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A photograph of a protest scene. In the background, a white banner with the word 'GAS' in black letters is visible. In the foreground, a person holds a sign that reads 'MAKE LOVE NOT WAR'. The scene is set in front of a modern building with a balcony. A person in the foreground is holding a smartphone, likely recording the protest.

# Demand-side solutions to address energy shortages

How the EU and Member States can boost  
energy savings through effective, socially  
balanced policy measures

## **Imprint**

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# Demand-side solutions to address energy shortages

How the EU and Member States can boost energy savings through effective, socially balanced policy measures

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Bitte folgen Sie [diesem Link](#), um die Zusammenfassung abzurufen

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## 1. Introduction

The new geopolitical and energy market reality urges Europe to **rapidly ensure strategic energy autonomy and European energy security**. Uncertainty about the supply of Russian gas is aggravating the rise of already-high energy prices and challenging the EU to manage without Russian energy sources. Baltic EU Member States have already ended their energy relations with Russia. Across the EU, the scenario of an import ban for Russian energy imports is intensely debated. However, due to the expected additional impacts on energy prices, which risk political and social instability, countries like Germany are still opposing this step.

As a response, a number of proposals and recommendations have been put forward to mitigate price developments and rapidly find alternative supply sources to Russian oil and gas. However, the debate currently lacks an appropriate consideration of inclusive demand-side measures that can **immediately and absolutely reduce energy consumption while simultaneously supporting the EU's long-term Green Deal climate objectives**.

With this paper, we aim to help close this gap. We will set out the **potential of demand-side policies to contribute to meeting a possible energy supply deficit** in the scenario of an import ban on Russian energy sources. Complementing industry-focused studies, we will focus on reducing final energy consumption by households in the areas of transport and housing. Both sectors have a strong impact on the total consumption of oil and gas as primary energy carriers.

**In doing so, we will demonstrate the economic, social, and geopolitical effects of an overall reduction of energy consumption.** Firstly and most importantly, demand-side measures will indirectly mitigate price increases for oil and gas. As such, they make a direct contribution to safeguarding the EU's social and political stability, especially if public policy focuses on measures with progressive or negligible social impacts. Secondly, demand-side measures increase the strategic independence of the EU and as such the EU's geopolitical leverage. Lastly, reducing the demand for oil and gas facilitates the EU's energy transition in the medium- and long-term and contributes to the objectives of the European Green Deal. In a joint statement<sup>1</sup>, eleven Member States have therefore urged the European Union to accelerate and ramp up the ambition of the 'Fit for 55' package as a crisis response.

This paper is structured as follows: Chapter 1 sets out how rising energy prices are correlated with the risk of socio-political instability and energy poverty and demonstrates the looming deficit in case of an import ban on Russian oil and gas. Next, we introduce the potential of demand-side reductions to fill this gap while contributing to other goals. Chapter 3 highlights policy design principles for successful demand-side measures, and chapter 4 gives an overview of the most promising demand-side reductions with short-term effectiveness. Finally, we put forward a proposal for a comprehensive Inclusive Energy Savings Initiative (IESI) at EU level, complemented by concrete recommendations for strengthening energy savings in existing EU legislation.

## 2. The challenge at hand: Addressing energy shortages that have strong asymmetric effects on households

## 2.1 Rising energy prices and the accompanying risks of socio-political instability and energy poverty

The EU is exposed to energy vulnerability through **two channels** - dependence on Russian oil and gas imports and susceptibility to volatile global energy prices. **This paper will focus on addressing the impact and implications of this vulnerability for EU households.**

An important concept used by the EU is **energy poverty**. Energy poverty describes the state in which a household is not able to meet its energy needs for heating, cooling, and lighting, negatively affecting the standard of living.<sup>2</sup> Rising diesel and gasoline prices exacerbate the risk of **double energy vulnerability**, which describes a “heightened risk of energy poverty and transport poverty simultaneously”.<sup>3</sup> Joint policy approaches to reduce energy consumption and improve energy infrastructure can help address energy poverty.

Currently, **16.2% of EU households find themselves in a precarious situation**. They have to prioritise between meeting their energy needs and other essential spending.<sup>4</sup> Double energy vulnerability particularly affects **low-income households**, “older people, households with children or dependents, people with pre-existing health conditions or disabilities, women, and people from ethnic minorities”.<sup>4,5</sup> The current energy crisis will likely put pressure on households that are usually not considered to be at risk. Based on the structure of energy consumption, energy poverty mainly affects low-income households in urban, peri-urban and rural areas, although some middle-income households in rural areas may also be at risk. Low- and middle-income households in peri-urban or rural areas may be at greater risk of transport poverty.<sup>6,7,8</sup>

Because of the effects on the affordability and accessibility of essential services such as heating, transport, and energy, **rising oil and energy prices are deeply political sensitive** and risk triggering socio-political instability. This is demonstrated for example by Figure 1, which shows a clear linkage between the number of fuel riots and the price of oil around the globe. To mitigate these risks, the EU and its Member States can use policy measures to soften the blow of rising energy and oil prices.

