



Work Package Market Uptake | Market strategy blueprints

Deliverable 3.7: Socially adjusted market strategy blueprints developed for distributed flexibility from underserved market segments

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1. Introduction

To safeguard Security of Supply in the renewables-focused electricity system of the future, it is crucial to tap into the vast flexibility potential in distributed assets. It could help speed up the energy transition and it could lower the total cost of energy for consumers in general. However, a societal problem could arise if the financial benefits that come with flexibility only go to a select group of households. Today, the early adopters of flexibility are typically wealthier households which own the necessary assets like solar panels, home batteries, heat pumps and electric vehicles.

The FlexSys project wants to help clear the path towards a more inclusive flexibility, in which lower-income households can also participate and enjoy the benefits. This report gives an overview of why this is important and how we can make it happen.

2. Why should flexibility be inclusive?

The electricity market for households will evolve towards a situation where electricity bills are not only determined by how much electricity households consume, but also by when households consume electricity.

Households able to shift their electricity consumption in time can offer flexibility and will receive financial benefits. We should avoid, however, that vulnerable households will not have the opportunity to offer this flexibility while precisely they are the ones that could benefit most from a lower electricity bill.

To incentivize the use of flexibility, strong price signals will be needed to encourage households to shift their electricity consumption from expensive to cheaper moments. Obviously, this will be detrimental to households who cannot tap into such flexibility.

If we don't want to leave anyone behind in the energy transition, we should pay attention to possible evolutions in the electricity market for households in the near future and actively seek opportunities to also lower the energy bills from vulnerable households and reduce energy poverty. Participating in flexibility should also allow vulnerable households to lower their energy bills without sacrificing covering their energy needs or sacrificing comfort to keep the bills low.

Since the long term energy transition and the renovation and electrification of houses requires significant effort and investments from governments and households, it is important that we start preparing today and think about where we ultimately want to end up as a society in the future.

3. What are the obstacles to make flexibility inclusive?

In a sustainable future, households should have access to assets like solar panels, a heat pump, an electric car or a home battery. However, vulnerable households may not have the financial capacity to invest in such assets. They may also be renting a home where such assets are not installed.

Energy efficient houses are better suited for flexibility. And precisely vulnerable households usually do not live in energy efficient houses. As such, these households often remain more dependent on older technologies, mainly still using fossil energy sources. If in the future the use of fossil energy becomes increasingly expensive compared to renewable energy, then the most vulnerable households will be more exposed.

A specific obstacle here is the tenant-landlord relationship. Tenants in the lower segments of the rental market typically do not have access to the required assets and do not enjoy the benefits of investments in energy efficiency.

To capture the financial benefits of flexibility it can be beneficial to opt for a dynamic electricity tariff, which offers hourly prices to financially optimize the households' consumption. However, many vulnerable households have access to social tariffs; a form of government price protection for their energy use. In these cases, households are unlikely to transition towards a dynamic tariff as long as the same level of price protection – or a significantly lower energy bill - is not guaranteed anymore.

Finally, participating in flexibility can seem too complex, which itself can be a barrier to participation. Understanding an energy bill is already quite a challenge. Participating in flexibility may be perceived as being even more complex and risks to be reserved for the happy few who can understand and deal with the associated complexity. So if the (perception of) complexity is too high, there is a risk that vulnerable households will miss out on the opportunities of participating in flexibility and they may even end up with higher energy bills.

4. What do we have to consider when designing inclusive flexibility?

A recent [report](#) “Flex-ability for all”, published by the NGO Regulatory Assistance Project (RAP) describes it well. The authors propose to take into account the following principles in order to make flexibility more inclusive:

- **Opens direct benefits to those who need them most**
- **Is easy and stress-free for households**
- **Offers savings without sacrificing comfort or well-being**
- **Works alongside price protection and social support**

The report itself includes more details on these principles and what inclusive flexibility could look like. It also discusses the barriers to inclusive flexibility and why it should be prioritised.

5. How can we start to make flexibility inclusive?

First and foremost, households must have access to the necessary assets such as an energy efficient home, a heat pump and/or an electric vehicle. Access to these assets not only enable the shift from fossil to renewable energy, it also allows to participate in and monetize flexibility.

Secondly, more expensive investments are needed such as solar panels, a larger water storage tank, a proper internet connection, a battery and additional tools to enable smart control (which can include additional software, hardware, or both).

Smart and automatic steering of the assets unburdens households as it removes the extra burden of having to plan their lives around the optimal moments to consume energy. In other words, smart steering could provide stress-free access to flexibility without the pressure to give up comfort in exchange for a lower energy bill.

