



# WHAT CLEAR 2.0 PROJECT TAUGHT US: RESULTS AND RECOMMENDATIONS



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 749402.



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## Introduction

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This paper is published as part of the CLEAR 2.0 project and presents results, recommendations as well as lessons learned from this project. CLEAR stands for enabling Consumers to Learn about, Engage with and Adopt Renewables.

CLEAR 2.0 was a project by European consumer organisations to advise and support consumers who want to produce electricity and heat from renewable energy sources in their households. The project was funded by the European Union Horizon 2020 research and innovation program and ran from September 2017 to February 2020.

As energy prices go up and costs for renewable energy technologies decrease rapidly, consumers are increasingly installing renewables energy systems at home. Apart from contributing to climate protection, using renewables at home can considerably cut households' energy costs. But when consumers want to generate electricity in their homes, they often meet obstacles, among which not knowing who to turn to for independent advice.

### **CLEAR 2.0 involved 6 national consumer organisations:**

- Test Achats/Test Aankoop (Belgium)
- Altroconsumo edizioni (Italy)
- OCU ediciones (Spain)
- DECO Proteste (Portugal)
- dTest (Czech Republic)
- Mipor (Slovenia)

### **It also included:**

- International Consumer Research and Testing (ICRT)
- The European Consumer Organisation (BEUC)

## 1. What did we do?

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- **Got better understanding of consumers' motivations and main triggers to change their behaviour** by conducting online interviews.
- **Tested what makes consumers use energy more efficiently** by monitoring a group of households, providing them with information and equipment.
- **Helped consumers make better informed choices** by assessing the performance of renewable systems and making this information accessible to more households through new online tools.
- **Accompanied the consumer to buy cheaper and smarter** through group purchases.
- **Contributed to more ambitious national and EU energy policies** where we advocated for easy and fast administrative and permit processes as well as for one stop shops providing consumers with information and personalised advice.

The technologies we covered were:

- Pellet stoves
- Heat pumps for cooling and heating
- Photovoltaic panels, inverters, and installations performance
- Domestic batteries
- Systems to improve self-consumption and energy efficiency
- Systems to monitor energy consumption

## 2. Policy recommendations

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To ensure consumer concerns and needs take centre stage during the implementation of the Clean Energy for All Europeans package and in upcoming legislative initiatives under the European Green Deal, we call on EU and national policy makers to take into account the following recommendations:

## 2.1 *Avoid frequently changing the relevant legislation/taxation*

Regulatory instability, such as the tax on sun in Spain,<sup>1</sup> changes in taxation, legislation and policies on renewable energy, such as prosumer network tariffs, undermine consumer trust and cut their appetite to engage in renewables. Consequently, consumers tend to wait choosing renewable energies until there is more clarity on regulation and taxation.

### **RECOMMENDATIONS:**

- **Ensure stable and clear regulatory and legal framework.**
- **Avoid retroactive changes in incentives for renewable energy.**

## 2.2 *Ensure consumers can easily access financing*

Making a return on one's investment is a decisive factor. While the cost of some renewable energy has tumbled, consumers still struggle with the upfront installation costs and traditional financial solutions are not addressing this hurdle. The administration involved can also be complex and make it difficult to access funds. In some countries, there are no viable financial products available to consumers.

### **RECOMMENDATION:**

**A variety of financing options should be available to households: affordable and well-designed green loans (including payments by instalments), public funding for emerging technologies as well as tax incentives and 'pay as you save' schemes. Consumers should be able to access the right type of financing that works for them. This is particularly important for lower income households.**

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<sup>1</sup> The so-called "tax on Sun" was a charge that households had to pay when they installed a photovoltaic panel but remain connected to the traditional electricity grid.

### **2.3 Make better deals more widely available**

Consumer organisations under the CLEAR 2.0 project tested a number of technologies and organised 17 group purchase campaigns. By signing up to these campaigns, consumers could get not only reliable advice and renewable energy technologies for a better price<sup>2</sup> but consumer organisations also negotiated better conditions such as extended warranty or the first visit of the technician for free to evaluate the feasibility of the installation. CLEAR 2.0 collaborated with certified installers so all in all, consumers received service they can trust.