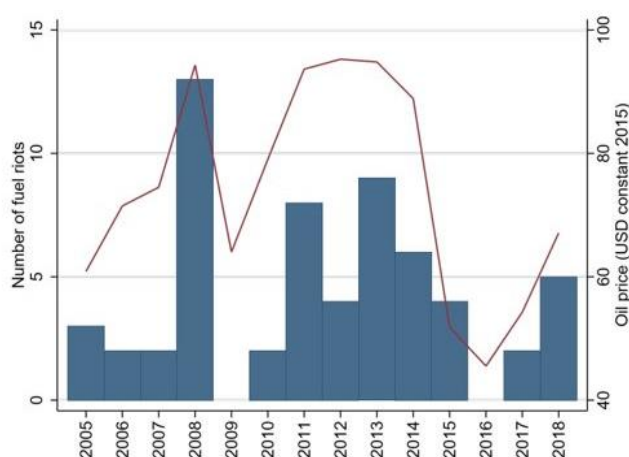


Figure 1: Fuel riots and international oil prices (McCulloch, Natalini, Hossain, and Justino, 2021)

## 2.2 The gaps in Russian oil and gas supply after substitution

Of the many factors affecting energy prices, the mismatch between supply and demand is one of the most important. To understand the extent to which an import ban would affect the gap between demand and supply, we conducted a rough assessment of expected oil and gas shortages based on existing studies. Even though oil and gas prices are global, it is this gap that affects the EU's leverage and market expectations.

We focus on oil and gas, because diversification with regard to coal is quite achievable.<sup>9</sup> The situation surrounding EU oil and gas imports is volatile and projections are subject to high levels of uncertainty; that said, the following analysis is based on the situation at the start of April 2022.

Generally, **Europe's energy dependence ratio reached 60.2%** in 2019, implying that more than half of the energy supply was imported – this figure was even larger for gas and crude oil (83,6% and 93,2%, respectively).<sup>10</sup> **Russia is the EU's main supplier of oil (27%), coal (47%) and gas (41%).**<sup>10</sup> Contingent on their own energy deposits and historical relations with Russia, **Member States depend on Russian energy to varying degrees.**<sup>11</sup> Vulnerability is also affected by the severity of a country's winters, dependence on economically vulnerable energy-intensive industries, and a country's progress on transitioning to clean energy.

### Ending imports of Russian oil and gas

In the case of oil, the EU imports roughly 3.5 mb/day from Russia.<sup>12</sup> The majority of oil demand is in transport. A significant proportion of Russian oil imports could be replaced by other sources; Bruegel has analysed how this can be achieved<sup>12</sup>. OPEC could offer an estimated delivery capacity of an additional 0.5 mb/d of oil immediately, plus another 0.5 mb/d later this year. Moreover, US President Biden has announced the release of 1 mb/d of oil reserves as a “wartime-bridge” for six months<sup>13</sup> and the IEA countries announced the tapping of 60 million barrels on top of that<sup>14</sup>. The exact timeframe of the IEA oil reserve release is not yet clear, but assuming it will be spread over the next six months like the US reserve release, this would add another 0.33mb/d of oil to the market over that time period. Boosting US oil companies' production capacity to the 1.5 mb/d higher pre-pandemic level would release an additional 1.5 mb/d in the medium term. However, high uncertainties remain about exact numbers and transport capacities to the EU.

Despite all of this, **a gap of 1 mb/d of oil would remain**, even if the entire additional medium-term US oil production were exported to the EU, as shown in Figure 2. Furthermore, the extraction of US shale oil through fracking is controversial. If the EU does not accept US shale oil in a future-proofing scenario, **the oil deficit would climb to 2.5 mb/d of oil**. Only parts of this could be replaced by the strategic oil reserves of Member States, who are, according to the EU's Oil Stocks Directive (2009/119/EC), obliged to maintain emergency stocks of crude oil and/or petroleum products equal to at least 90 days of net imports of 61 days of consumption.<sup>15</sup>

**Europe's final consumption of natural gas amounts to ~3500 TWh annually**. About one third of total final consumption is accounted for by electricity and heat. As of 2019, household heating account for 39% of natural gas consumption in the EU.<sup>16</sup> Foà et al (2022)<sup>17</sup> estimate that **Europe could possibly cover 62% of energy needs from other sources, such as extra LNG imports**, revoking the closure of German nuclear power plants, and utilising spare pipeline capacity. However, **a deficit of about 721**

**TWh would remain**, as demonstrated in Figure 3. Foà et al (2022) conclude that the remaining energy deficit could exhaust gas reserves in about five months

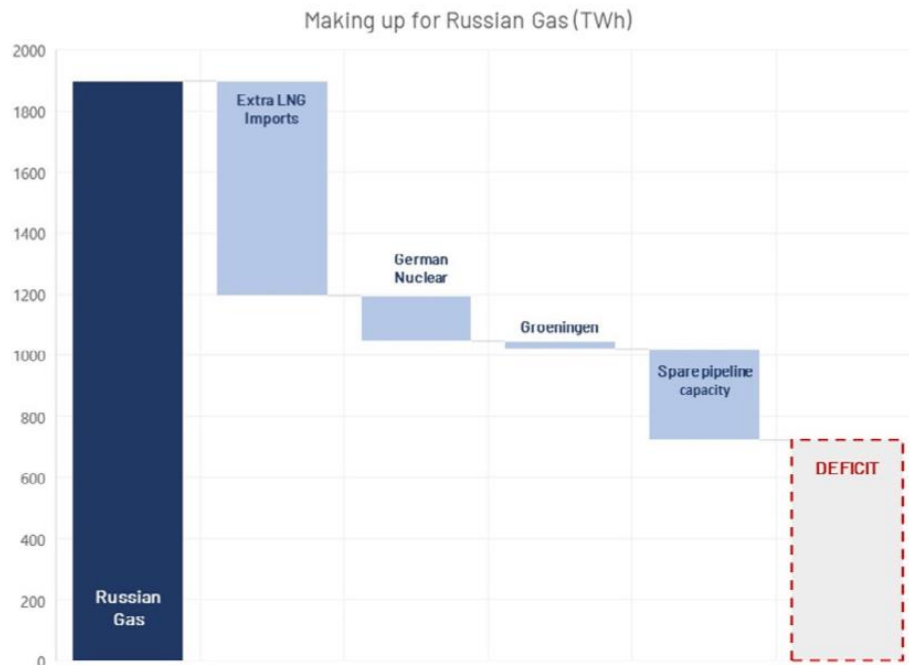


Figure 2: Substitutes and deficits for Russian gas imports (Foà, et al 2022)<sup>17</sup>

