



## D8.6 | Written formulation of policy proposals

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### The project in brief

The European Union is further shaping its energy integration pillar, in the form of the EU Energy Union. It aims at fostering a cost-efficient energy transition able to deliver secure, sustainable and affordable energy to all European consumers. The Energy Union Framework Strategy laid out on 25 February 2015 embraces a citizens-oriented energy transition. The low-carbon transformation of the energy system includes the development of sustainable energy production and energy efficiency. Resting on five pillars (Energy security, solidarity and trust; a fully integrated European energy market; energy efficiency contributing to moderation of demand; decarbonising the economy; and research, innovation and competitiveness), it aims at enabling the delivery of the EU energy-climate objectives.

The main assumption of the ENABLE.EU project is that the successful implementation of the Energy Union and the EU objectives depends on energy production and energy consumption behaviours and the changing roles of household and business consumers, as well as on the policymakers. Those behaviours are heavily shaped by past, present and future individual and collective choices, whether they are related to the economic prerequisites, value systems, gender-based preferences, the efficiency of governance and the implication of civil society. As a consequence, the final aim of the ENABLE.EU project is to contribute to more enlightened, research-based policy decisions, to ease the finding of the right incentives for the reaching of the twin goals of successful implementation of the Energy Union and Europe's transition towards a low-carbon energy system of the future.

To achieve it, the project has focused on different themes. In the first phase, a theoretical research basis through a literature review was developed. Then, research was led thematically: first, economic and technological factors of energy choices with analysis of their effect on energy efficiency. As a next step, the research has focused on the analysis of social, cultural and behavioural factors of the energy choices and in-depth studies on mobility, prosumers, heating and cooling. Then at the governance level, the bottlenecks that hinder the transition were defined. The studies were supplemented by participatory foresight exercise in a form of workshops for stakeholders and households. The results of the latter have been used in a modelling exercise that helped to translate the microdata into macro scenarios. Those scenarios present a possible impact that the decisions of consumers might have on the development of the EU Energy Union.



# Introduction

### Policy advice to implement the European Green Deal

After three years of research led in eleven European countries (Bulgaria, France, Germany, Hungary, Italy, Norway, Poland, Serbia, Spain, Ukraine and the United Kingdom), the ENABLE.EU project comes to its end. Investigating energy choices in different energy areas, findings have identified ways forward for achieving the Energy Union and for overcoming the gaps in the social acceptability of the energy transition<sup>1</sup>.

These recommendations come at a decisive moment in Europe. After the election of new Members of the European Parliament in May 2019, the President-elect of the European Commission Ursula von der Leyen is composing her team with the European Green Deal as the top priority for the five years to come. Her ambition to make the European Union climate-neutral by 2050 represents a challenge that all policy-makers, companies, civil society organisations and citizens will need to embrace and work hand in hand to achieve. While progress is needed in all sectors of our economy, our research with ENABLE.EU delivers recommendations for the energy transition, which represents a large share of the required changes.

### How did we compile this list of recommendations?

The 76 recommendations compiled in this report come from research and workshops with citizens and experts. They are a selection from a list of 150 recommendations. We took out recommendations deemed not relevant when they were either too general, already implemented or that had very low probability of being implemented in the current political environment (e.g. measures that would not be accepted because too extreme or restricting individual freedom).

### For whom are these recommendations?

This report provides a compilation of recommendations that first focus on EU energy policy with most of them being targeted at EU institutions. However, many recommendations can also be implemented by national and local policy-makers, businesses and citizens themselves, and contribute to the making of the energy transition in Europe. Therefore, anyone interested in pursuing the energy transition can find measures to undertake in this report.

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<sup>1</sup> This research is summarised here but more extensive explanations can be found in the synthesis of the project (D8.5) and in the quoted deliverables (DX.X). They can all be found online: [www.enable-eu.com/downloads-and-deliverables/](http://www.enable-eu.com/downloads-and-deliverables/)

### What is in this deliverable?

This deliverable is composed of a policy brief, i.e. a short brief with key recommendations that is available for dissemination to policy-makers. The brief is followed by a policy report that is a long version of potential actions that details the findings and rationale behind each recommendation. The recommendations are organised by area of application, i.e. energy efficiency at home and in the industry, mobility, heating, prosuming and governance. Finally, a short list of actions that everyone – from citizens to cities – can implement at their level concludes the report.

# Policy brief

## ENABLING THE ENERGY TRANSITION IN EUROPE: POLICY RECOMMENDATIONS BASED ON ENABLE.EU FINDINGS

Europe is building its clean energy future. While European companies deploy new solutions and policymakers develop a new legal framework, it is essential to consider citizens' energy behaviours in the energy transition. The Horizon 2020 ENABLE.EU project attempts to understand the key drivers of individual and collective energy choices. At the governance level, we investigated energy policies and the challenges to perform the energy transition in European countries. We also looked at how companies react to energy policies and how citizens and households make choices in terms of electricity consumption and production, heating and mobility.

Based on research led in eleven European countries, this brief proposes a selection of recommendations to enable the transition towards a low-carbon future.

### Governing the energy transition

EU public authorities should:

- Set an example by implementing the sustainable actions they advocate: for example, renovating EU institutional buildings and switching to renewable energy suppliers, eliminating flights for short distances and developing a public fleet of clean vehicles.
- Develop a single online portal that provides:
  - European households with credible information in all EU languages about clean energy solutions, including solar panels, heat pumps, energy efficiency, etc. This could take the format of an application easily accessible on a smartphone.
  - European cities, regions and States with the possibility to share their experiences, develop partnerships and learn from one another in the field of energy transition policies (e.g. renovation, mobility, prosuming).
- Finance activities and provide tools to promote energy and climate education in schools. As a first step, the EU could implement such changes in the European Schools it funds (e.g. in Brussels where children of EU civil servants go).