We should make sure that the price protection given to vulnerable households - like social tariffs for energy – remains, while combined with the possible benefits of flexibility. Electricity tariff schemes should be designed so that they combine both.

Lastly, for vulnerable households who are not able to offer flexibility, solutions can be provided which directly lower the energy bills of an entire community, including the vulnerable households who may not own the necessary assets themselves.

Later in this report (section 7) a list of practical examples is provided; initiatives which have attempted to make flexibility more accessible in a number of different ways.

6. Policy recommendations and a timeline to realise inclusive flexibility

Vulnerable households are not the early adopters when it comes to participating in flexibility. Although their participation in flexibility is not required yet, we do need to prepare for the future to avoid households being 'left out' at some point. When does it become important?

When we experience higher energy prices again due to factors such as energy policy, crises, or CO2 taxes, the first and most regret-free measure is to ensure that vulnerable households live in energy-efficient homes. Energy-efficient houses are better suited for flexibility, and precisely, vulnerable households often do not reside in such homes. Therefore, we need to accelerate the renovation of social housing and private rental properties to make them more energy efficient.

When electric heating becomes more attractive than heating with fossil fuels e.g. due to tax shifts between gas and electricity, lower prices for heat pumps, and similar factors, this presents an opportunity to lower energy bills for vulnerable households, even though they do not need to be early adopters. As mentioned earlier, providing the necessary assets to vulnerable households to participate in flexibility involves, in part, shifting from fossil fuels to renewable energy. This includes having an energy-efficient home, a heat pump or electric heating, or an electric vehicle. Currently, few social housing units are equipped with heat pumps.

When the last users of gas bear the costs of the phased-out gas network through distribution tariffs or other means, this situation exemplifies the earlier point. We should avoid leaving vulnerable households more dependent on fossil energy sources than other households. If fossil energy

becomes increasingly expensive compared to renewable energy in the future, the most vulnerable households will be disproportionately affected.

When energy bills can be significantly reduced by participating in flexibility, e.g. due to strong price signals from energy suppliers, this also presents an opportunity to reduce energy bills for vulnerable households, even though they do not need to be early adopters. If households cannot participate in flexibility for various reasons, they might end up with higher energy bills than other households. Policymakers can prepare for this moment by developing strategies to lower energy bills for vulnerable households.

- How can flexibility be designed as described in het RAP¹ report?
- Can social tariffs combine price protection and participation in flexibility?
- When heat pumps are installed in social housing units, today, do they have already easy and stress-free steering installed, ready for the future to use?
- How can landlords from private rented houses be stimulated to renovate towards energy efficient houses and electric heating?
- How can the benefits from flexibility within an community be re-distributed?

7. Examples of initiatives paving the way to inclusive flexibility for vulnerable households

As described in section 5 - *How can we start to make flexibility inclusive* - the following puzzle pieces are necessary to make flexibility more inclusive in the future.

- A. First and foremost, households must have access to the necessary assets. Solutions to provide households with these assets could be amongst others leasing, or pre-financing the assets or energy-as-a service solutions.
- B. Rented houses should also be equipped, faster than currently, with the necessary assets. Especially vulnerable households often rent their houses.
- C. Smart and automatic steering of the assets is needed to provide stress-free access to flexibility without the pressure to give up comfort in exchange for a lower energy bill.
- D. Outsourcing flexibility to an expert party can provide stress-free access to flexibility combining maintenance and monitoring and lower energy bills.
- E. We should make sure that the price protection given to vulnerable households - like social tariffs for energy – remains, while combined with the possible benefits of flexibility. Electricity tariff schemes should be designed so that they combine both.
- F. Lastly, for vulnerable households who are not able to offer flexibility, solutions can be provided which directly lower the energy bills of an entire community, including the vulnerable households who may not own the necessary assets themselves.

Below you will find some examples of these puzzle pieces. The mentioned initiatives are not necessarily designed for vulnerable households or might today even only being implemented at non-vulnerable households. But all together these examples form puzzle pieces that we can use to shape inclusive flexibility.

¹ <https://www.raponline.org/knowledge-center/flex-ability-for-all-pursuing-socially-inclusive-demand-side-flexibility-europe/>

A. Helping vulnerable households to gain access to the assets that allow use of flexibility

- a. **Leasing of installations or energy-as-a-service** contracts are good practices because households do not need to have the budget to pay for the installation upfront and they are also often relieved of the burden of installing and maintaining the installations. Examples are leasing solar panels, heat pumps, batteries,...