#### **RECOMMENDATIONS:**

- Consumers should have access to services that are reliable and well-designed. Legal and technical assistance and good after sales conditions negotiated by consumer organisations make it easier for consumers to switch to renewables.
- Group purchases and negotiated advantages can lower the costs for consumers. However, group purchases of renewable technologies are difficult to sustain for consumer organisations in the long run and additional funding in this area will be needed.

### **2.4 Provide consumers with clear, reliable and granular information on their energy consumption**

Smart meters are being rolled out across Europe at different speeds. They can help consumers to better understand their energy consumption and control their energy bills. However, smart meters providing only one's total consumption, or instant consumption, are not helpful. The consumer needs to know the consumption of an appliance, which appliances cost the most to run and what are the alternatives that could help them to save energy and money.

#### **RECOMMENDATIONS:**

- Consumers should have access to and control all the data generated by the smart meter.
- Consumption information should be communicated to consumers via an interface of their choice. It should be visually attractive, simple and granular enough (i.e. per appliance).

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<sup>2</sup> For instance, during its campaign on air conditioners, Altroconsumo edizioni negotiated a 45% discount on all their appliances and a 50% discount on the tested models compared to traditional market prices.

## **2.5 Nudge consumers through education and awareness campaigns**

Consumer organisations have been providing consumers with behavioural tips such as how to correctly use electrical cooking plates, optimising the use of appliances like washing machines, tumble dryers or fridges, making savings via eco-mode and providing tips on equipment replacement with personalised return-on-investment scenarios (e.g. on dishwashers, cold appliances or hot water boilers). Consumers could also profit from advice on smaller size investments (such as for extra insulation and timers for electric boilers which leads to high savings) as well as from tips on how to shift their energy consumption.

### **RECOMMENDATIONS:**

- Raise awareness among consumers so that they better understand their energy consumption and how to be more energy efficient.
- Illustrate to consumers the return on their investments. Consumption of major appliances will allow consumers to consider alternatives and calculate by when the replacement would pay off.
- Provide consumers with consumption information in a user-friendly format, accompanied with actionable tips and alerts.
- Facilitate personalised tips on how to save energy such as via behaviour change, small investments, equipment replacement or bigger investments which are particularly effective.

## **2.6 Improve information on and energy efficiency of appliances**

Tests of heat pumps under CLEAR2.0 revealed that the Energy label is not fit for purpose and needs to be adapted as it does not currently reflect real life use conditions. Concretely, it means that the devices are less efficient in real life than what is claimed on the Energy label, which is misleading for consumers. Also, out of 160 models tested, 90 did not have information regarding the warmer conditions which means consumers in warmer climate do not have suited information. At the same time, we observe based on CLEAR 2.0 testing results that there is technological room for setting stricter energy efficiency requirements to allow for improvement towards higher efficiency appliances in the future.

**RECOMMENDATIONS:**

- Consumers should receive real life use consumption information of their appliances via the well-known Energy label.
  - The revised Ecodesign and Energy labelling measures should improve the calculations of the final energy indices, SEER (cooling) and SCOP (heating).
  - Only class A (the most efficient class) should be empty at the introduction of the new label to incentivise manufacturers to design more efficient appliances. Products should then be spread among all the other classes to ensure consumers can differentiate between different products and technologies.
- The European Commission should set stricter Ecodesign energy efficiency requirements for both the heating and cooling mode, and monitor energy consumption of heat pumps for future revisions.

