the grid. This more complex, yet hybrid role needs to be mirrored in an appropriate regulatory framework, responding to each of a self-generator's new function in our electricity supply system. At the same time, it should take into account consumers' highly different patterns of behaviour that influence these functions (see chapter 3).

From a consumer perspective, solar self-generation bears an important potential for cutting household energy costs. In the EU, 80% of households live in regions where generation one kilowatt-hour of electricity with a solar PV rooftop system is cheaper than buying a kilowatt-hour at the average national retail electricity price, delivered by a power company via the grid.[5]

[5] Joint Research Centre (JRC): Cost Maps for Unsubsidised Photovoltaic Electricity 2014, September 2014. Assumptions: 1,400 Euro/kW system price plus national VAT rate, levelised costs of electricity generation (LCOE) with 20 years payback, 5% p.a. interest, 2%/year maintenance. The actual spread between the retail price on the one hand and the LCOE of solar PV electricity may differ because the JRC model applied EU average data and did not take into account any eventual public support granted (e.g. tax exemptions) that could increase or decrease retail prices respectively generation cost.

Fig. 1: Solar PV self-generation: consumers as buyers & producers



2. Need to provide a simple and reliable framework for consumers' self-generation

Legislation should not make renewable self-generation more complicated than it technically is. Currently, the regulatory framework still seems to be made for big utilities, thinking in Gigawatts. But consumers are neither engineers nor utilities. They deserve a dedicated framework, appropriate to households, thinking in kilowatts.

Consumers need to have better access to information and advice
Generally, consumers' plans to invest in self-generation are hampered by a lack of reliable and structured information on technological options and potentials. According to BEUC's mapping report, single one-stop shops dealing with consumers' financial and administrative questions are mostly lacking. Recent research looking at consumers' experiences shows that improved access to independent advice during the sales process is urgently needed.[6]

Consumer organisations partly provide what one-stop shops should do
Several BEUC member organisations currently launch collective purchase actions for solar PV panels in their country in order to push the market for good quality offers at reasonable prices (Belgium, Netherlands and Portugal).

Consumer organisations can to some extent offer a one-stop shop situation for consumers who are in search of unbiased information and access to this technology. Currently, no Member State provides a nation-wide one-stop shop solution responding to all of consumers' specific needs. But a rising number of local initiatives driven by municipalities, local companies or citizens' groups also can provide a consumer-friendly contact point (Germany, Netherlands).

Offers need to match consumers' needs
According to BEUC members' experiences in several Member States, the quality of offers could be improved in many solar PV markets, especially those recently emerged. This refers, for instance, to quality standards for planning and building installations as well as to the comparability of offers and devices.

In this context, several BEUC members have together launched the CLEAR project[7] that advises consumers on renewable self-generation technologies. A number of consumer organisations provide exhaustive online information tools, raising awareness of the potential of self-generation as well as guiding consumers who are interested in investing in renewable self-generation.

At the same time, many BEUC members have been raising awareness about problems related to marketing practices such as door-step or telephone selling. These practices as well as new ways to engage such as "rent a roof" and third party financing have been observed in some Member States (UK, Belgium). When confronted with such practices, consumers willing to invest appear to be less likely to shop around and therefore may not be getting the best deal.[8]

[6] See the report of BEUC's UK member Citizens Advice: Staying FIT. Learning from consumer experience of solar PV systems to inform the development of low-carbon policies, June 2015.
[7] The CLEAR project (Consumers Learn about, Engage with and Adopt Renewable energy technologies) covers the most important devices for self-generation of electricity and heat, such as solar PV modules, solar thermal collectors, heat pumps and wood pellet stoves; see http://www.clear-project.eu.
[8] Future Climate/Purple Market Research: Final Report to Citizens Advice: A review of consumer experience of solar PV systems, June 2015; Citizens Advice: Staying FiT. Learning from consumer experience of solar PV systems to inform the development of low-carbon policies, June 2015.

Going forward, these new business models warrant closer examination by regulators in order to ensure that national regulation does not stand in the way of their potential to benefit consumers, and the same time to mitigate risks.