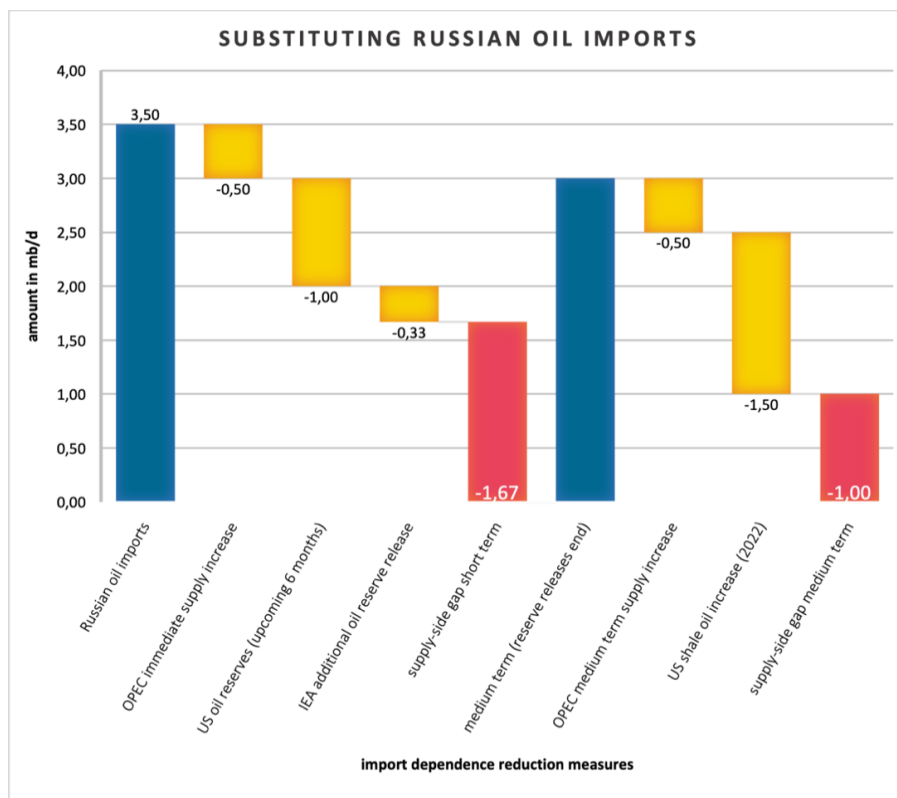


Figure 3: Substitutes and deficits for Russian oil imports (own calculations based on Bruegel 2022)<sup>12</sup>



## 2.3 The potential of demand-side reductions to close the gaps

**As a reaction to the risk of energy shortages in the course of the invasion of Ukraine, the EU is launching the REPowerEU plan.** This plan aims to achieve energy independence from Russia ‘well before 2030’ by speeding up the clean energy transition, alongside the diversification of gas sources, more LNG and pipeline imports, and improved energy efficiency.<sup>9</sup> The REPowerEU plan will also outline steps for energy price mitigation, building on the 2021 ‘Energy Prices Toolbox’.

**The plan is strong regarding its medium- to long-term measures, as infrastructure needs time to build up. However, it currently overlooks the potential of demand-side sufficiency<sup>1</sup> options.** Through their immediate effects on energy savings, these measures have a strong capacity for mitigating energy prices and as such tackling energy poverty. The recent IPCC report, *Climate Change 2022: Mitigation of Climate Change*, identifies sufficiency as a critical tool alongside renewables and energy efficiency; the report further highlights the broader category of demand-side measures, under which sufficiency falls, as “**fundamental to an integrated approach to low carbon energy systems**”.<sup>18</sup> The **Avoid-Shift-Improve (ASI) Framework**, used by the IPCC and the United Nations Environment Programme, is useful in identifying these options.<sup>25,19</sup> The framework categorises policy options into three types:

- **Avoid** – the reduction of energy demand by eliminating some forms of consumption (e.g., teleworking reducing the need for travel)
- **Shift** – shifting to less carbon-intensive modes of consumption (e.g., switching to public transport)
- **Improve** – improving energy technology or the carbon-intensity of technology (e.g., improving energy efficiency in homes)

Beyond direct price mitigation, the measures currently included in **the REPowerEU plan focus on ‘Improve’ and ‘Shift’ strategies** such as improving energy efficiency or changing energy sources. However, these steps may **not effectively achieve energy savings both in the short- and long-term without utilising ‘Avoid’ strategies to reduce demand.** Improved energy efficiency can trigger **rebound effects** by increasing demand for energy-efficient products, thereby maintaining or even increasing energy consumption.<sup>20</sup> The rebound effect has already been demonstrated with both cars and home energy, in which, respectively, increasing car ownership and a rising demand for larger living spaces have cancelled out the savings achieved by better fuel and energy efficiency. It is therefore critical for the EU to **widen the REPowerEU policy mix to include ‘Avoid’** policy measures in order to effectively reduce energy consumption and strengthen the existing ‘Improve’ and ‘Shift’ measures<sup>21</sup>.

Ultimately, current geopolitical developments are forcing European policymakers to achieve independence from Russian energy supplies within a short period of time. In the following section, we set out how achieving energy sovereignty in Europe is possible through demand-side measures which reduce overall energy demand in the EU. This pathway also unlocks several co-benefits for Member States, as demonstrated in the next chapter.