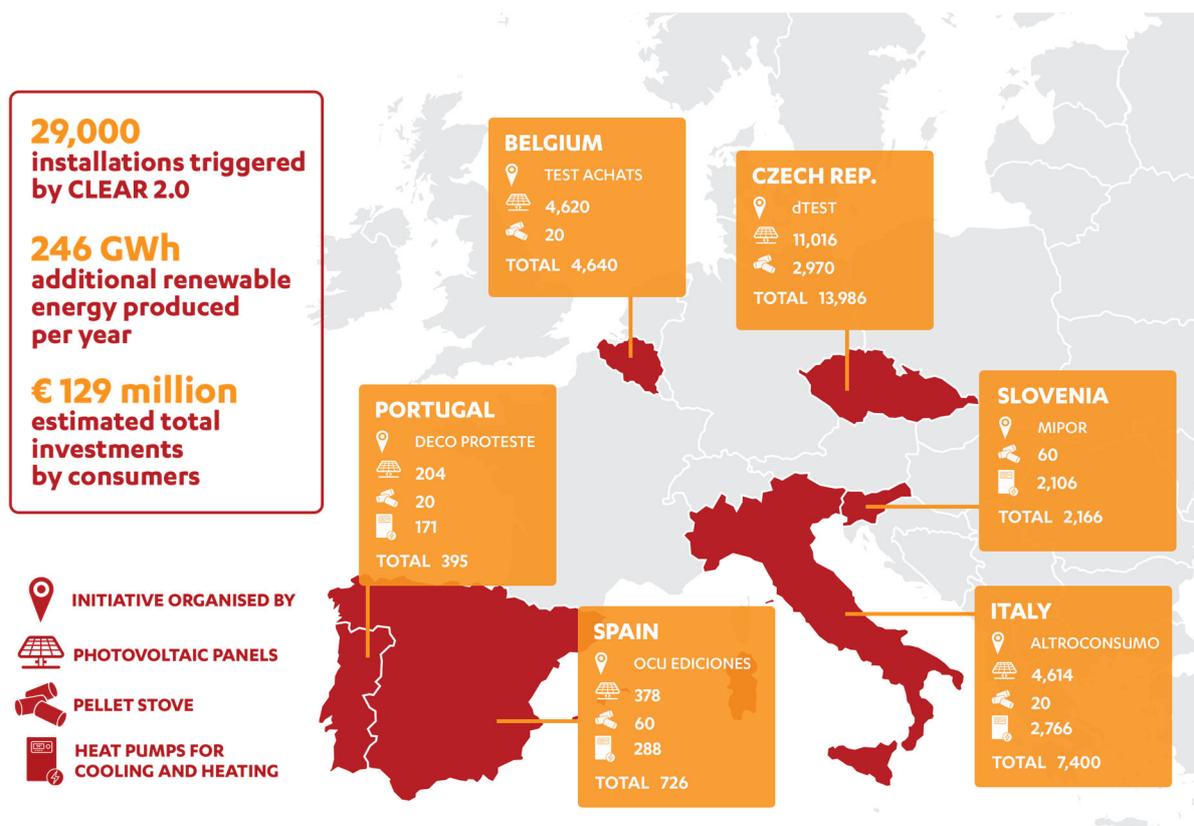
### 3. Results

CLEAR 2.0 group purchases triggered more than 29,000 installations of solar panels, pellet stoves or heat pumps for heating or cooling in households. The vast majority of installations were solar panels (71%), followed by heat pumps (18%).

Consumer organisations have been raising awareness and providing testing results on above technologies in more than 80 magazine articles.

Thanks to CLEAR 2.0, consumers are now producing an additional 246 GWh of renewable energy per year, the equivalent of doing 15 thousand laps around the equator by car.

Households participating in CLEAR 2.0 achieved cumulative savings of 255 MWh/year and managed to directly use 26 MWh/year renewable energy they produced at home. This means cumulative savings of 97t CO<sub>2</sub>/year, which is the equivalent to the CO<sub>2</sub> emissions saved in one year by planting over 16,000 trees.



## 4. Clear 2.0 in action: case studies

### 4.1 Portugal

Portuguese consumer organisation, DECO Proteste, carried out a study on the habits in terms of energy consumption in households in Portugal, identified a number of different household profiles and selected families to participate to the project based on these profiles.

DECO Proteste first did an energy audit of the households that accepted being involved in the project, installed advanced energy monitoring equipment, studied the energy consumption, with a strong focus on electricity and space heating. DECO Proteste also provided tailored recommendations mainly on stand-by mode, hot water and space heating.

A very simple behavior change that can bring very important energy savings is **unplugging appliances, rather than keeping them in stand-by mode**. Consumers tend to underestimate how much energy is used by appliances in stand-by mode and generally do not pay attention to it. The 15 families that put in place this very simple measure achieved average **savings amounting to 309,016 kWh/year – €160 per year**.