EU and national public authorities should:

- Provide adequate training for professionals in the field of the energy transition (e.g. installation of heat pumps and solar PVs, energy efficiency jobs). At the EU level, this can be supported by adding a green component to the Erasmus Pro programme for apprentices.
- Ensure that human resources (e.g. in terms of length of contracts and when relevant, workload and remuneration) allocated to the management of national and local energy policies are consistent with the challenges of energy policy-making.
- Support the implementation of bottom-up approach and wider stakeholders' involvement in the design and implementation of climate and energy policies,



particularly in Central and Eastern European States, including with the aim to enhance the management of general innovation policies in these countries.

- Make direct links between SET Plan priorities and targets into the 2030 climate and energy framework, 2050 low-carbon framework and EU R&I Missions.

### Decarbonising the industry

The European Commission should:

- Further work with Member States and regions to provide retraining and adequate unemployment benefits for workers in industries that suffer from the energy transition. This can build on the experience of the Coal Regions in Transition Platform.
- Study how to direct energy efficiency policies at SMEs in order to exploit yet untapped potential for cost-efficient improvements.
- See how it could target energy efficiency policies and incentives for low-carbon equipment at new firms while they still have to decide upon which machines to buy.

### Energy efficiency in electricity and heating consumption at home

European and national authorities should:

- Steer funding towards the deep renovation of buildings, in order to achieve large-scale improvements in the energy efficiency of dwellings.
- Establish restrictions on the rental of dwellings with low energy efficiency ratings when there are public schemes helping owners to renovate the dwelling.
- Put a stronger emphasis on the promotion of renewable energies for heating (not only for electricity), with technologies such as heat pumps, biomass boilers and solar heating (e.g. through visible support schemes).
- Support cities in the organisation of community meetings (e.g. neighbours, networks, condominiums) to discuss best energy practices to save energy and provide positive feedback about behaviour change.
- Support the further development of programmes for local energy advisors to support energy-poor households. Trusted interlocutors can help households identify the available schemes that best address their situation. This could also be done through discussion groups for energy-poor households to share experience and seek support and could be a task of the EU Energy Poverty Observatory.
- While monitoring the proper implementation of the Clean Energy Package, ensure that consumption data on the energy bill are compared to the consumption of similar households or own consumption in previous periods.
- Steer EU funding, especially innovation, regional and cohesion funds, to support the uptake of innovative energy saving and energy conservation measures.

### From consumers to prosumers

The European Commission should:

- Further engage Member States to facilitate access to solar panels technology by reducing transaction costs (e.g. simplification of the bureaucracy, support in assessing the suitability of solar to the household's circumstances and in selecting the products and installers, minimisation of the burden linked to registration and monitoring of the systems) and by providing subsidies, especially for low-income households.
- Encourage public authorities and businesses to advertise energy technologies, such as solar panels, in a more diversified way to reach a larger audience, i.e. showing more women using the technology, underlining both economic and environmental aspects to also appeal to a public less interested in the technological dimension.
- Allocate EU funding to the creation of video games/apps to raise awareness of sustainable behaviours, such as prosuming. This could take the form of a mobile phone video game targeting specific groups, e.g. young parents or low/middle-income women, that may ease the transition to more sustainable behaviours, incl. prosuming.

National and local authorities should:

- Develop 'hands on workshops' for children and adults on how to use technologies to produce energy at home.

### Towards a low-carbon mobility

European Institutions, national and local authorities and companies should:

- Develop initiatives that encourage Europeans to try out sustainable behaviours, such as free public transport days, days without cars in city centres and electric car-sharing services.
- Invest more in clean public transport and trains (i.e. fleets and infrastructure).

EU and national authorities should:

- Introduce higher taxes on more polluting fuels. EU legislation should tax polluting activities like aviation.

The European Commission should:

- Propose strict rules for the advertisement of polluting products - e.g. gasoline and diesel cars. This could build on existing rules for other products that have an impact on health, such as tobacco.

National authorities, regions and cities should:

- Develop more projects that integrate public transport and transport sharing services (e.g. bikes, scooters, cars) in one application (i.e. Mobility as a Service).
- Provide incentives for users of private cars to switch to car-sharing services (as long as they do not foster a shift from public transport and soft modes to shared cars). Such incentives can be financial as well as non-financial incentives (e.g. access to faster lanes/bus lanes, easier access to city centre, reserved parking slots).



## Policy report

# 1. Governing the energy transition

ENABLE.EU research analysed governance bottlenecks and constraints faced during the design, monitoring and implementation of energy transition policies in nine European countries (Bulgaria, France, Germany, Hungary, Norway, Poland, Serbia, Ukraine and the United Kingdom). These processes are to a large extent country-dependant but the analysis also reveals many similarities across the countries (see D5.2 and D5.3).

According to desk research and interviews with national experts, policies and legislation related to energy transition are generally framed at the EU level and regulatory rules implemented in most countries are mostly elaborated in response to these EU requirements. This is valid for the “policy-takers” countries (here Bulgaria, Serbia, Ukraine) but often also for the countries in the middle (here Hungary and Poland) and for those considered as leading the energy transition (here France, Germany, Norway, UK). It produces or at least reinforces two spill-over effects at the level of national policy-making and implementation – the “stop-and-go” problem and the discrepancy between the top-down approach of the general policy-making and the bottom-up trends in the energy transition, seen as crucial for its success by many interviewed experts.

## 1.1 Aligning resources and policy tools with the level of ambition for a realistic achievement of the energy transition

Our research points out to a frequent scattering of responsibilities and competences, with inadequate allocation of resources and funding in the governance systems of the studied countries. The stop-and-go approach appears in many policies related to energy, for instance in the development of renewable energy where countries enact particular legislation concerning the development of renewables but at the same time delay important bylaw regulations and relevant procedures such as the delivery of permits and grid connections. Additionally, inconsistencies between ambitious commitments and actions can lead to a loss of trust in political claims and targets. Public support is deemed fundamental to the energy transition: when policies lose their credibility in achieving the targets, the consequence can be a lack of public trust in governments' energy and climate commitment.