[ECoob](#) is a citizens energy cooperative that installs solar panels for free at the homes of households who cannot invest themselves. In exchange Ecoob receives a fixed amount per month during 15 years. Ecoob retains ownership of the panels and relieves the residents. The households receive no income from the injection of electricity that is not used locally. Ecoob, as a citizens' energy cooperative, is a company that is not solely profit-driven but also pursues social objectives. This type of company will organize these services in a cost-neutral manner from their social goals, as opposed to private companies or publicly traded companies that primarily aim for profit maximization.

Several companies offer rental or leasing solutions for residential PV installations or home batteries. (E.g. Otova, EnergyVision, Savesmart, Futech). This has the advantage that households do not have to finance the initial investment. Households pay a fixed amount per month or a stipulated price for the electricity they use. Such formulas should always be evaluated critically as it is not certain that this will lead to a lower energy bill.

Various Flemish energy houses offer interest-free loans or loans with a very low fixed interest rate to make investments in PV systems and/or home batteries possible for vulnerable households. These formulas are often much more financially attractive than the ones offered by companies like EnergyVision. However, vulnerable households often do not find their way to these solutions and are also wary of (additional) loans. These families need intensive guidance to realize such projects. Here lies a significant task for the government and energy houses to allocate the necessary attention and resources for this target group.

[Noven](#) is an ESCO company, that offers leasing for geothermal drilling and heat pump installations for newly built residences. For detached homes, they make this financially feasible by leasing the heat pump for a fixed monthly fee smaller than the savings realized. In addition, customers receive an omnium warranty. For larger buildings or multi-story residences they also offer management and monitoring in energy as a service contract. Even though Noven does not aim at the market of vulnerable households this principle could possibly be adopted for individual houses, this as well could be an interesting solution for social housing companies to speed up decarbonization of social housing by using private initiatives with if needed some guarantee offered by the social housing companies

[Non-Energy](#) offers energy as a service for the installation of heat pumps in private homes for a fixed monthly fee. Monitoring and control is provided by them. Customers receive a full-omnium service contract throughout the entire period.

[Octopus](#), originally was a small energy supplier that originated in the UK and is now active in Germany, the US, Japan, Spain, Italy, and France. As a small supplier, they have significantly expanded their supply model with an offering of heat pumps and EV chargers. Octopus also offers numerous plans to significantly reduce the cost of heat pumps.. By streamlining the installation process, training engineers, creating a more efficient supply chain with lower material costs, etc. they are able to offer heat pumps at similar cost to a gas boiler for most homes.

- b. **Pre-financing** an energy efficient residence: An energy efficient residence is often a first step to participate in private flexibility. For example : Heat pumps can only be installed efficiently in an energy-efficient home. In addition, it is also easier in an energy-efficient building to slightly postpone or shift consumption for heating. The building can act longer as a buffer.

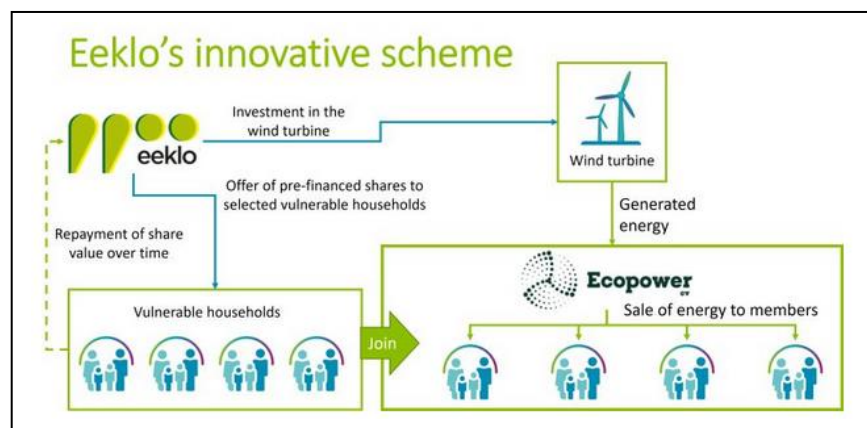
“[Gent knapt op](#)” is a project in which the renovation of homes of vulnerable households was pre-financed by the municipality. The initial financing received for renovating the home only needs to be paid back when the building is transferred to a new owner (upon death or sale). When a surplus value is generated when the property is sold there is an opportunity to pay a compensation or interest on the financed amount. The payment of both the initial financing and its compensation is thus postponed until cash flow is available, notably when the property is sold. Meanwhile, these households already live today in a more comfortable renovated home.

B. Dealing with split incentives in the tenant-landlord relationship.

- a. Energy as a service is also a good solution for tenants if the savings in energy are sufficient to pay back the investments of the installation and preferably simultaneously reduce the energy bill for the tenant. The examples shown in the previous point also apply here.