The profile that achieved the largest average savings was that of a household switching from a central gas heater to an electric air conditioning source, which cut its **energy expenditure by 81%**.

The households that achieved the lowest energy savings were those already using renewable energy technologies, in one case paired with batteries to store the excess electricity that was generated by the solar panel. This shows that relying on efficient and renewable technologies can, by itself, result in low energy bills.

Overall, DECO analysis shows that, if all Portuguese families adopted DECO's advice, **Portugal could achieve 5.5 TWh of energy savings, which represents 29% of Portugal's total residential energy demand** (i.e. not only consumption of electricity in households, but also of gas, natural gas and LPG).

### CASAS DESLIGADAS DA TOMADA

Entre janeiro e março deste ano, medimos os consumos em stand-by de 15 famílias do projeto Clear 2.0, no qual a DECO PROTESTE participa com mais cinco países europeus. Ao seguirem os nossos conselhos, reduziram o consumo de eletricidade em stand-by. Mas as famílias não são todas iguais. Identificamos três perfis.

- PERFIL 1** É a típica família portuguesa: sem energias renováveis e que ainda recorre a equipamentos portáteis de aquecimento e a lareiras abertas.
- PERFIL 2** Lareiras com recuperador de calor e ar condicionado, opções baseadas em energias renováveis, já integram as opções deste perfil. Corresponde a cerca de 1 milhão de casas portuguesas.
- PERFIL 3** Adota um sistema fotovoltaico e outras fontes de energia renovável e tem viatura elétrica. É marginal no território português.

## 4.2 Slovenia

Mipor ran a successful group purchase of air conditioning units. The organisation's **initial goal of 100 direct** (and 200 indirect) installations of air-cons was by far surpassed, as **more than 600 devices were installed** within the group purchase scheme. Although this was the first technological group purchase carried by Mipor, they built upon the previous learnings of running successful consumer/group purchase campaigns. The diversification of the marketing mix proved to be the key issue of attracting a vast mass of prospects. This enabled Mipor to communicate efficiently the goals of this Horizon 2020 project, energy efficiency and renewables with the identified target group, with a basic interest in the topic.



Overall, **632 air conditioning units were installed in the context of the group purchase, which is estimated to represent 5% of the total annual installations of air conditioning units in Slovenia.**

However, it is important to note that the first tender by Mipor, targeting air conditioning units' distributors as partners, was unsuccessful. All the meetings resulted in an unwillingness to cooperate because of the level of discount that Mipor asked, of the uncertain volume and of the timing, which was colliding with their annual peaks in sales. The second tender targeted retailers and took place at the beginning of the year (i.e. outside the summer installation peaks). The offer Mipor received from the retailers was within the range of their expectations, even if a lesson learnt is that the amount of effort required by the installation of the air conditioning systems was underestimated.

In addition, Mipor observed some negative reactions from the distributors and installers that did not participate to the group purchase scheme. The installers complained to their distributors that the prices of two models were simply too low. The distributor thus decided to cut off the supply to the retailer Mipor was working with and even threatened not to provide any technical assistance to customers' who bought air conditioning units without his knowledge. Because of this dispute and the high volume of orders, the installation of the air conditioning units was delayed. Most of the consumers did not object to the delay, but some expressed a high degree of dissatisfaction, which was also noted in the post-purchase survey that was executed.

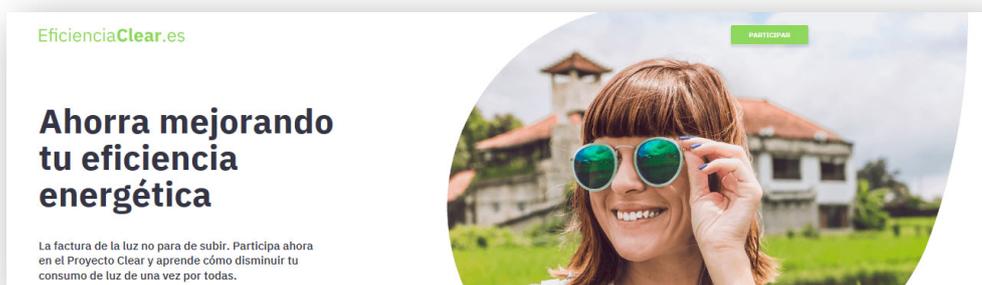
Another learning is that **the consumers that participated to the group purchase scheme were consumers that already had the intention of buying an air conditioning unit but were lacking enough information** on how to pick a quality, energy efficient device. The fear of making a wrong purchase was overcome as they trusted the consumer organisation.