In the case of energy efficiency for instance, virtually in all countries (with the exception of Norway) this policy is seen as a top-priority. In many of them though, the major concern is

the proper introduction and implementation of energy efficiency measures in the residential sector.

### *Recommendations*

- European institutions and countries should **ensure that long-term political, financial and social commitments are in line with priorities**, and actions that are realistic. The national Long-Term Strategies developed under the EU Energy Governance Regulation<sup>2</sup> can be used to reach such objective.
- National authorities should **improve dialogue in planning synergies at national, regional and local level** when designing energy and climate plans.
- EU and national authorities should **provide more resources for regional and local levels** to implement the required actions for the energy transition.
- EU and national public authorities should **ensure that human resources** (e.g. in terms of length of contracts and when relevant, workload and remuneration) allocated to the management of national and local energy policies **are consistent with the challenges of energy policy-making**. In several countries, the lack of qualified human resources and frequent turnover in the public administration is an institutional barrier and can contribute to the instability and delay of energy projects.
- EU public authorities should **lead by example and implement the sustainable actions that they advocate**. This can also improve the social acceptability of energy transition policies. This includes:
  - Commit at EU level to deeply renovate all EU institutions and EU agencies, in cooperation with local authorities to ensure that it feeds into local decision-making processes;
  - Eliminate flights for EU officials for short distances (e.g. inferior to 400 km);
  - Ensure that the entire car fleet of EU institutions switch to zero-emission cars within five years;
  - Ensure that all the goods acquired by public authorities have long warranty periods and can be easily repaired (e.g. such as the FairPhone).

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<sup>2</sup> Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

### 1.2 Improving support for research and innovation

Research and Innovation (R&I) is a key enabler for the energy transition. If Europe is to reach climate-neutrality by 2050, then it needs to develop today the clean energy innovations that can be deployed in the years and decades to come.

Research and Innovation was therefore an important component of the ENABLE.EU research, that also paid particular attention to the EU's Strategic Energy Technology Plan (SET Plan).

#### *Recommendations*

- EU and national public authorities should **support the implementation of a bottom-up approach and wider stakeholders' involvement** in the design and implementation of climate and energy policies, particularly in Central and Eastern European States, including with the aim to enhance the management of general innovation policies in these countries.
- EU and national public authorities should **encourage local authorities to keep experimenting locally** in order to identify what works or not and to share experience at EU level.
- European Institutions should **steer EU funding**, especially innovation, regional and cohesion funds, **to support the uptake of innovative energy saving** and energy conservation measures.
- The European Commission should design a programme **tackling energy poverty in the framework of the R&I Mission 'Climate-Neutral and Smart Cities'**.
- The European Commission should improve the **support to low-carbon R&D and technological development in universities and to tech companies**.

An assessment of the SET Plan through a survey with national experts showed that its implementation progress in the studied countries has not been positive and that the SET Plan is not seen as enhancing the policy coordination and support for R&I in national policies (see D5.4). The low level of knowledge about the SET Plan and the lack of active engagement with the SET Plan of some Member States (e.g. Central and Eastern European countries) are among the main reasons quoted. In addition, even the coordination of the SET Plan at the EU level, incl. the creation of specific monitoring mechanisms to track its progress, is seen as ineffective mostly due to the non-binding targets and requirements.

### Recommendations

- EU and national public authorities should **make direct links between SET Plan priorities and targets into the 2030** climate and energy framework (e.g. including specific initiatives into the National Energy and Climate Plans), **2050 low-carbon framework and EU R&I Missions**.
- The European Commission should **set up a monitoring tool** at EU level, which requires every country **to report the implementation of the SET Plan priorities** on policy level, as well as some basic targets towards a pre-defined set of criteria.
- EU public authorities should require that the **SET Plan priorities are directly aligned with the planning and implementation of programmes funded by European structural and investment funds** at national level.

### 1.3 Fostering electric mobility

The electrification of vehicles in Europe faces several challenges, mainly technical and political. Although there is a lack of policy priority and long-term objectives, several interviewees indicate a lack of prior development to ensure large-scale car electrification, such as grid flexibility. Also, support schemes are rather limited and problems of affordability slow down the transition.

### Recommendations

- EU and national public authorities should **promote the benefits of electrification** on economic growth, employment and reducing carbon emission.
- National public authorities should create a comprehensive **national framework for the roll out of EVs** (i.e. institutional cooperation, regulation, financial support). In countries where financial incentives are not in place (such as Bulgaria, Hungary and Ukraine), electric vehicles should benefit from tax exemptions or reductions.

### 1.4 Improving energy literacy and empowering citizens

Empowering citizens in terms of energy consumption and production implies giving them the tools to understand their energy use and to be able to make informed energy choices while we head towards a clean energy future. Throughout the project, research often showed that information provision on its own is not sufficient to change behaviours, but can be more efficient when coupled with other potential interventions (e.g. subsidies, nudges, social comparison) or when tailored and targeted at a specific audience (see

D2.2, D3.4, D4.4). Many measures – from education about climate change to increasing awareness of energy use in our daily life and regulations to give people more possibilities to make sustainable choices – can contribute to empowering citizens.