Governments need to provide predictability without administrative barriers
Looking at the general policy framework, the ongoing decline in renewable energy investments in the EU in 2014 was not only caused by the economic crisis. The renewable energy sector was also affected by political incertitude as many Member States frequently revised their policies, especially in the solar PV sector. Without ambitious targets for increasing renewable generation capacities, no new dynamics are initiated.[9]

While companies in the renewable energy industry can adapt their business strategy to policy revisions, private households might rather give up their investment plans. Consumers easily lose confidence in the whole technology once governments send contradictory signals.[10] A lack of predictability in renewable energy support schemes and retroactive changes undermine consumers' investments in most of the analysed countries.

Regulation is made for big utilities, not for private households
At the same time, administrative barriers, established in the past to regulate big utilities, discourage consumers. The EU network codes bear such a risk and should accommodate the different requirements for residential self-generation in comparison to larger utilities.[11] Private households cannot handle complex permit procedures like utilities do. Such barriers disproportionately increase investment costs of private self-generation projects.[12]

Consumers experience unnecessary administrative barriers
Moreover, in some Member States, the different administrative levels of a national government, regions or municipalities have introduced contradictory regulation affecting consumers' self-generation (Belgium, Italy). Partially, procedures and regulation are inappropriately lengthy and complex (Italy, Spain and Portugal).

What should be improved in future legislation?

- The future Renewable Energy Directive must **provide a dedicated long-term strategy for an adequate support** to consumers' small-scale renewable self-generation projects.
- Based on the Commission's State Aid Guidelines, Member States should be urged to **establish or to improve national self-generation strategies that target private households**.
- Member States and regulators must **ensure that a simplified administrative framework responds to the specific needs of consumers who want to invest in a small-scale self-generation project**.
- Regional and local authorities should be encouraged and supported to **establish one-stop shops for consumers**.

[9] Eurobserv'ER: The State of Renewable Energy in Europe, March 2015, p. 4-7; International Energy Agency (IEA): Energy Policies of IEA Countries. European Union 2014 Review, December 2014, p. 11.
[10] See, for instance, in Belgium the solar PV investment slump and consumers' scepticism expressed in surveys after government action with prohibitive character. Consumers seem to refrain from investments despite the fact that the economic viability of small-scale solar PV self-generation still could be given.
[11] This means that the elaboration of network codes should be made transparent and accessible to consumer organisations.
[12] PV GRID project: Final project report, August 2014; http://www.pvgrid.eu.

3. Guarantee priority grid access and use to consumers' self-generation

Grid access can become the bottleneck of consumers' self-generation projects. If small-scale solar PV installations on households' rooftops have to compete with multi-megawatt power plants for the use of grid capacity, self-generation will remain a niche market.

Without selling excess electricity to the grid, self-generation won't fly
Households running their own solar PV panel often produce more solar electricity than they can consume at the same time, e.g. when solar irradiation and electricity production is peaking at noon, family members tend to be at their working place or at school (see Fig. 1: Possible functioning of a self-generation system at household level). Consequently, self-generators must be able to sell their excess electricity production into the grid.[13] Against this backdrop, a priority grid access is key for ensuring the economic viability of consumers' self-generation projects.

Administrative procedures entail undue financial burdens
On the administrative level, letting consumers wait for an inappropriately long period can further question attractiveness of a self-generation project.[14] The introduction of undue charges for the grid access and for the use of grid capacity might have a prohibitive effect. Consumers' projects might not pay off, especially if such charges are applied in a retroactive way.

Technical restrictions of the grid access further question a project's amortisation
Furthermore, the grid operator might fear that connecting consumers' solar PV installation leads to grid congestion. Instead of reinforcing the grid to integrate consumers' excess electricity, the grid operator could just cap the granted network connection capacity which can be compared with the size of the 'entrance door' to the grid. This would mean that the consumer would have to shrink the size of the solar PV installation. The obligation to scale it down to the measurements of the 'entrance door' may artificially limit the potential of consumers' rooftops. Such practice unnecessarily increases the costs of solar electricity generation. Curtailment of self-generators in case of grid congestion also represents a risk for their amortisation. If the associated risks are not clarified, the economic viability of a project can be threatened.