### 4.3 Spain

In Spain, over 99% of the electricity meters currently installed are smart meters, which potentially enables electricity companies to already provide energy advice to their customers.

OCU ediciones worked with Lucera, an energy supplier, which used the energy consumption data that they collected to provide personalised energy advice to more than 650 families in Spain. On average, the families involved in the project reflected the typical size of a Spanish household, as they were composed of 4 people, living in a home between 70 and 90 m<sup>2</sup>.

All in all, the families who followed OCU's recommendations were able to achieve significant savings. **Behavioural measures and those involving small investments lead to average savings of €755 per household. All the recommendations that OCU provided, which were related to electricity, heating, hot water and self-consumption of solar energy, led to €1,590 savings per household.**



OCU calculated that, if the energy recommendations followed by the families involved in the project were adopted by all the families in Spain, this would lead to total savings in households bills of **€2,500 million.**

The recommendations that were the most followed were related to **how families light their homes. Switching the light** off when leaving a room led to cuts in the energy consumption linked to lighting of up to 25%. **Replacing incandescent light bulbs** with newer LED ones led to 80% savings. The recommendation of **making the most of natural light** and avoiding switching the light on, if unnecessary, led to up to 25% savings.

The families involved in the project also responded well to the recommendation of **avoiding keeping their homes' windows open for too long**. By keeping the windows open for not more than 10 minutes, all the air in the room will be replaced, but that walls and furniture will not be cooled. Following this advice, once the windows are closed, the heating system will only have to heat the new air that entered the room and not also the walls and the furniture.

The recommendations that were the least followed by the families involved in the project were related to the installation of **solar energy systems, both photovoltaic panels and solar thermal installations**. The reason is that, despite some improvements, **Spanish legislation does not foresee clear incentives to self-consumption of renewable energy**. Historically, owners of solar panels could pay a "tax on sun", which discouraged many families to install them. This tax has recently been lifted and the current legislation also allows for net metering of electricity. However, the regulation is still not perfect, as those consumers who produce their electricity are not yet compensated for the electricity that they provide to the electricity grid.

Families also tended not to follow the advice of replacing their old fridge, even this may lead to annual savings of €30 to €35. The reason why these recommendations were the least popular is the **significant initial investment**, which many families could not afford.

#### **4.4 Belgium**

More than 10% of Belgian households already have a photovoltaic system. As of 2020, the net metering support scheme has been suppressed in Belgium. For this reason, one of the focuses of Test Achats/Test Aankoop was to understand to what extent behavioral change with no investments could help increasing the direct use of PV produced electricity and cutting energy bills.

**Hot water heating represented 13-38% of the annual energy consumption of the families that were monitored, hence boilers were Test Achats' primary target.**

First, Test Achats/Test Aankoop recommended the families to apply extra insulation on the boiler's external surface, for a cost of 30 euro. This measure resulted, on average, **in an annual reduction in the energy costs of €135, due to a heat loss reduction of up to 75%.**

Second, Test Achats/Test Aankoop recommended to switch the boiler on during the production peak of the PV system, to increase self-consumption, by using a timer worth €15. This resulted in an annual increase of self-consumption of 13%. If we consider that the families which installed a battery reached an increase in self-consumption amounting to 22%, installing a cheap timer proved to be a very impactful and cost-effective measure.

Test Achats/Test Aankoop also raised awareness of appliances' consumption in **stand-by mode**. The consumption of appliances left in stand-by mode by the families involved in the project was quite significant – roughly between 50 and 300 Watt. The families were recommended to connect their appliances to a timer, automatically switching them off for 18 hours a day.

**This measure resulted in significant energy savings and, if all Belgian families decided to adopt it, the overall annual savings would be 528 GWh.**

One of the challenges of consumers is to have a clear picture of each of their appliances' annual consumption. **Providing information about the consumption of each of their appliances** helped the families involved in the project making better decisions on their replacement, as they were able to estimate the return on the investment.