### Recommendations

- Generally speaking, EU, national and local public authorities should **provide information that is free, easy to understand, connected to practices, and tailored to different groups** (and hence through different channels).
- Public authorities should **promote the idea that energy-conscious behaviour is fashionable and trendy** by building communication around reference group influence.
- EU public authorities should **develop a single online portal that provides:**
  - **European households with credible information** in all EU languages about clean energy solutions, including solar panels, heat pumps, energy efficiency, etc. This could take the format of an application easily accessible on a smartphone.
  - **European cities, regions and States** with the possibility **to share their experiences**, develop partnerships and learn from one another in the field of energy transition policies (e.g. renovation, mobility, prosuming).
- EU public authorities should **allocate EU funding and provide tools to promote energy and climate education in schools**. As a first step, the EU could implement such changes in the European Schools it funds (e.g. in Brussels where children of EU civil servants go).
- National public authorities and private companies should **embed more sustainable consumption practices in popular reality TV programmes**, e.g. revolving around educating kids, renovating/buying a house, etc.
- Following the adoption of the Ecodesign package to make home appliances easier to repair, the European Commission should **extend EU legislation to all types of electronic goods** (e.g. including phones) providing longer **warranty periods** and more **repair possibilities** on the side of consumers. The Commission adopted on 1 October 2019 new eco-design measures including repair and recycling conditions, life span improvement, re-use and waste handling for a list of appliances (incl. refrigerators, washing machines, televisions, electric motors).

## 1.5 Ensuring a socially acceptable transition

The modelling of a package of policy measures under the 'ENABLE.EU – Sustainable Citizens Practice (SCP) Scenario' indicates that, by 2030, households can help reduce by 29% the EU GHG emissions compared to 1990 levels, develop renewables so they account for 22% of the EU final energy consumption and increase energy efficiency by 33% for final energy consumption (see D7.2). This modelling exercise showed that both low-income and high-income households see positive net changes in their real incomes from the household transition in the ENABLE.EU scenario. Furthermore, this scenario showed the relative change in real income is higher for poorer households than richer households. Therefore, the energy transition need not negatively affect poorer households but – if policy is wisely chosen - can also enable them to benefit, ensuring a transition that is socially acceptable. However, public action is needed for these conditions to occur.

### *Recommendations*

- National public authorities should **use policy instruments, such as subsidies and taxes, to make the clean option also the cheaper option.**
- National public authorities should **spread the cost of policies** used to incentivise the transitions **evenly across the economy**, favouring progressive policies (e.g. income taxes) as opposed to regressive ones (e.g. VAT increases).



## 2. Energy efficiency in electricity and heating consumption at home

We led throughout the project several studies on energy efficiency which brought to light findings that can serve policy-making.

First, research teams explored the drivers of individual short-term energy choices by using Randomised Controlled Trials<sup>3</sup> (see D3.4). Research on the effects of information and feedback provision on energy consumption showed limited potential for such interventions in Bulgaria and Serbia. In contrast, research on smart meters in the UK showed that information treatments, combined with subsidies, can have a significant impact on household behaviour regarding the adoption of energy saving technologies. This confirms former studies in the literature about information provision and the need to combine strategies (see D2.2). Research in Germany also looked into the impact of consumption and payment of energy being separated in time. Payment of costs appears less important from the moment of when the consumption choice is made and leads to an overconsumption of energy.

Second, the drivers of individual long-term energy choices were investigated in Germany and in the UK (see D3.2 and D3.5). Results in Germany suggest a difference between short-term and long-term energy choices: While short-term choices are influenced by the lag between consumption and payment of energy (see also D3.4), long-term choices are not influenced by the lag between investing in energy efficiency and benefiting from lower energy costs. Households do not undervalue these future benefits of energy efficiency. Results further suggest, that neither the true electricity price nor the expected electricity price can predict low-cost and mid-cost energy efficiency investments.

In the UK, the studied schemes have been quite successful in delivering energy efficiency measures to more deprived households. However, the energy savings are much higher for households living in more affluent areas. Furthermore, it appears that combinations of measures deliver higher savings than the combined sum of individual measures. When it comes to Pay-as-you-save financial mechanisms, studied schemes in the UK to finance energy efficiency measures were found to have high interest rates. The scheme avoided negligible amounts of CO<sub>2</sub> emissions and this rate is not sufficiently low to provide

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<sup>3</sup> Randomised Controlled Trials (RCTs) are economic experiments, where researchers randomise participants into either a treatment or a control group. This way, a comparison of average energy consumption in the two groups reveals the causal effect of the intervention without contamination of any other characteristics.



incentives for many households to partake in this scheme. Market-based interventions will only work for certain segments of the population and policy needs to take this into account.

Third, we led research on the factors that influence household heating behaviour in France, Germany, Hungary, Spain and Ukraine (see D4.4). Through focus groups and survey methods, our research aimed at better understanding the attitudes and opinions of households, the obstacles they face in their everyday lives, and the potential solutions they can identify and support. In focus groups, households expressed their support for providing more solution-oriented advice. Diverse interests in the case of rented dwellings and multi-apartment buildings also hinder energy-saving measures. Owners are not always interested in carrying out investments as benefits are usually embraced by tenants. Furthermore, in multi-apartment buildings the implementation of major refurbishments may need consensus among all inhabitants, which is a further barrier to improvements. Financial challenges such as insufficient resources and the lack of available loan and subsidy programmes are present in all five studied countries. Several experts argued that energy bills are not easy to understand, particularly by low-income households, while many households feel that feedback about energy consumption is not frequent enough.

This research led to cross-cutting recommendations to improve energy efficiency of European households and to benefit the most vulnerable citizens when it comes to home energy consumption.

### *Recommendations*

## 2.1 Pushing an EU-wide policy for building renovation

- The EU and countries should **develop a comprehensive policy to improve the thermal condition of current housing stock**: i.e. undertake large-scale deep renovation with rise in energy price and support for low-income households. This should involve diverse actors (i.e. innovators, NGOs, authorities) to design large-scale renovation plans. While the European building stock needs energy renovation, progress is slow, and many families are living in poor and insalubrious housing conditions. Research on heating showed that while financial means are with investors and business, actors on the field such as local authorities and NGOs, who are most aware of the situation, lack resources to improve housing conditions. It is therefore critical to bring resources together and tackle precarious situations at the same time as implementing energy transition policies for zero-emission buildings.
- European institutions should **steer EU funding towards the deep renovation of buildings** in order to achieve large-scale improvements in the energy efficiency of dwellings. Research led in the UK on the drivers of household adoption of energy-saving technologies highlighted that **combinations of measures deliver higher**



**savings than the combined sum of individual measures.** This suggests that there may be efficiency gains in installing multiple measures simultaneously. Qualitative research on heating also showed that many households are less likely to invest in deep renovation of their dwellings once they invested large sums and achieved energy efficiency gains through smaller renovation actions, such as roof insulation and double-glazing.