Households should not be treated like established power plant operators
When asking for grid connection of their installation, consumers cannot be compared with established power plant operators. They enter the playing field under completely different conditions. One cannot expect private households to act like well-informed commercial utilities. On a technical level, self-generators naturally have to comply with technical provisions of the grid. But applying grid access procedures and codes to them that normally address multi-megawatt power plants again causes an undue burden.

Revision of network costs refinancing schemes may be needed
Policy-makers in a number of Member States tend to perceive consumers who run a solar PV installation as a risk for the refinancing of the electricity grids' operating costs. Several Member States consequently have introduced levies or other restrictions on self-generators (Austria, Belgium, Norway, Portugal and Spain).

[13] Electricity storage devices for households could gradually increase the share of self-generated electricity in total electricity consumption of households. Although prices of storage devices decrease, these technologies will not redundantise households' grid connection. We do not regard households' total energy autarchy as reasonable.

[14] In Sweden, the average waiting period for getting connected a small-scale rooftop PV installation is more than one and a half year, see: PV GRID project: Final project report, August 2014; http://www.pvgrid.eu.

Indeed, households that consume their own solar PV electricity will reduce their electricity consumption from the grid and will consequently contribute less to the coverage of total costs for maintenance and extension of the electricity networks since these costs are mainly paid by network fees charged on every kilowatt-hour consumed ('consumption-based fee'). At the same time, they need to make use of the grid to export their excess electricity production. A fair solution needs to be developed which is appropriate to this new role of consumers.

However, it should be born in mind that the impact of self-consumption on network fees remains limited. The effect of self-generators' diminishing contribution to network fees described above should not be overestimated. Even in far developed solar PV self-generation markets (e.g. Germany, Italy), self-consumption by households only makes up a very limited share of final electricity consumption (<0.5% in Germany). In most Member States, reliable and comparable data on household consumers' self-generation units does not exist.[15] Given its limited share, self-consumption at the moment will not be liable for lowering substantially grid operators' revenue from network fees. Therefore it would be neither appropriate nor fair to burden in-house electricity generation and consumption by imposing specific levies or network fees on the self-consumed electricity.

Revised network fees could foster flexibility – but also social inequality

Revision of consumption-based network fees towards more capacity-based fees could be designed to address the fair sharing of network fees and to incentivise flexibility of electricity generation. Every household would, for instance, pay a fixed fee for being connected, regardless of the specific electricity consumption, likewise a 'flat rate' fee. But since capa-city-based network fees might increase the burden for small consumers and discourage energy efficient behaviour, such a revision would require additional compensating mechanisms, including measures for vulnerable households. For them, such a 'flat rate' fee could be disproportionate and lead to an unduly strong increase of their electricity price. Such distributional impacts upon non-participating consumers need to be better assessed and made transparent in order to safeguard fairness.

What should be improved in future legislation?

- In the future legislative framework for the electricity market design, grid operators must **grant priority grid access to small-scale renewable self-generators without setting any caps**, e.g. on the size of consumers' installation. The **duration of the permit procedure should be short and straightforward**, without excessive charging for grid connection and use.
- In the future legislative framework, grid operators should be obliged to immediately optimise and expand their network in order to **guarantee to self-generators the purchase, transmission and distribution of their electricity**.
- With regard to network fees, it is worth to **consider more differentiated schemes that foster flexibility options of demand and supply**, involving all electricity producers and consumers. However, retroactive changes are unacceptable.

[15] Given that the Council of European Energy Regulators (CEER) highlights the number of 'prosumers' as an indicator for consumers' involvement in its position paper on well-functioning retail energy markets (October 2015), European-wide statistical data needs to be collected, e.g. on how much electricity is self-consumed by household consumers and which share of the installed capacity actually is owned by them.

4. Ensure fair and appropriate refinancing for all consumers

Market integration of renewable self-generation is not a self-runner. Given the market distortions and the high uncertainty, a stable remuneration scheme is crucial for reducing the risks. Such support schemes must be designed in a fair way, meaning that benefits need to be accessible to different consumer groups, including vulnerable ones, while the costs are distributed evenly amongst all final customers.