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<sup>1</sup> Sufficiency measures, as defined by the IPCC, “avoid demand for energy, materials, land and water while delivering human wellbeing for all within planetary boundaries” (IPCC, 2022, p. SPM-41)<sup>18</sup>.

## 3. Demand-side policies: Benefits for the EU and Member States

### 3.1 Successful examples of reducing energy usage in the aftermath of crises

Reducing overall energy consumption has been a successful strategy with lasting effects to cope with energy shortages in many places in the past. For example, **Japan** deployed the successful and lasting **energy saving strategy “setsuden”** after the country was struck by earthquakes and a tsunami in 2011 and consequently faced the danger of large-scale power cuts. The “setsuden” was an information campaign in the media that called for voluntary private energy saving measures and gave energy saving advice to companies alongside directions to switch off large advertising banners<sup>22</sup>. As a result, energy consumption was reduced by 15% in the short term. **These temporary measures also have proven long-term impacts**<sup>23</sup>.

Likewise, after a 2008 avalanche, households in **Juneau, Alaska**, reduced energy consumption **by 25% initially and 8% in the long run**. They saved energy through new habits and new technologies. This included major changes in lighting, space heating, fuel switching, water and appliance usage, installing efficient light bulbs, turning off lights, switching to wood heating, and hanging clothes out to dry. These behavioural changes were almost exclusively voluntary due to high prices, but thereby achieved long-term awareness<sup>24</sup>.

Similarly, after the 2001 **Brazilian** Electricity Crisis, an energy conservation incentive programme reduced household energy consumption by **25% initially and 12% in the long run**. The programme included some private incentives which set consumption quotas based on past usage. There were also economic incentives that took the form of fines for larger consumers. A customer exceeding their quota would be charged a per-unit fine for every kWh consumed above 200 kWh. At the same time, bonuses targeted mostly smaller and poorer consumers. Additionally, conservation appeals were implemented and taxes on efficient light bulbs were reduced while taxes on electric showers, water heaters, and incandescent light bulbs were temporarily increased<sup>25</sup>.

To sum up, **measures that primarily aim to immediately reduce household energy consumption can be impactful in reducing the overall energy demand in the short-term with lasting effects**. Such measures also have a number of co-benefits for Member States, from decreasing energy prices, greater geopolitical leverage for the EU, a contribution to the targets of the European Green Deal, and the wellbeing of people, as we highlight below.

### 3.2 Co-benefits of demand-side solutions

#### The effect of demand-side reductions on energy prices

Generally, energy markets are particularly susceptible to stark price increases due to the relatively inelastic demand in the short run<sup>26</sup>. It is therefore difficult to induce a fast decline in final energy consumption solely through a price effect, as demand reacts only weakly to price increases in the short run. This also means that a sudden supply reduction, induced for example by a gas embargo, is likely to cause unprecedented price increases.

In addition, there is evidence suggesting that energy price elasticity is dependent on household income<sup>27</sup>. Oswald et al (2020)<sup>28</sup> find that energy-intensive goods tend to be more elastic, leading to higher energy consumption by high-income groups. The greater elasticity of energy-intensive luxury goods means that higher income groups have several options to absorb price increases. This implies that low-income groups have less options to react to price increases, which might trigger difficult choices between cutting essential energy consumption or other essential consumption such as food.

As past experiences with demand-side reduction policies clearly show, demand-side reductions that increase inequality are prone to fail because of resistance from citizens (see chapter 4.1). Thus, because of the rather inelastic demand in the short run and the unequal distribution of elasticity dependent on income, policy is needed to mitigate the negative effects of a supply-side shock.

Measures to reduce energy consumption can have a mitigation effect on high energy prices. This is because demand-side reduction policies will lead to less final energy consumption by households and thus decrease the total domestic energy demand. **As the demand for fossil heating and fuel falls, energy prices will also decrease**, as shown in the simple supply-demand model with inelastic demand in Figure 5. As a consequence, if prices go down, demand-side reductions will firstly have a stabilising effect and thus, financial support schemes and other price mitigation measures at Member State level will be less needed.

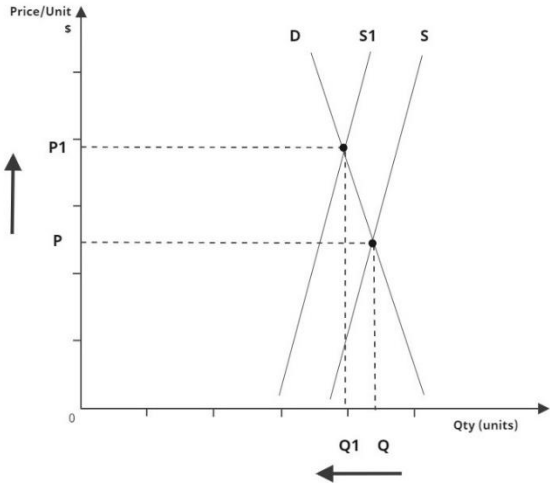


Figure 4: Supply shock of an energy supply shortage (created by the authors)

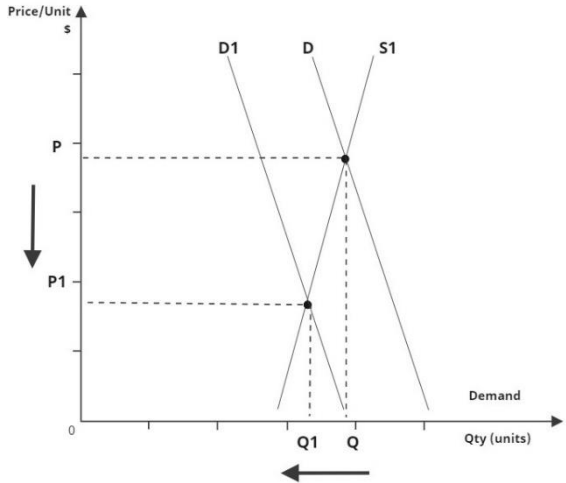


Figure 5: Price effect of an energy demand reduction (created by the authors)