[Ecopower](#), a citizens energy cooperative, is organising a group purchase for solar panels in [Eeklo](#). With an additional innovative approach, this group purchase will also be accessible for solar panels on roofs of rental properties. This project is e result of the [Power Up Project](#), where the city of Eeklo joined in the investment of a cooperative wind turbine and redistributed these profits towards the socially vulnerable households of the city. It’s a beautiful

example of collaboration of a citizens energy cooperative with a local government to attend needs of vulnerable households.



- b. If the landlord is willing to invest in assets required for energy efficiency or flexibility, the benefits can be contractually shared between tenant and landlord

[Brussels region](#) provides standard contracts that can be used between landlord and tenant e.g. when installing solar panels

- c. Leaseholds of unoccupied properties can be used to renovate and rent residential buildings to vulnerable households E.g. [Renovassistace](#) acquires a leasehold for 20 à 30 years on an unoccupied property. Renovassistace will renovate the property and rent it out during this period via a social housing agency thus recovering the renovation costs. At the end of those

20 or 30 years, the owner will receive full disposal of his property, which has since been renovated.

C. Reducing the electricity bill using fully automated 'smart control' solutions

A house and its renewable energy installations can be designed in such a way that it is possible to have a time buffer between the moment electricity is consumed from the grid and the moment it is really used by the household. For example, a battery or a larger hot water tank (in addition to a well-insulated home). Important is that smart and automatic control is present. This smart control should mainly ensure that the household does not have to worry or have more stress but still gets a lower electricity bill without sacrificing comfort.

The monitoring, maintenance and updates of this smart control can optionally be provided by a third-party service provider.

[Bliq](#) provides a smart battery control system. It automatically charges the battery when the electricity price is low or when local solar power is available and automatically discharges it upon consumption when the electricity price is high. They offer software for a fee that also allows you to offer your services - through an energy supplier - in the imbalance market

[Thermovault](#) provides a module with self-learning algorithms to optimise the energy flows of electric water heaters, storage heaters and heat pumps. The smart control of these devices also enables to lower energy bills. Their solution increases device efficiency and improves the way the device is used. As a result, the device operates at a lower cost while maintaining your comfort.

D. Outsourcing flexibility to a third party

Thermovault offers ESCO contracts to social housing companies and central heating plants with larger sanitary water buffers, where the flexible control of these buffers is optimized by Thermovault. The contracts include SLAs that guarantee the profitability of this optimization..

[SEDS](#) is short for Sustainable Energy Distribution System. SEDS is an example where a central boiler room in an apartment building is combined with decentralised domestic hot water boosters that are, however, electrically powered and controlled centrally. With buffer tanks, peak shaving and net levelling, SEDS limits the purchase of additional energy. Currently, SEDS is only used in newly built flats, but could also be used in social housing as a renovation in the long run. SEDS also offers energy-as-a-service, providing financing, dimensioning and maintenance, and then also takes on the role of organising the flexibility.

PowerShaper is a service from [Carbon Co-op](#) which will allow households and small businesses to contribute to grid operations by responding to requests to turn on and off appliances at specific times in specific locations. Carbon Co-op will install equipment which will enable certain existing electrical appliances (such as electric vehicle chargers, heat pumps, immersion water heaters, battery storage) to be turned on/off remotely. They will turn things on/off when they receive a request from grid operators.

E. Combining flexibility with price protection mechanisms like social tariffs

In the Spanish initiative [The Bono Social de Electricidad](#) , social support is layered on top of a flexible retail tariff to form a de facto flexible social tariff. Households have a flexible tariff depending on the time of day. Social support is given in the form of a discount (a percentage depending on the social situation) on the total amount of the billed electricity. The tariff is notable for offering price protection to low-income and vulnerable households while maintaining opportunities for flexibility savings and participation in smart retail offers.²

F. Socially distributing the benefits of flexibility across a larger community

[Klimaan](#) installed solar panels on roofs in a social housing area in Otterbeek. Through an energy community, the solar energy is distributed to the tenants of this neighbourhood. This way, tenants without a PV installation can still benefit from cheaper solar energy.

[ECoob](#) established an energy community precisely to provide solar energy to vulnerable households. The vulnerable households do not own a PV installation but Ecoob owns PV installations on other locations. The solar power that is not consumed locally from these PV installations of Ecoob is then distributed to the vulnerable households through the energy community.

² <https://www.raponline.org/knowledge-center/flex-ability-for-all-pursuing-socially-inclusive-demand-side-flexibility-europe/>