Market distortions disadvantage renewable self-generation
Consumers who invest in self-generation face an absurd market situation. Although they help abating external costs of the incumbent energy supply system, e.g. environmental damages and health costs, they are disadvantaged: their fossil competitors' electricity appears to be cheaper because the external costs are not shown on the bill of fossil energy sources. This discrimination should be stopped. In order to offset and overcome this market distortion, adequate support for small scale self-generation is required. Concurrently, such intervention is necessary to spur consumers on being more flexible and responsive when interacting with electricity markets.

Stable and adequate policy framework needs to be in place
In general, consumers are confronted with high financial risks related to long amortisation of the self-generation investment and the difficulty of access to capital. This can be further worsened by a lack of stable and sufficient legal frameworks for consumers' small-scale self-generation (see chapters 2 and 3).

Consumers' access to capital is generally hampered by the financial crisis and in particular by the uncertainty of public policies with regard to self-generation. Naturally, public support schemes have to be adjusted when the costs come down rapidly like in the case of solar PV. But retroactive changes undermine consumers' investment in self-generation – as well as the willingness of the finance sector to get involved in such projects. Banks may ask for a risk premium when allowing a credit to consumers who want to invest in a solar PV installation.

Current wholesale markets fail to provide investment security to consumers
According to BEUC's analysis, several policies of Member States push small-scale self-generators out of dedicated support schemes in order to direct them to the wholesale markets. Consumers running a solar PV installation are incentivised to individually search and negotiate a sales channel for their excess electricity generation (Austria, Norway and Spain). Again, the Spanish policy virtually prohibits consumers' small-scale self-generation.

When private households only have the opportunity to sell their excess electricity to the wholesale markets, they would not only be overburdened but put into a flawed competition with commercial stakeholders. In this case, transaction costs again might unnecessarily increase the electricity generation costs. Given the high uncertainty of future wholesale market prices, self-generation could become risky in terms of amortisation.

Need for stable remuneration scheme for electricity fed into the grid
Solar PV electricity generation naturally peaks at noon. Consumers like a typical family normally would not be at home (see Fig. 1) and fail to directly use all their self-generated kilowatt-hours.[16] So, as a matter of fact, substituting electricity imports from the grid by 'home-grown' electricity alone usually does not allow to pay off an investment in self-

[16] The consumption patterns of other households, e.g. tenants in huge multi-storey-dwellings differ and require a specific approach.

generation, regardless of the technology and local potentials.[17] Consumers need to be able to sell their excess electricity at an adequate price. But again, amortisation is questioned by a lack of sufficient remuneration schemes for excess electricity fed into the grid, or even by retroactive changes that endanger the projects' viability.

Short-viewed revisions of support schemes jeopardise consumers' investments
Feed-in tariffs (FiTs) and net metering are the dominating support schemes that provide a more or less reliable remuneration for consumers' self-generation projects. Generally, the analysed Member States tend to change their support schemes in a more or less frequent way. After the value of renewable electricity decreased because of the wholesale market price decline, the differential costs[18] of fixed FiTs increased in some Member States.

The increasing differential costs often led to sudden cuts and abrupt changes in the support schemes, affecting the economic viability of consumers' investments. Cuts are indeed possible because fortunately the investment cost of solar PV installations fell down massively so that the need for financial support also decreased. However, Member States should not throw out the baby with the bathwater. Consumers became distrustful and restrained from further engagement. As a consequence, the newly installed capacity clearly went down (Austria, Belgium, Germany, Greece, Italy, Portugal, Slovenia and Spain).[19]

A balance is needed in the renewable energy policies that ensure fair treatment for all consumers, including for consumer groups that do not have solar PV installations and that are therefore supporting those that do. In parallel, some Member States exempted some commercial consumers from contributing to the costs of the support schemes, increasing the burden for the remaining consumers who are not exempted. Such practice also needs to be assessed.