Secondly, the **positive effect of demand-side reductions on energy prices contributes to protecting EU industry**. Germany and Austria recently declared the early warning stage of the Gas Emergency Plan.<sup>29</sup> In the emergency phase, rationing could be imminent, which would affect industry first. This could have serious consequences for heat generation, chemical industry, and securing electricity for

businesses. To prevent such a scenario, demand-side reductions can be used to save energy in the short term without jeopardising the functioning of our systems.

However, the decrease in energy prices due to reduced primary energy consumption can create an appetite for more energy usage. Hence, to **avoid rebound effects**, it is crucial that demand-side measures **create lock-ins into low-carbon infrastructures for lasting effects**, such as the expansion of public transport or the replacement of gas boilers with heat pumps. One suggestion is to mitigate rebound effects through progressive carbon pricing, which will combine incentivising efficiency improvements and sufficiency actions, while at the same time mitigating any associated rebound effects and protecting low-income consumers.<sup>30</sup>

### Benefits of early action

Alternative energy supply sources as well as decarbonised energy carriers will most likely have high costs (notably e-fuels); thus, **reducing demand for them has direct economic benefits**. In addition, the reduction in final energy consumption and thus also in primary energy demand has a positive co-effect of reducing the energy and environmental impacts.<sup>31</sup> As such, lifestyle changes will also **decrease the long-term economic costs of the energy transition by one-third**.<sup>32</sup> Reducing final energy demand is a cost-effective measure for GHG emissions reduction and has the ability to further progress towards socio-economic and environmental goals.

### Demand-side reductions can increase the EU's geopolitical leverage

Moreover, energy savings will reduce the final consumption of oil and gas and thus Member States' dependence on Russian oil and gas, as well as on other energy imports. As a consequence, this will alleviate negative effects on Member States in case of a gas shortage. Hence, the resulting reduction of primary energy demand will increase the EU's strategic independence and as such increase the EU's geopolitical leverage.

### Positive effects of demand-side reductions on the wellbeing of people

Research shows that energy-saving policies do not necessarily compromise the well-being of people; this is dependent on what need is usually met with the energy being saved. As stated in the latest **IPCC report, *Climate Change 2022: Mitigation of Climate Change***, "**many solutions that reduce primary material and fossil energy demand, and thus reduce GHG emissions, provide better services to help achieve wellbeing for all.**"<sup>18</sup>

The key here is to distinguish between essential needs and luxury needs. While this distinction seems to come with a strong normative stance, research has suggested ways to distinguish both based on empirical evidence.<sup>20</sup>

Energy sufficiency is about giving priority to the fulfilment of essential needs such as heating, electricity, and mobility. In other words, it is about providing the amount of energy that goes hand-in-hand with an improvement in human well-being. Given steep inequalities and the unavoidable harms of energy use, energy sufficiency allows for a direct consideration of the relationship between energy use and well-being, identifying the level at which more energy use does not correlate with an increase in well-being anymore. The existence of this phenomenon has already been demonstrated in the form of a saturation effect.<sup>33</sup>

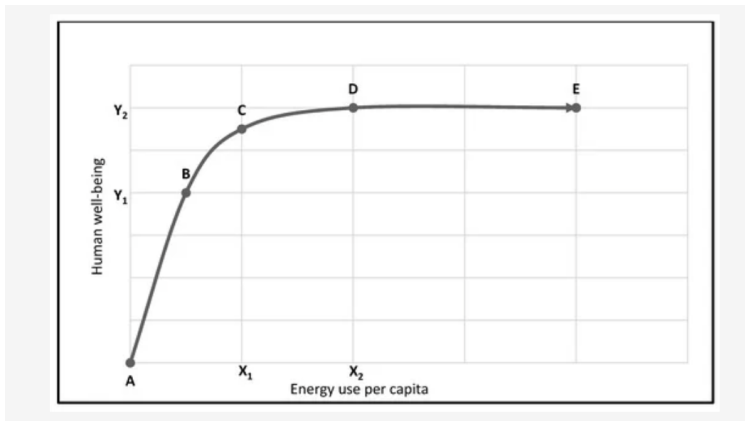


Figure 5: The saturation effect, Burke 2020

In a recent paper, Creutzig et al. demonstrate that **79%** of 306 analysed **demand-side options have a positive effect on human wellbeing**. Wellbeing improvements are most notable in health quality and energy, including the reduction of indoor air pollution through clean cookstoves, improved outdoor air quality in cities as a result of reduced private motorised mobility, and active mobility.<sup>34</sup>

#### 4. Policy design for successful and socially balanced demand-side reductions

For demand-side reductions to succeed, **policy design is fundamentally important**. While well-designed demand-side measures offer a raft of benefits, poorly designed behavioural change campaigns risk being ineffective and even politically harmful.