### 2.2 Estimating renovation needs

- European and national authorities should **implement systematic energy performance appraisals of dwellings.** When renting a dwelling, one is rarely aware of the energy performance of its equipment and of its insulation. This can result in unexpectedly high energy bills. Improved knowledge of the energy efficiency of buildings would be beneficial for owners who can then invest in efficiency improvements, for tenants who avoid unexpected high bills and for policy-makers who can target renovation measures at the least energy-efficient housing first.
- Local authorities should **undertake surveys with the inhabitants of buildings** to gather data about needed interventions and **identify solutions for the whole building.** Several households living in multi-apartment buildings regretted the lack of possible recourse to improve their heating situation. The difficulty to find solutions for condominiums and in multi-apartment social housing can be tackled by asking all inhabitants about their situation and identifying either solutions for the whole building or only affected household(s).

### 2.3 Encouraging investment in renovation and clean energy sources

- National authorities should develop national investment tools and encourage banks to **provide financing tools for big investments that are easily accessible to households:** e.g. access to grants or loans for energy efficiency renovation and renewable heat-related investments (with attractive interest rates). Banks could propose such offers to clients that are willing to invest (e.g. invest 40,000€ in deep renovation, rather than on the stock market).
- National authorities should **establish restrictions on the rental of dwellings with low energy efficiency ratings** when there are public schemes helping owners to renovate the dwelling. Many households rent dwellings with very poor energy efficiency ratings and have no recourse to improve their living conditions without action of the owner. This is particularly the case for low-income households who cannot afford better housing options.

- National authorities should **provide more incentives for owners to improve the energy efficiency performance of the dwellings** they own and let.
- While at EU level, the 2018 Renewable Energy Directive<sup>4</sup> includes provisions to support individual prosumers and energy communities, all public authorities should **promote community-based solutions such as the creation of local energy communities**.

### 2.4 Giving citizens the possibility to improve their energy situation

- European and national authorities should support cities in the **organisation of community meetings** (e.g. neighbours, networks, condominiums) **to discuss best energy practices** to save energy and provide positive feedback about behaviour change. Such initiatives can reinforce saving behaviours both through internal community meetings (where individuals share ideas and decide about energy-saving initiatives) and through wider community meetings where members share their best practices and get reinforcement from other energy communities about their efforts and achievements.
- European and national authorities should **put a stronger emphasis on the promotion of renewable energies for heating** (not only for electricity), with technologies such as heat pumps, biomass boilers and solar heating. Visible support schemes for such technologies should be further developed to make them more accessible. Discussions about renewable energy tend to focus on technologies producing electricity while many renewable energy technologies also produce heat, providing solutions that individuals can implement at home and that can largely support the energy transition.
- National authorities and energy providers should **combine information provision with subsidies to impact household behaviour regarding adoption of energy saving technologies (e.g. smart meters)**. Research on smart meters showed that information treatments, combined with subsidies, can have a significant impact on household behaviour regarding adoption of energy saving technologies.
- Public authorities and energy providers should **reflect on how smart meters could be more useful for consumers** – e.g. energy providers giving consumers the **possibility to monitor their energy consumption** when they have installed smart meters. Today, even when Europeans have smart meters at home, they do not

<sup>4</sup> Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources

necessarily have easy access to their energy consumption data. Clear information on how to monitor consumption should come with the smart meter, i.e. either an in-home display or clear explanation on how to check it online.

- While monitoring the proper implementation of the Clean Energy Package, European and national authorities should **ensure that consumption data on the energy bill is comparable** to the consumption of similar households or own consumption in previous periods.
- EU public authorities should **develop more research and experimentation with commitment technologies** such as energy saving goals or particular contracts which help individuals to stick to their ex ante electricity consumption plans.
- Energy suppliers should **test alternative billing schemes, such as more frequent billing or pre-paid billing**. Research on intermittent billing in Germany (where meter readings only occur on a yearly basis) showed that people undervalue their costs because costs are less salient as payment is only relevant later in the future.
- EU public authorities should finance research to **identify whether households have a nearly zero price elasticity** or whether another price construct influences short-term and long-term energy choices.

### 2.5 Supporting vulnerable households in the energy transition

- National authorities should **create a regulatory framework for Pay-as-you-save financing mechanisms with attractive conditions** – e.g. loans with low interest rates that can support low-income households in energy efficiency investments. A recent policy initiative in the UK providing households with loans in order to finance energy efficiency measures was widely considered to have been a failure as interest rates were as high as eight percent. In particular, low-income households would actually lose money by making these improvements unless energy prices rise significantly. It is thus critical to provide such financing mechanisms with conditions that are beneficial for the targeted population.
- National public authorities should **modify the support system for vulnerable consumers** from using subsidies to forms of financial support favouring energy efficiency and deep renovation.
- Local authorities should **promote community-based solutions at local level** (e.g. collectively helping each other in a renovation, family-based “home-sharing” for

the elderly and students). Community-based solutions are more welcome than top-down solutions and can contribute to social inclusion.