Self-generation opportunities for tenants need to be explored
The debate about 'prosumer' potentials and legislation for self-generators mainly focuses on private owners of detached houses. Access to renewable self-generation is also relevant for cutting energy costs of vulnerable consumers, regardless if they live in their own home or as tenants in multi-storey dwellings. It should go hand in hand with energy efficiency measures in the building sector in order to combat energy poverty.

However, in most Member States, tenants do not yet find a favourable framework allowing them to profit from 'in-house' renewable energy use, e.g. from solar PV electricity produced on the rooftop of their multi-storey dwelling. New tailor-made solutions have to be developed to tackle this potential, providing a secure legal framework covering relations between landlords, tenants and house-owners. Such new business models (see chapter 2) need more attention to avoid risks and make them work for consumers' needs.

Mere self-consumption without feed-in gives away a huge potential
But instead of enabling tenants to benefit from solar PV installations, some Member States have designed a policy framework that confines this technology to the role of home owners' self-consumption only. Feeding of excess electricity into the grid beyond a home owner's annual consumption is not actively incentivised (e.g. Cyprus, Denmark or Portugal). Within such net metering frameworks, solar PV installations tend to cover just a certain share of home owners' electricity consumption.

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[17] International Energy Agency – Renewable Energy Technology Deployment (IEA-RETD): Residential Prosumers – Drivers and Policy Options (RE-PROSUMERS), September 2014.

[18] The differential costs are caused by the gap between the low revenue from selling a renewable kilowatt-hour at low wholesale market prices on the one side, and the higher feed-in tariff granted to the producer of the renewable kilowatt-hour. In many Member States, theses differential costs are then allocated to electricity consumers by means of a levy included in the retail electricity price paid for each kilowatt-hour.

[19] For a detailed analysis of hurdles, see BEUC's mapping report and the 2020 Keep on track project (http://www.keepontrack.eu).

Restricting consumers' role to self-consumption of solar PV at the premises without enabling feed-in to the grid would artificially limit the potential of self-generation. Beyond covering a certain share of their own electricity demand, consumers can contribute to a cleaner energy supply for the benefit of the whole society. Renouncing this potential appears like keeping a child off playing outdoors.

What should be improved in future legislation?

- The future Renewable Energy Directive must ensure **stable and adequate safeguards** for small-scale renewable self-generation projects, including a **remuneration scheme for electricity fed into the grid**.
- Member States must **remove undue financial burdens such as taxes or fees imposed on self-consumed electricity** because such practice unduly increases the costs and helps maintaining incumbents' business models and market positions.
- Member States should take into consideration that **consumers who cannot afford or are not willing to invest into self-generation technologies must neither be left behind nor be charged with inadequate costs** related to a possible market split into privileged 'prosumers' on the one side and consumers on the other side.
- In order to enable all households to benefit from renewable self-generation, the future Renewable Energy Directive should pay **more attention to the role of tenants and foster the self-generation potential of multi-storey dwellings**. In principal, tenants should have the same opportunities to participate in self-generation projects as home owners.

Annex 1: State of play of renewable self-generation

Consumers want to use their local renewable energy sources and consider investing in self-generation technologies.[20] When asked about their individual contribution to climate protection, 5% of Europeans replied that they already implemented renewable energy installations in their homes, according to a 2013 Eurobarometer survey.[21]

Renewable self-generation as a pillar of security of supply

Self-generators using renewable energy sources proved that they actively contribute to key objectives of the Energy Union strategy:

- They help to increase energy security, diversify generation capacities and the fuel mix by reducing the EU's dependence on finite energy sources.
- They are key to decarbonise the EU's energy mix and combat climate change.
- They bear a potential to enhance competition.[22] For instance, self-generators started to break up market concentration as well as oligopolistic electricity markets in some Member States through investing in renewable energy generation capacities.[23] Self-generators' and citizens' renewable energy investments also significantly increase the number of market participants.
- Together with other renewable power plant operators, they decrease wholesale market prices. Especially high shares of solar PV excess electricity fed into the grid impact on the merit order by diminishing the previous price peaks at noon.[24]

State of renewable self-generation markets in the EU

Analysing solar PV as the most widespread self-generation technology, market development in the Member States differs widely, depending on the stage of market liberalisation, on the legal framework and on the variety of support schemes. Some fore-runners amongst the Member States supported research and development of solar PV technologies since several decades. With the help of dedicated support schemes, they were able to prepare the market, launch the market introduction and then scale up market volumes after the turn of the millennium.