##### 4.1 Lessons learned from the past

To understand how to design demand-side measures properly, four lessons from past attempts are illuminating:

1. Policy design should be **participatory**. Public participation is key to the acceptance and uptake of new approaches to energy, as demonstrated by renewable energy campaigns in Denmark and the USA.<sup>35</sup> Energy prices are an especially sensitive area directly connected to citizens' everyday lives, meaning imposed changes risk strong public backlash.
2. Effective demand-side policy mixes **go beyond voluntary measures**. Campaigns purely targeting voluntary behavioural change without supporting regulations or changes in price incentives are likely to achieve little or no change and do not take fairness into account, for example the unsuccessful 'Power of One' energy savings campaign in Ireland.<sup>36</sup> Because of the inelasticity of energy demand, consumers are unlikely to voluntarily reduce their consumption without strong incentives or support.
3. Demand-side approaches should employ **careful framing** and **avoid over-individualising** the problem. Values-lead messaging<sup>37</sup> is as important as recognising the joint responsibility of governments, businesses, and communities to transform our ways of living. Moreover, many

examples show that just providing consumers with a large amount of information about energy consumption simply overwhelms them. With a well-crafted frame, ‘less is more’ in energy savings campaigns.<sup>38</sup>

4. Policy design must **prioritise equity**. When it comes to energy savings, it needs to be taken into account that currently, wealthy households are using much more energy, notably in the areas of transport and housing.<sup>20</sup> Demand-side policies which neglect to address this while further aggravating the situation for lower-income households are likely to provoke backlash, as in the case of the Yellow Vest movement in France, and policy mixes which fail to support low-income households through this energy crisis can trigger protests and crises, as in Peru.<sup>39</sup>

## 4.2 A Framework for Demand-Side Reductions

From this we derive a **policy design framework** that gives guidance on both the “how” and the “what” of demand-side measures to reduce final energy consumption.

Policy Design Framework for Demand-Side Reductions												
<p><b>How?</b></p> <p><b>Co-creation and involvement of stakeholders to ensure:</b></p> <ul style="list-style-type: none"> <li>• Context specificity</li> <li>• Equity</li> <li>• Ownership and acceptance</li> </ul> <p><b>Whole-of-government approach to:</b></p> <ul style="list-style-type: none"> <li>• Manage tensions and trade-offs effectively</li> <li>• Create policy coherence</li> <li>• Avoid carbon lock-ins and ensure DNSH compliance</li> </ul> <p><b>Appropriate and honest framing to:</b></p> <ul style="list-style-type: none"> <li>• Avoid misunderstandings and feelings of overwhelm</li> <li>• Avoid over-individualising the problem</li> </ul>	<p><b>What?</b></p> <table border="1"> <thead> <tr> <th colspan="3">Policy Instrument Impact Assessment</th> </tr> <tr> <th>Primary energy saving potential</th> <th>Social impact</th> <th>Transformative potential</th> </tr> </thead> <tbody> <tr> <td>Mb/d of oil equivalents or gas</td> <td>Assessment of Equity impacts</td> <td>Assessment of transformative potential</td> </tr> </tbody> </table>			Policy Instrument Impact Assessment			Primary energy saving potential	Social impact	Transformative potential	Mb/d of oil equivalents or gas	Assessment of Equity impacts	Assessment of transformative potential
	Policy Instrument Impact Assessment											
	Primary energy saving potential	Social impact	Transformative potential									
Mb/d of oil equivalents or gas	Assessment of Equity impacts	Assessment of transformative potential										

The “how” encompasses three principles for the policy design process:

- **Involve people and key stakeholders in designing policies which affect them and their communities.** There are no one-size-fits-all solutions for reducing energy consumption while addressing energy poverty. Solutions should arise from the bottom-up expression of needs, and each solution should be tailored to the context and community through local participation and consultation. This not only creates ownership and acceptance, but it also ensures better-quality policy outcomes.
- **Take a whole-of-government approach.** The energy crisis is complex and requires cooperation across different departments or ministries and different levels of government.<sup>40</sup> A whole-of-government approach can help to effectively manage trade-offs and tensions and

support policy coherence. The application of the ‘Do No Significant Harm’ principle can be a useful tool for integrated approaches and avoid lock-ins into harmful patterns.

- **Communicate change in a positive way.** People tend to disengage when they are overwhelmed and don’t see improvements in the situation as realistic<sup>2</sup>. This is an important lesson learned in climate campaigning, which is also applicable for navigating the energy crisis. To engage citizens in reducing energy consumption, it’s important for them to see both 1) that such reductions are possible and 2) that these reductions even carry co-benefits.

The “what” of the framework provides a **Policy Instrument Impact Assessment Tool** to evaluate demand-side measures along three dimensions:

1. Their potential to **reduce primary energy demand** and as such to contribute to the geopolitical independence of the EU;
2. Their **social impact**: To alleviate energy poverty in the long-term, **progressive** measures and measures which enhance the **affordability** and **accessibility** of energy services are necessary, which means enabling agency for disadvantaged citizens. Not only will this contribute to public acceptability, but it will improve the effectiveness of demand-side measures, as the emissions of the wealthiest Europeans continue to rise and therefore have a particularly high potential for cuts.<sup>20</sup>
3. Transformative potential: Effective demand-side measures should avoid any lock-ins into fossil infrastructure and **initiate long-term changes** that support the achievement of the EU’s climate objectives beyond short-term implementation.

## 5. Demand-side policies for Member States

For this paper, we looked at a total of 68 demand-side measures proposed by research institutions, think tanks and civil society institutions in response to recent energy price increases. To evaluate their primary energy saving potential, their social impact and their transformative potential, we applied the Policy Instrument Impact Assessment, as outlined in the [policy design framework for demand-side reductions](#) above. The full list of the assessed measures can be found in the [annex](#).




**What is missing in the debate is a focus on absolute reductions in final energy consumption, coupled with measures that tackle energy poverty and avoid carbon lock-in.** In the following section, we present promising demand-side measures that make a substantive contribution to the criteria mentioned above. It is important to note that this list is non-exhaustive. There are a number of other measures that have similar potential, such as speed limits, incentivising remote working, limiting business travel, and freezing company car fleets. Here we have focused on measures whose potential have been less illuminated by other institutions.