The appliance replacements that resulted in the biggest savings were concerning fridges and freezers. Replacing a fridge resulted on average in 360 kWh annual savings, replacing a vertical freezer in 390 kWh savings. These figures are close to 10% of the annual average electricity consumption of a Belgian family.

Test Achats/Test Aankoop was able to demonstrate that the combination of all measures could result in huge savings. One of the families involved in the project was able to save a whopping €542 per year, which represented a 10% reduction in their energy bill. This family could save another 20% extra with equipment replacement and boiler insulation.

Test Achats/Test Aankoop also provided the families involved in the project with other kinds of recommendations, including behavioural measures (i.e. closing doors, turning the lights off or using the dryer less), replacing electric heating appliances with pellet stoves and installing solar panels.

## **4.5 Italy**

In the context of the CLEAR and CLEAR 2.0 projects, Altroconsumo edizioni **tested 57 wood pellet stoves, with a focus on their quality, safety, comfort, convenience, and performance.** In the context of CLEAR 2.0, Altroconsumo edizioni also tested **pollutant emissions – especially ultra-fine particles** – from several biomass heating appliances **in real use conditions.**

During the testing carried out in the context of the CLEAR project, Altroconsumo Edizioni noted that thermal safety conditions were not met in 8 out of the 36 appliances tested. Thanks to Altroconsumo's advocacy work, **the appliances tested in CLEAR 2.0 had safety problems only in**

**3 cases (out of 21).** The learnings from the project were taken into account and included in the updated CEN standard on “Residential solid fuel burning appliances” (FprEN 16510).

Similarly, also pollutant emissions have improved in the second round of tests. In parallel Altroconsumo edizioni has investigated pollutants **in real use condition** for biomass appliances. The tests highlighted that **automatic wood pellet appliances have steadier and better controlled combustion conditions** compared to batch-wise heaters.

Automatic wood pellet stoves also have **lower emissions of incomplete combustion products** (CO, OGC, and TSP) compared to firewood appliances, while on the other hand, they have **slightly higher NOx emissions**.

During the **past 5 years, biomass heating appliances reduced their pollutant emissions by 4 to 8 times**. The appliances that improved the most are wood appliances, which are, however, still the worst in terms of dust pollutant emissions.

Altroconsumo’s investigation suggested that **Ecodesign should tighten dust emission limits in real use conditions and should introduce ultrafine particle matter emission limits for wood heating appliances**. For wood pellet stoves, tighter NOx emissions limits should be introduced.

CLEAR 2.0 was also able to shed light on **consumers’ behaviour vis-à-vis differently shaped financial incentives to purchase renewable technologies**. In Italy, the same type of product (for instance, a heating and cooling appliance), was eligible for two different incentive schemes. One scheme - “**discount on invoice**” – was connected to **higher initial savings, but to a total cost that is 20% higher** than the ten-year tax deduction incentive already in force for several years. Altroconsumo edizioni discovered that consumers were more likely to accept a higher initial discount, even if this meant higher total costs.

The new incentive scheme was certainly appealing for consumers, however it created some market distortions. The new scheme granted an initial discount on the purchase and installation of new appliances amounting to up to 65%. This discount was provided by the companies installing the appliances and recovered over 5 years, thanks to tax breaks for consumers, which were automatically passed on to the companies.

As this meant that companies were able to fully recover their investment in 5 years, only large energy companies were able to bear the 65% price discount. These large companies were able to influence the market, forcing the upstream supply chain (building companies, installers, appliance manufacturers) to agree on their terms and conditions, considerably reducing the variety of the offered products and the quality of the installation, as they used networks of installers who were not anymore responsible for aftersales assistance.

Altroconsumo edizioni fed into a public consultation on the impact of fiscal policy measures on energy efficiency, providing the Italian government with evidence on the impact of the discount on invoice scheme and asked for its revision as to avoid market distortions.

The new 2020 Budget Law took Altroconsumo’s recommendation into consideration and put a threshold of €200,000 on the application of the “discount of invoice” mechanism, which is now applicable only in case of deep energy renovation of a building.