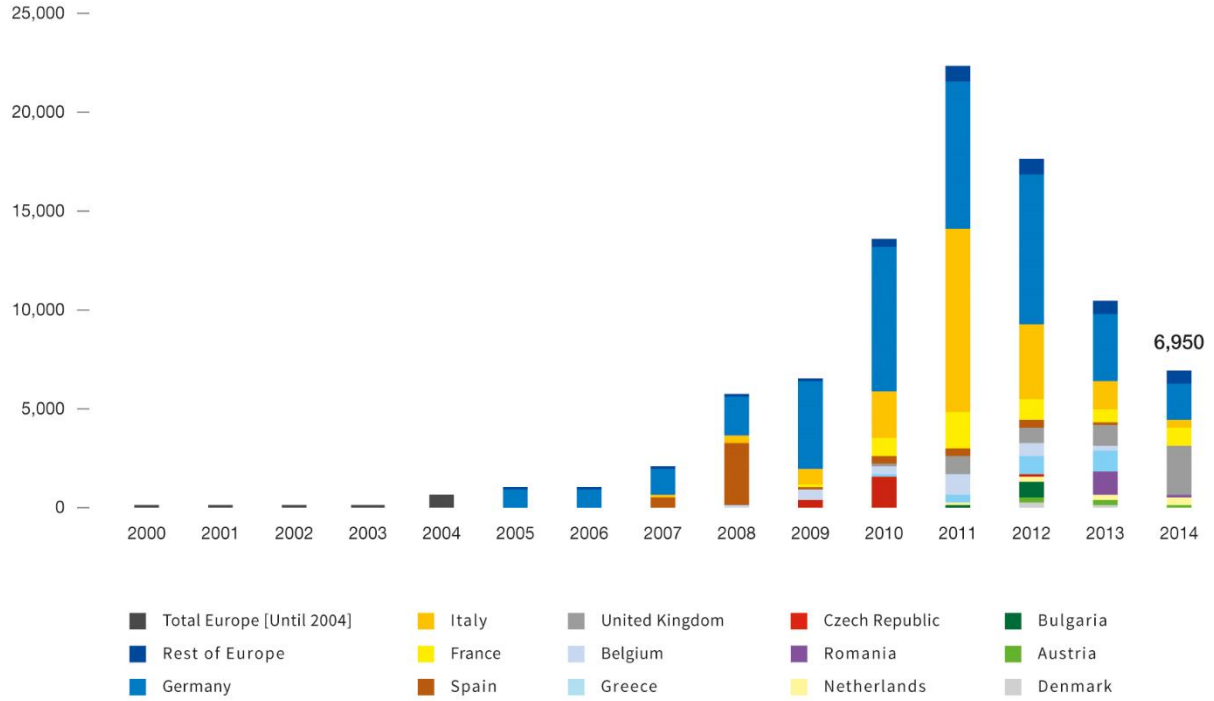
While solar PV self-generation markets are already quite advanced in these Member States, others just recently started market introduction. The huge difference in the installed capacity per inhabitant reflects this non-uniform development.

Most of the Member States assessed in BEUC's mapping report have developed dedicated categories for small-scale self-generation in their support schemes, at least formally (Austria, Belgium, Cyprus, Denmark, Germany, Greece, Italy, Netherlands, Portugal and UK). This does, however, not protect consumers against severe retroactive changes that

[20] European Commission: Flash Eurobarometer 367. Attitudes of Europeans towards building the single market for green products, July 2013; Special Eurobarometer 416. Attitudes of European Citizens towards the environment, Sept. 2014.
[21] European Commission: Special Eurobarometer 409. Climate Change, March 2014.
[22] For instance, the Commission highlights the importance of the growth in renewable generation capacities for competition on the Italian and Spanish electricity markets. European Commission: EU Energy Markets in 2014, October 2014.
[23] In 2014, Germany counted around 1.5 million individual solar PV installations (source: BSW-Solar), mainly owned by private households and farmers, see: Poize, Noémi, Rüdinger, Andreas: Projets citoyens pour la production d'énergie renouvelable : une comparaison France-Allemagne, Working Papers n°01/14, IDDRI, January 2014.
[24] Agency for the Cooperation of Energy Regulators (ACER)/Council of European Energy Regulators (CEER): Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2013, October 2014, p. 110. Concurrently, fundamental changes of the German wholesale electricity markets were nudged by the massive expansion of distributed solar PV after 2009.