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<sup>2</sup> For more information on framing, please visit <https://1point5lifestyles.zoe-institut.de/insights/toolkit/>

## 5.1 Selected energy saving measures for EU member states for the short-term

### Overview

Policy measure		Energy savings potential 	Social impact 	Transformative potential 
Transport	<b>Incentivise Car&amp;Ride sharing</b>	0.108 mb/d of oil equivalents	Positive impact on accessibility	medium
	<b>Car free Sundays</b>	0.09 mb/d of oil equivalents	Benefits for cyclists, children, physically disabled people, and health benefits	High, if long-term measure
	<b>Annual local public transport ticket for 365-Euro</b>	0.076 mb/d of oil equivalents	Positive impact on affordability, accessibility, and progressivity	high
	<b>Substitution of short haul flights by train connections</b>	0.009 mb/d of oil equivalents	Progressive effect	high
Buildings	<b>Bonus programme for deep renovations for worst performing buildings</b>	0.056 mb/d of oil equivalents	Positive impact on affordability, accessibility, and progressivity	high
	<b>Smart thermostat rollout</b>	0,054 mb/d of oil 0.55 mcm per day of gas	Positive impact on affordability and accessibility	medium
Cross-cutting	<b>Energy savings campaign</b>	0.056 mb/d of oil; 0.027 bcm per day of gas saving	Positive impact on affordability	medium
	<b>Ban on energy-intensive cryptocurrencies</b>	0.032 mb/d of oil equivalents	No direct impact	medium

### Measures for the transport sector

As stated above the transport sector is particularly important as the largest consumer of oil in the EU. In order to reduce oil consumption, policy measures should focus on reducing the use of internal combustion engine vehicles (ICEVs) and flights, by reducing mobility needs, stimulating modal shift and accelerating the switch to Battery Electric Vehicles (BEVs). As stated above, the transport sector is particularly important as the largest consumer of oil in the EU. In order to reduce oil consumption, policy measures should focus on reducing the use of internal combustion engine vehicles (ICEVs) and flights by reducing mobility needs, stimulating modal shifts, and accelerating the switch to Battery Electric Vehicles (BEVs).



### Incentivise Car- & Ridesharing




Carsharing has an indirect influence on energy consumption (reduced production of cars, and potentially less usage of the car compared to a household owning a car). It also has a direct effect through a higher occupancy rate compared to privately owned cars. Ridesharing (also called ride hailing or pooling) can directly reduce petrol consumption, assuming that the passenger(s) would have done the same trip with their own car.<sup>41</sup> Average occupancy rates in the EU continue to decline and are about 1.1-1.2 persons per car for commuter and 1.6-2.0 for leisure trips.<sup>41</sup>

#### Design of the measure

Member States can take various actions to foster ridesharing through:

- privileged lanes on highways and privileged parking lots
- an acceptability campaign that appeals to citizens to save energy and emphasises the potential monetary savings
- the introduction of a state-backed verification system for ridesharing platforms, to increase citizens' trust

#### Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.108 mb/d</b> of oil equivalents	Enabling and promoting car and ride sharing has an inclusive effect and improves access to mobility for those who cannot drive themselves or do not own a car. Especially in rural areas where public transport is poorly developed, we expect a particularly <b>positive effect on accessibility.</b>	This measure has transformative potential and <b>avoids fossil lock-ins.</b> The expansion and promotion of car- and ridesharing options enables a <b>gradual reduction of private car usage.</b>

#### How we calculated

The IEA estimates that an increase of around 50% in the average car occupancy in 1-in-10 trips and adopting best-practices to decrease car fuel use can save around 470 kb/d of oil in the short term in advanced economies<sup>42</sup>, which is 0,47 mb/d of oil (1000 kb/d = 1 mb/d). According to BP, EU oil demand was 10.149 mb/d in 2020<sup>43</sup>, the oil demand in advanced economies is 44.6 mb/d according to the IEA<sup>42</sup>. Thus, the EU-share of advanced economies' oil demand is at around 23%, so about 0.108 mb/d of oil could be saved in the EU.



### Car-free Sundays

Car-free Sundays were a measure introduced in the first oil crisis in the 1970s by some Member States to cut oil demand. The measure directly restricts petrol consumption via the restriction of car utilisation. Sundays are the appropriate weekday as the day with the most avoidable (leisure) trips.

#### Design of the measure

Exceptions are required for those who need to commute to work on Sundays. The IEA proposes focusing this measure on cities in which a viable alternative exists with public transport. To incentivise a trial of public transport options, car-free Sundays could be combined with free public transport.

#### Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.09 mb/d</b> of oil equivalents	This measure has a beneficial effect for non-car owners, cyclists, children, and disabled people due to the additional space becoming available on streets. It also has <b>health benefits</b> due to an increase in active mobility as well as less exposure to air pollution, to which lower-income and marginalised communities tend to be more exposed in many cities.	If maintained on a <b>permanent basis</b> , this measure will have a very <b>significant long-term impact</b> .

#### How we calculated

The IEA estimates that this measure (if applied only to cities) could save 0.38 mb/d of oil<sup>42</sup>. According to BP, EU oil demand was 10.149 mb/d in 2020<sup>43</sup>, the oil demand in advanced economies is 44.6 mb/d according to the IEA<sup>42</sup>.

Thus, the EU-share of advanced economies' oil demand is at around 23%, so about 0.09 mb/d of oil could be saved in the EU.