- European and national authorities should **support the further development of programmes for local energy advisors** to support energy-poor households. Trusted interlocutors can help households identify the available schemes that best address their situation. Trust in local communities and municipalities is higher than trust in energy providing companies or top-down information. Energy education of people who have direct contact with citizens is thus crucial as what the physician or the gas fitter says has more impact than general information from the media.
- This could also be done through **discussion groups for energy-poor households** to share experience and seek support and could be a task of the EU Energy Poverty Observatory. Discussion groups could be developed by local authorities or civil society organisations to support the most vulnerable households to engage in dialogue and the exchange of good practices among people who face similar challenges. Small discussion groups can be organized at a relatively low cost, can easily be implemented locally, and can effectively encourage households to improve their situation.

### 2.6 Communicating about heating energy consumption

- EU, national and local authorities should **introduce information campaigns about good energy-related practices**, e.g. eco-gestures (pro-environmental individual initiatives), wearing adequate clothes in winter, and the proper use of technology (e.g. thermostats, incl. in refrigerators to avoid over-cooling). It appears that many simple actions to reduce one's energy consumption are unknown to the general public, especially when it comes to specific things like the efficiency of a refrigerator or the importance of airing the dwelling even in winter with the heating turned off.
- EU, national and local authorities should **create communication campaigns on energy efficiency** that are more **user-friendly**, based on easily understandable **infographics**. This should be accompanied by a reflection on how the information is provided to citizens. Some households highlighted that they would like to receive **more specific information** on how much they could save with specific measures, e.g. by decreasing the temperature by one Celsius degree during the night or by using smart technologies.
- EU, national and local authorities should **put forward the "comfort-at-home" argument** showing that thermal renovation is not just a way to save money but also

a way to improve one's well-being at home. The EU would gain in terms of image by communicating such implications for the everyday lives of Europeans.

- EU, national and local authorities should **emphasize the impacts on health of overheating in winter** when communicating about energy savings. Many households keep high indoor temperature in winter (sometimes even higher in winter than in summer) and this can have undesirable health effects.
- Where relevant, national authorities could **raise awareness on the positive impacts of energy efficiency on national energy security**. Highlighting various motivations for changing energy behaviours has the potential to reach different audiences: financial, environmental and technological motivations for instance are often used in communication. Ukrainian citizens also highlighted that knowing they contribute to the energy security of their country influenced their energy investment decisions.

## 3. From consumer to prosumer

### 3.1 Developing prosuming throughout Europe

ENABLE.EU research led in Italy, Norway, Serbia, the UK and Ukraine has shown that prosuming through solar panels is becoming more common. However, there is a significant potential, which is still underutilised. Italy and the UK are leading countries when it comes to household solar installations, and the market in Ukraine and Norway is emerging. In Serbia, few households have installed solar panels, and the regulations on prosuming are not in place yet meaning that solar panels are being used as off-grid solutions or as an addition to central electricity supply (see D4.3).

When it comes to policy to encourage prosuming, several Member States already have experience with regulatory and economic tools. At the EU level, currently, the recast of the Renewable Energy Directive<sup>5</sup> includes provisions to support individual prosumers and energy communities, mainly the right for consumers in all Member States to become renewables self-consumers and to be remunerated for the electricity they feed into the grid. The measures should be effective at latest in July 2021. EU Member States and European neighbouring countries should pursue national policy in this direction to accelerate the roll-out of solar panels among households and in buildings (both for new constructions and renovation).

ENABLE.EU results show that households' motivations for becoming prosumers are quite varied: financial benefits, environmental aspects, technological interest, security are some of them. In the UK, Italy and Ukraine, financial motives were common (often together with environmental aspects). In Norway, where solar panels have high up-front costs and revenues from selling power production are more uncertain, environmental reasons take more priority and financial benefits are rather seen in a long-term perspective. However, the general findings show that support schemes like feed-in tariffs seem to be of utmost importance for the growth in the number of prosumers, based on the comparison between our case countries. In the UK and Italy, and more recently in Ukraine, support schemes have been in place and resulted in a more mature prosumer market.

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<sup>5</sup> Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources



### Recommendations

- National authorities should **combine different policy tools to enable consumers' access to prosuming**: e.g. initial investment by government-supported green banks or solar panel loans, feed-in tariffs, information campaigns about the benefits and basics of solar technology, assistance with the screening process for solar energy companies and products, and normalisation of solar panel aesthetics.
- Public authorities should establish incentives and regulations to promote **solar energy technologies** (PVs and solar heating) **for energy production in apartment blocks** when planning new housing areas (building standards, etc.).
- National authorities should **create a label to certify companies which guarantee a high-quality job for energy systems installation**. While the solar panel market is developing, it is difficult in some countries to find skilled professionals in the field of home production systems and many households are reluctant to adopt new technologies due to a lack of trust in providers and installers.

### 3.2 Making prosuming easily accessible to all Europeans

In the five studied countries, the interviewed prosumers seem to have middle-to-high income and higher education than the average population. Hence, there is a challenge in making solar panel technologies also accessible and affordable to all Europeans, including lower income groups. Workshop participants also stressed the need for economic incentives to encourage prosuming among vulnerable consumers and to avoid increasing energy inequality.

The study also pointed out that the decision of producing one's own solar power involves a complex process: bureaucracy, assessment of the suitability of solar energy production to the household's circumstances, selection of the products and installers, registration and monitoring of the systems...

### Recommendations

- The European Commission should further engage Member States to facilitate access to PV technology by **reducing transaction costs and by providing subsidies, especially for low-income households**. The adoption of solar panels often implies a complex process for the household.

- National authorities should **create incentives for tenants to install solar panels**, e.g. by regulating the sharing of investment costs with the owners or by means of tax reductions for the owners.
- The European Commission should **integrate the deployment of PVs for low-income households into a comprehensive plan to fight energy poverty** (taking into account the condition of the building stock).

### 3.3 Prosuming becoming the norm for European households

The diversity of motivations for becoming prosumers also urges the importance of a varied promotion of this technology: both underlining economic and environmental dimensions and reaching to people interested in the technological elements.