endanger their investments in solar PV rooftop systems as is the case in Greece, Italy and Spain. In these countries, the annual growth in installed capacity slowed down massively and to some extent, solar PV self-generation markets even collapsed.

Fig. 2: Annual newly installed capacity of solar PV installations in Europe 2000-2014 (in megawatt)[25]



Grid parity as an important factor for consumers' future use of solar PV

The so-called grid parity (or 'socket parity') is one of the most decisive benchmarks for consumers' involvement in the national solar PV markets: it defines the point in time when self-generated solar PV electricity is cheaper than electricity bought from a supplier via the grid. Theoretically, for 80% of EU households, self-generation of solar electricity would be cheaper than buying it from the grid.[26] Of course, this cost advantage is key for enabling consumers to cut their electricity bill with the help of solar PV self-consumption. But naturally, it only applies during some hours per day. It doesn't imply that investments will amortise automatically or that self-generators can compete on a par with other commercial generators. Against this backdrop, renewable self-generation is not a self-runner, regardless of grid parity achieved or not. Although solar PV installations at the premises have become cheaper and undercut retail electricity prices in most of the Member States, the impressive cost reduction of the technology alone will not guarantee the market penetration. For these reasons, we see the need to provide fair and thoroughly assessed safeguards that ensure solar PV self-generation really leads to benefits for consumers.

[25] Solar Power Europe (SPE): Global market outlook for solar power 2015-2019, June 2015. The installed capacity entails all solar PV installations, from small-scale units on private households' rooftops up to commercial ground-mounted solar PV power plants run by utilities.

[26] Joint Research Centre (JRC): Cost Maps for Unsubsidised Photovoltaic Electricity 2014, September 2014. Assumptions: 1,400 Euro/kW system price plus national VAT rate, levelised costs of electricity generation (LCOE) with 20 years payback, 5% p.a. interest, 2%/year maintenance. The actual spread between the retail price on the one hand and the LCOE of solar PV electricity may differ because the JRC model applied EU average data and did not take into account any eventual public support granted (e.g. tax exemptions) that could increase or decrease retail prices respectively generation cost. Depending on the different patterns of behaviour (see page 5), for a consumer, the value of a self-generated kilowatt-hour can vary.

Annex 2: Overview of Member States' practices (status at the editorial deadline of 26 November 2015)