## 4.6 Czech Republic

dTest organised a successful group purchase of photovoltaic panels under the CLEAR 2.0 project. The campaign ‘I Want Solar Energy’ ([www.chcislunecnienergii.cz](http://www.chcislunecnienergii.cz)) was launched at the end of January 2019 and exceeded dTest’s expectations, both in terms of registered participants and dissemination of information related to the production of solar energy on premises. 14,556 participants registered to the campaign.

The campaign helped to increase awareness about the photovoltaic technology and its benefits for households. Even households who decided not to purchase photovoltaic panels (e.g. due to low consumption or technical problems) became interested in the possibility of sustainable energy sources for their own consumption.



The winning supplier expects 200 installed PV plants throughout the project. The expected installation number is in line with dTest expectations. The auction happened on a voluntary basis, that is, the consumer can think about the power plant until the last moment – until he signs the contract. Should the subsidy not be awarded during the project implementation, the applicant may withdraw from the contract completely free of charge and all advances paid up to that point would be returned.

In the next step, while implementing photovoltaic technology, dTest experienced various technical complications. For example, when the measurement took place, the service provider found that some roofs were not suitable for the construction of a photovoltaic panel due to the size, slope or type of covering. Or, household consumption may not be adequate to operate the photovoltaic panels with a reasonable return on investment.

The most frequent choice of customers in the project “I want solar energy” was the combination of a photovoltaic power plant with a CEZ Battery Box. Average total price of PV panels without VAT and without the subsidy was 340,877 CZK and average installed capacity was 4,76 kWp.

While the installation of photovoltaic panels is ongoing and will continue in 2020, the campaign clearly showed that Czech consumers are interested in renewable energy and value the service of a credible partner.

## 5. Technologies covered in CLEAR 2.0

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### 5.1 Photovoltaic technology

The technology with the greatest potential for consumers when it comes to a return on investment remains solar panels.

The CLEAR2.0 project tested 30 types of panels and inverters (which convert variable direct current (DC) into alternating current (AC) that can be fed into a commercial electrical grid or used by a local, off-grid electrical network).

For solar panels, the project partners tested several factors in both indoor and outdoor conditions:

- a. Their ability to stabilise output because of varying weather conditions (power stabilisation),
- b. Their maximum power,
- c. Whether the panels contained cracks and micro-fissures (electroluminescence) or leaked water which can affect their electrical supply.

For inverters, the project partners also carried out:

- a. Efficiency test measurements,
- b. Their consumption on standby mode.

What emerged was that there were mismatches between the real power output of the panels and what was written on the label. 20% of the panels tested had 5% less power than what was claimed. Transport of the solar panels is too often a problem. Much of the damage which occurs and which might even be invisible to the naked eye is often caused by damage which occurred during transport.

The partners also found that, for the residential sector, distributors did not have the capacity or the means to carry out quality control when the solar panels arrived at their destination. Consumer organisations have felt that the same practices which benefit utilities and businesses should be applied to household consumers in order to limit the gap in quality. There is a feeling that consumers are not treated with the same fairness as industrial users because consumers' solar panels are likely to carry more defects.

### 5.2 Batteries for solar panels

The project partners analysed how profitable batteries were for domestic storage. They took into account the end-of-life and refurbishment cycles of the batteries.

The partners found that lithium ion was the most available technology because of its use in electric cars but that it wasn't necessarily the most interesting technology for households. Although they

are available, dense, require no maintenance and their price is decreasing fast, their profitability is uncertain, there are safety hazards and there is no recycling process which is profitable.

The test revealed that the price of a battery should be lower than €250/kWh to be profitable. In no country is it currently advantageous to own a battery for households. In Belgium, the return on investment for a lithium ion battery is 30 years. In Portugal, the return on investment is around 13 years. In Italy, the return on investment is around 8 years if the government's support schemes are retained.

The project partners found that battery storage should be done centrally and only locally when absolutely necessarily. Batteries with a lower environmental impact than lithium-ion batteries should be favoured, such as lead-acid ones.