Gender also matters for the agenda-setting work of the energy sector and energy science more broadly. Gender should thus be a concern for policy-makers seeking to design and implement socially, economically and environmentally feasible and sustainable energy policies as it may have consequences for the equity, efficiency and effectiveness of these policies. Based on findings from the ENABLE.EU project, lack of financial means, skills and education was a barrier for women to engage in or opt for solar panels. However, in most cases energy policies neglect gender issues and social differentiation, rather than drawing out measures that attract diverse groups of people.

#### *Recommendations*

- The European Commission should encourage public authorities and businesses to **advertise energy technologies, such as solar panels, in a more diversified way to reach a larger audience**, i.e. showing **more women** using the technology and underlining both **economic and environmental aspects** to also appeal to a public less interested in the technological dimension. Motivations to become a prosumer are diverse but the typical prosumer tends to be a tech savvy man, like illustrated by most advertisement on solar panels. More diverse advertisement can be a way to reach to a wider audience, and more specifically women, non-engineers and later adopters.
- The European Commission should **allocate EU funding to the creation of video games/apps to raise awareness of sustainable behaviours**. This could take the form of a mobile phone video game targeting specific groups, e.g. young parents or low/middle-income women, that may ease the transition to more sustainable behaviours, such as prosuming.



- National and local authorities should **develop ‘hands-on workshops’ for children and adults on how to use technologies to produce energy at home**. Practical experience can be more engaging and memorable for people than just theoretical information. As education is a national competence, the EU could provide tools or financing for such activities in Member States. Such activities could be either developed in schools or proposed by local authorities and civil society organisations at the level of a neighbourhood for instance.



## 4. Towards a low-carbon mobility

ENABLE.EU research on mobility was conducted in Hungary, Italy, Norway, Poland and Spain. Its main aim was to better understand citizens' choices, habits and preferences regarding mobility and alternative transport modes to private cars, to identify key drivers and barriers to low carbon mobility, and to explore potential solutions and best practices to shift away from private diesel and gasoline car dependence. This research focused on the potential of car-sharing modality (see D4.2).

### 4.1 Encouraging a shift to cleaner and more energy-efficient modes

Emissions from transport can be reduced by a) limiting the need for constraint journeys (e.g. more teleworking possibilities); b) Shifting to clean(er) modes (e.g. electric vehicles, cycling, walking); and c) Shifting from individual mobility to a system where we rely on collective and shared transport, i.e. buses, trains or ride-sharing.

This last option, however, usually requires more effort to plan a journey than by private car and their costs are incurred directly to the user (as opposed to private cars' expenditures such as purchasing, refuelling and maintenance costs). Hence, increasing competitiveness of these solutions requires journey planning facilitation and raising awareness of the costs connected to a trip.

Car-sharing is considered as part of the solution towards low-carbon mobility. It consists of renting a car for a short period of time. Car-sharing could contribute to reducing the carbon intensity of the urban transport sector by complementing the public transport offer and providing an alternative to the ownership of private cars. It can also contribute to reducing the bias in evaluating the cost of a car trip as it connects the price to the use of the vehicle. Moreover, it can be a tool to spread new and environmental-friendly technologies such as Electric Vehicles (EVs) and other alternative fuelled vehicles, as well as new vehicles with high fuel efficiency standards.

Based on this research, we recommend several policy measures that are to a large extent applicable at the city level. Many of them are already effective in numerous European cities but should be applied more extensively throughout Europe. The EU can also encourage their adoption through networks like the Covenant of Mayors.

### Recommendations

- European institutions, national and local authorities and companies should **develop initiatives that encourage Europeans to try out sustainable behaviours**, such as free public transport days, days without cars in city centres and electric car-sharing services. Based on the studied literature, it appears that encouraging people to try a new behaviour that breaks their routine can positively influence the adoption of new behaviours. In ENABLE.EU study, users who have experienced electric vehicles through car-sharing are positively evaluating the technology and tend to prefer it to conventional vehicles.
- National authorities, regions and cities should **develop more projects** that integrate public transport and transport sharing services (e.g. bikes, scooters, cars) in one application – i.e. **Mobility as a Service**.
- The European Commission should **revise the Alternative Fuel Infrastructure Directive** to raise the target of electric charging stations on European roads by 2030 and to review the definition of alternative fuels to only include those that contribute to a clean energy future.
- European institutions, national and local authorities and companies should **invest more in clean public transport and trains** (i.e. fleets and infrastructure).
- Cities should **develop affordable (or free) park and drive** on the outskirts of cities for people living further to easily access the city centre by public transport.
- Cities should  **earmark parking space for carpooling**.
- The European Commission should **develop a comprehensive set of measures encouraging the use of bikes** that countries, regions, cities and employers can implement (e.g. bike lanes, slower car speed, subsidies for the purchase of electric bikes, reward system for bicycle users from employers).
- European and national authorities should **improve the legal framework to encourage more teleworking**.

## 4.2 Developing car-sharing

ENABLE.EU research on car-sharing showed that users seem to choose this service mainly for its flexibility and comfort aspects and characterise car-sharing as a practical solution. However, the costs of the service also seem to be an important factor for users. Environmental concerns related to air quality and global warming have also been mentioned as motivations by some although they tend to take second place. The mode also comes in handy to reach specific destinations poorly connected by public transport due to the location site or the timetables.

The potential electrification of car-sharing services is seen as a foreseeable future development by business stakeholders and is highly considered by policy-makers who see electro-mobility as an important asset to meet emission limits.

### *Recommendations*

- National authorities, regions and cities should **provide incentives for users of private cars to switch to car-sharing services** (as long as they do not foster a shift from public transport and soft modes to shared cars). Such incentives can be financial as well as non-financial incentives (e.g. access to faster lanes/bus lanes, easier access to city centre, reserved parking slots).
- The European Commission should **develop a toolkit of measures that countries and cities can implement to deploy car-sharing**: e.g. parking facilitation, private car access restrictions, investment in charging infrastructure for electric car-sharing. The shift towards more sustainable transport modes will occur when such modes are convenient and affordable for users. All these measures are incentives that make car-sharing more attractive.