	Renewable energy policy	Relevance of renewable self-generation	How grid access and use are guaranteed to self-generating consumers	How consumers' excess electricity production is treated	Which typical risks consumers face when starting a self-generation project
Austria	Well-functioning feed-in tariff scheme but annual stop-go.	High interest and good progress, grid parity.	Inappropriate costs for grid connection and grid extension.	Effective feed-in tariff and grants, but restricted access and lack of appropriate remuneration scheme for small installations.	Dependency on suppliers' conditions when selling excess electricity, latency because of yearly stop-go.
Belgium	Several retroactive changes, lack of coherence.	Clear grid parity, solar PV self-generation is widely spread amongst households.	Priority access, but retroactive network fee for self-generators.	Adequate net metering, but prohibitive 'green certificates' scheme.	High uncertainty, except for small solar PV net metering systems.
Cyprus	Net-metering, without remuneration of excess electricity, frequent changes in support schemes.	Very high potential because of low generation costs and the island's need to diversify.	Simplified grid connection for small self-generators, but cost for grid extension may be charged.	No remuneration within the net-metering scheme.	Lack of access to capital to cover high upfront investment costs, frequent changes of support schemes.
Denmark	Traditional forerunner of energy transition in the EU with far-reaching targets for renewables.	Solar PV bears important potential for cost reduction in the context of high retail prices.	No priority, but normally hassle-free access.	Hourly net metering is rather prohibitive but saves taxes and fees, market premium pay-off remains questionable.	Relatively low risk, amortisation difficult to calculate, self-consumed electricity risks network fee charged
Germany	Uncertainty regarding transition from feed-in tariffs to tenders.	Biggest EU market for solar PV, clear case for grid parity in the context of high retail prices.	Hassle-free priority grid access.	Appropriate feed-in tariff, provided consumer substitutes expensive retail electricity.	Relatively low risk, amortisation and reliability questioned by a deterring surcharge on self-consumption.
Greece	Retroactive changes and very unstable regulatory framework.	Consumers are interested but discouraged by the regulatory headwinds and instability.	Relatively hassle-free simplified grid connection for small self-generators, but extra connection fee.	Little and instable FiT remuneration, net metering scheme.	Questioned remuneration and continuous regulatory changes undermine amortisation.
Italy	Frequent changes, small solar PV exempt from retroactive cuts.	EU's second biggest solar PV market with highly attractive cost advantages of self-consumption.	Hassle-free priority grid access.	High potential for self-consumption units involving several modules and stakeholders, but mostly insufficient remuneration schemes.	Limited access to capital due to incalculable pay-off period, high administrative costs.
Netherlands	Dedicated net-metering with remuneration of excess electricity but prohibitive tenders.	Still young, but booming market for small solar PV self-generation.	Normally swiftly but without priority granted, local rejections remain possible.	Attractive net metering with remuneration of excess electricity fed-in.	Frequent policy changes, still some reluctance of banks due to bad experiences with unreliable market premium scheme.
Norway	Minimum quota with technology-neutral certificate scheme.	No clear case for grid parity, solar PV still before the stage of market introduction.	No priority access, grid operator may deny connection.	No appropriate remuneration scheme, new grant for investment to be assessed in future.	Amortisation of solar PV self-generation projects tends to be very difficult.

	Renewable energy policy		Relevance of renewable self-generation		How grid access and use are guaranteed to self-generating consumers		How consumers' excess electricity production is treated		Which typical risks consumers face when starting a self-generation project	
Portugal		Dedicated regulation for self-consumption, prohibitive against export of excess electricity, incertitude because of previous moratorium.		Still very young but promising solar PV market for consumers because of clear grid parity.		Dedicated, but relatively complex and lengthy registration process.		New regulation focusses on self-consumption only with guaranteed but insufficient remuneration for excess fed into the grid.		Access to capital, lack of information, insufficient remuneration for excess electricity, regulatory incertitude.
Slovenia		FiT and premium tariff with dedicated but phased-out support for small self-generation, new tender system not operational.		Solar PV grid parity just reached.		Priority grid access without restrictions.		FiT/premium tariff is insufficient because of too sharp cuts, replaced by a not operational tender system.		Lack of financial viability due to absence of any remuneration scheme for newly installed renewable self-generation.
Spain		Many retroactive changes, all support schemes phased-out.		Clear grid parity, but lack of policy, instability and recession hinder potential to be tapped.		Prohibitive network fee on self-consumption and long waiting periods for permits.		No support, consumers must negotiate electricity sale at the wholesale market.		Lack of access to capital, prohibitive approach of policy framework, long amortisation period.
UK		Clear framework for solar PV self-generation under review, generally lacking behind targets.		High interest and good progress despite lack of clear grid parity.		No relevant restrictions for small projects, although no priority grid access is granted.		Relatively simple and effective feed-in tariff system guaranteed appropriate remuneration until 2015.		Difficult access to capital for self-generators, some speculative selling practices.

Evaluation scale:

Good practice; issue showing good solutions related to transparency and/or market access from the point of view of consumers' rights	
Average performance; issue with some problems and some solutions related to transparency and/or market access from the point of view of consumers' rights	
Bad practice; issue with relevant problems related to transparency and/or market access from the point of view of consumers' rights	

For a detailed explanation of the ranking methodology, please refer to the BEUC mapping report, chapter 4, and to the report's annex for the catalogue of research questions and references.

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