CLEAR 2.0 partners recommended setting up incentives to favour a second life for electric vehicle lithium ion batteries. The guarantee for such a battery should be 10 years for the main components and an inverter. At the same time, the recycling process for lithium-ion batteries should be regulated. Partners also suggested that authorities should support collective self-consumption programmes to reduce the impact of intermittent renewables on the local grid and to make smart meters profitable.

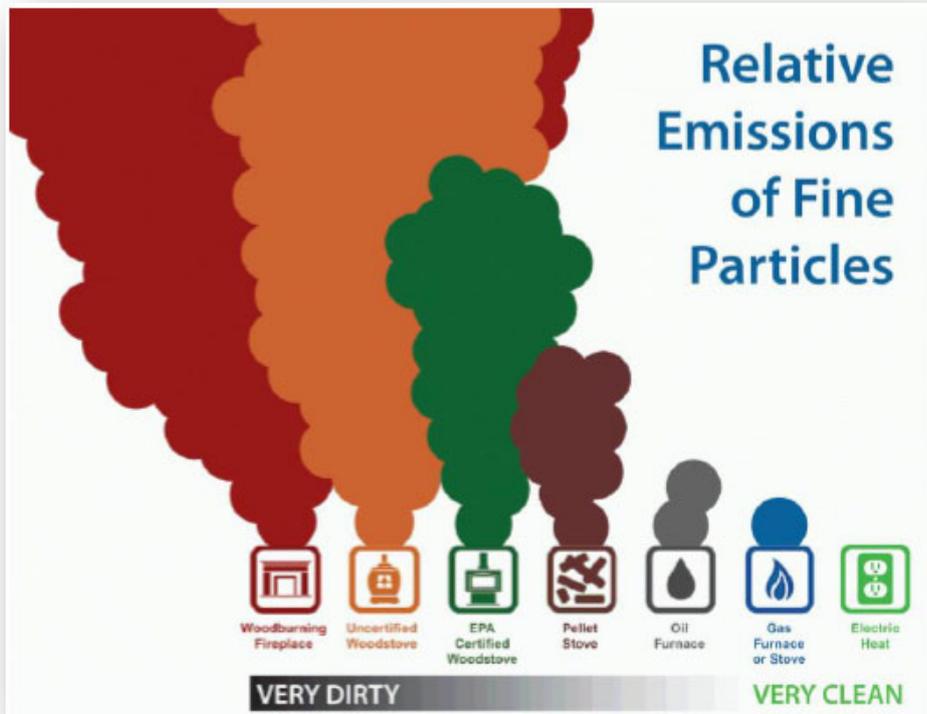
### **5.3 Pellet stoves**

The project partners carried out tests on 36 types of pellet stoves, with focuses on quality, comfort, convenience and performance. They also tested their emissions of ultrafine particles, which are the most dangerous for human health.

The tests revealed an improvement in thermal safety conditions compared to 2014-2017 when the project CLEAR ran. Back then, there were safety issues in 20% of cases. This had been halved to 10% of cases.

Pollutant and carbon emissions also decreased overall compared to 2014-17. Compared to firewood appliances, pellet stoves produced less dust emissions but their NOx emissions, on the other hand, were slightly higher.

In Belgium, Test Achats/Test Aankoop noted a clear improvement by market surveillance authorities in removing low-cost polluting stoves from the retail market.



#### 5.4 Heat pumps for heating and cooling

Under CLEAR2.0, the project partners tested nearly 160 different heat pumps. They tested several things:

- how efficient they were while cooling and heating,
- their capacity to dehumidify the air,
- their consumption on stand-by mode,
- their convenience,
- the distribution of air-flow,
- their temperature distribution,
- the time it took for the device to cool down or heat up,
- its noise,
- the instructions for use.

Consumers showed a lot of interest in the product tests, with over 1 million visits in three countries (Italy, Portugal and Spain) in one year.

Tests of heat pumps under CLEAR2.0 revealed that the Energy label is not fit for purpose and needs to be adapted as it does not currently reflect real life use conditions. The information on 90 of the models tested did not contain information about warmer temperatures even though they are sold in countries which have warmer climates.

Some older models consume too much energy when in stand-by mode.

All heating appliances are currently in the A and B categories of the rescaled energy label, which makes it hard for consumers to distinguish between different technologies and appliances.



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## **NOTES**





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