## 4.3 Phasing-out transport based on fossil fuels

While cleaner, collective and shared modes should be encouraged, the climate urgency also requires quickly leaving behind carbon intensive modes over the coming years. To this end, it is also critical to set measures limiting the uptake of polluting vehicles and aviation. For the time being, it would be consistent to align tax revenues on emitting modes with energy transition objectives. If the transition pace is deemed too slow to reach climate targets, more radical solutions, such as limiting individual emissions, might have to be considered by policy-makers according to citizens involved in ENABLE.EU discussions.

### Recommendations

- The European Commission should **propose strict rules for the advertisement of polluting products** – e.g. diesel and gasoline cars. This could build on existing rules for other products that have an impact on health, such as tobacco.
- EU and national authorities should **introduce higher taxes on more polluting fuels**. EU legislation should tax polluting activities like aviation with redistribution of funds towards actions that are aligned with the energy transition.
- However, public authorities should also **reflect on the potential unintended consequences of taxation as an instrument to change habits**. Tools like taxation (e.g. in order to reflect the social cost of emissions from fossil fuels) are often questioned, especially when it can fuel social unrest, like in 2018 with the Yellow Vests in France. The use of such tools should therefore be based on a thorough assessment of its positive and negative impacts.
- EU and national authorities should also reflect on potential **measures to reduce dependence on car ownership** and assess their impacts and social acceptance (e.g. tradable car quotas; limiting ownership by increasing circulation and property taxes on the second and next cars owned; while taking into account different situations, such as people with disabilities, large families, no alternative for work commute).

## 5. Enabling the energy transition in the industry

### 5.1 Decarbonising the industry

The ENABLE.EU modelling exercise showed that the contribution of households in the energy transition can be substantial but it is not sufficient by itself to meet the EU energy and climate targets. To meet these targets, action and ambitious policy are needed in other areas of the economy, including a transition in industry to cleaner technologies and economy-wide improvements in energy efficiency (see D7.2).

The research led on companies in ENABLE.EU took place in France and Germany where we researched the drivers of firm-level and industry-wide energy use, emissions and investment choices to reduce emissions (see D3.6). The studies analysed how firms and the industry as a whole respond to shocks that influence their energy use and emission levels.

#### *Recommendations*

- The European Commission should see how it could **target energy efficiency policies and incentives for low-carbon equipment at new firms**. New firms still have to decide upon which machines to buy, i.e. between “cleaner”/more energy-efficient and “dirtier” machines. Incumbent firms are more likely to be locked-in with their past technology choice, amortising their investment, so that they are less inclined to scrap it after just a few years and buy new machines just because these are “cleaner”.
- The European Commission should study how to **direct energy efficiency policies at SMEs in order to exploit yet untapped potential for cost-efficient improvements**. Research on German manufacturing firms found that SMEs show a much lower energy efficiency of production than large firms so they are a target group where significant energy savings can be made.



### 5.2 Training workers in the energy transition

Research on the manufacturing sector in France provides some evidence that an increase in the energy price modifies the technology produced and used by the firms (see D3.6). Large firms innovate more while all firms invest more in end of pipe pollution abatement technologies presumably because energy efficient abatement equipment are more expensive. While there is a trade-off between environmental and economic outcomes due to changing prices, the reduction in emission is significantly higher. Only large firms (250 employees or more) experience a loss in employment. In contrast with large firms, SMEs do not reduce employment in responses to higher price because they substitute energy for labour with greater magnitude.

It seems that a carbon tax (or any instrument leading to increases in energy prices) can lead to improved competitiveness, either through increase in scale of production or investment in energy-efficient technologies. However, policies would be needed to combat the negative effect of energy price increases on employment in some industries, such as providing unemployment benefits or retooling to improve their skills and marketability.

#### *Recommendations*

- EU and national public authorities should **provide adequate training for professionals in the field of the energy transition** (e.g. installation of heat pumps and solar PVs, energy efficiency jobs). At the EU level, this can be supported by adding a green component to the Erasmus Pro programme for apprentices.
- The European Commission should further work with Member States and regions to **provide retraining and adequate unemployment benefits for workers in industries that suffer from the energy transition**. This can build on the experience of the Coal Regions in Transition Platform.

# Now, what should each of us do?

Recommendations above are mainly targeted at EU and national policy-makers. Local actors and citizens can also act towards a clean energy future:

### **If you are a citizen...**

- Renovate your house to make it more energy efficient
- Switch to a renewable energy supplier
- Make your next car an efficient electric vehicle
- Use car-sharing services
- Organise a car pool for your daily commute
- Turn the thermostat down (or up, in the summer) to save energy
- Unplug whenever possible

### **If you are a school...**

- Raise awareness of sustainable behaviours in a way that is appealing and accessible, such as through video games and apps
- Install solar panels on your roof and create activities related to energy production with children

### **If you are a university...**

- Provide adequate training for professionals specialised in the energy transition
- Encourage research and innovation in the field of the energy transition (e.g. batteries, clean energy sources, behaviours) building on research to date

### **If you are an energy company...**

- Advertise clean energy technologies, such as solar panels, in a more diversified way to reach a larger audience (e.g. showing more women using the technology, underlining also economic and environmental aspects)
- Propose to your customers 'pay as you save' services to finance energy-efficient renovations
- Offer smart meters and easy monitoring of energy consumption

### **If you are a city or public authority...**

- Set an example by implementing the sustainable actions that you advocate
- Renovate institutional buildings to make them net-zero emission buildings
- Incentivise your employees to choose a clean transport mode (e.g. train) rather than taking the plane for medium-range trips
- Switch your public fleet to clean vehicles
- Take part in the EU Research and Innovation Mission for "Smart and Climate-Neutral Cities"