### Annual local public transport ticket for 365-Euro

According to the IEA, increased use in public transport instead of individual mobility helps to directly reduce oil consumption.<sup>42</sup> A (temporary) price signal can stimulate changes in mobility routines, especially in cities with a well-functioning infrastructure. For example, in German cities 62% of respondents to a ADAC survey stated in 2017 that high prices are a reason for them to not or only rarely use public transport.<sup>44</sup>




#### Design of the measure

An annual local public transport ticket for 365€ per year could incentivise citizens to switch (back) to public transport. Particularly, a double price signal through high (petrol) prices for individual mobility and a lower price for public transport would provide a strong incentive to reduce car use and switch to public transport.

#### Best practice example

An example is Vienna, where the parallel introduction of a 365€-ticket and introduced pricing for private parking led to more than a doubling of the sales of annual tickets for the local public transport.<sup>45</sup>

#### Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.076 mb/d</b> of oil equivalents	This measure has a positive effect on the affordability and accessibility of public transport and has a progressive effect, as low-income households tend to be more dependent on public transport.	This measure has potential for long-term transformation, as it incentivises public transport usage and avoids carbon-lock ins.

#### How we calculated

The IEA estimates that short-term measures to incentivise public transport use and micro-mobility can avoid around 0,330 mb/d of oil use in advanced economies<sup>42</sup>. According to BP, EU oil demand was 10.149 mb/d in 2020.<sup>46</sup> The oil demand in advanced economies is 44.6 mb/d according to the IEA<sup>42</sup>. Thus, the EU-share of advanced economies' oil demand is at around 23%, so about 0.076 mb/d of oil could be saved in the EU.

### Substitution of short-haul flights with train connections

Design of the measure

Long-haul flights account for the largest amount of CO2 emissions, short-haul flights are bigger emitters per passenger, and per kilometre<sup>47</sup>. We recommend that the Member States introduce regulations that ban **substitutable short-haul flights**. As such we define flights of **distances that can be travelled by train under 4 hours**.




Best practice examples

**EU countries are already taking steps to reduce short-haul flights.** For example, Austria plans to ban domestic flights for which a train connection under three hours is available and implement a minimum price for tickets via fees and taxes<sup>48</sup>. **France has set out a law banning domestic flights, where a rail alternative of under two-and-a-half hours exists<sup>49</sup>.** In the Sustainable and Intelligent Mobility Strategy, the Commission calls for scheduled collective travel of less than 500km to be carbon neutral by 2030. Nevertheless, it does not encourage reducing air travel as a whole.

Public acceptance

62% of Europeans support a ban on short-haul flights, according to a survey<sup>50</sup> conducted by the European Investment Bank (EIB), and a large majority<sup>51</sup> of people in Germany (63%), France (72%), Poland (73%), Spain (80%) and the Netherlands (65%) want to take more night trains, at reasonable costs.

Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.009 mb/d</b> of oil equivalents	This measure has a positive social impact and a <b>progressive effect</b> as lower-income groups fly the least <sup>20</sup> ; thus, high emitters are harder hit by the implementation of this regulation.	A ban on short-haul flights <b>avoids carbon lock-ins</b> and contributes to accelerating the green transition towards climate neutrality.

How we calculated

According to estimates from IEA, around 2% of aviation activity in advanced economies could be shifted to high-speed rail based on existing high-speed rail infrastructure. This would avoid around 40 kb/d or 0.04 mb/d (1000 kb/d = 1 mb/d) oil use in the short term in advanced economies according to IEA. According to BP, EU oil demand was 10.149 mb/d in 2020<sup>43</sup>, the oil demand in advanced economies is 44.6 mb/d according to the IEA<sup>42</sup>. Thus, the EU-share of advanced economies’ oil demand is at around 23%, so about 0.009 mb/d of oil could be saved in the EU.




## Measures for the heating sector

### Bonus programme for deep renovations for worst-performing buildings

#### Design of the measure

We recommend a bonus programme for deep renovations for the worst-performing buildings in terms of energy efficiency. This would boost the deep renovation rate and comply with primary energy needs below 80 kWh/m<sup>2</sup>/year. In addition, critical safeguards are important to ensure progressive impact, such as ensuring that the costs of renovation are not passed on by landlords. This also includes the obligation to ensure adequate accommodation for households during renovation work.

#### Expected impact

Energy savings potential 	Social impact 	Transformative potential 
0.056 mb/d of oil equivalents	This measure contributes to a high degree to social goals and the mitigation of energy poverty. It makes renovations more <b>affordable and accessible</b> and has a <b>progressive effect</b> , because low-income groups tend to live in buildings with low energy efficiency performance.	Accelerating deep renovations contributes to a high degree to carbon neutrality.

#### How we calculated

In December 2021, the European Commission proposed to renovate all the 20 million of the 131m buildings in the EU that belong to class G, the very least performing buildings until 2030. According to the European Commission, this will save 4.6 to 6.2 Mtoe a year, upgrading also the buildings classified energy efficiency class F will save additional 3.5 Mtoe/y, approximately.<sup>52</sup> Hence, upgrading buildings with an energy performance class of F or G to at least class E will save about 9 Mtoe/y until 2030 and 3 Mtoe/y until 2025, as we estimate that 33% of the 2030 goal could be achieved by then. 1 toe equals 6.841 boe<sup>53</sup>, so savings of 20.523 mboe per year and 0,056 mb/d oil equivalents would be possible.




**Smart thermostat rollout**

The EC, when announcing REPowerEU, appealed to citizens to lower room temperatures. However, with smart thermostats, a technical tool exists that can lead to demand reductions of about 10% without any loss of comfort. The thermostats are connected to the smartphones of residents. They thereby detect regular times of presence and adjust the room temperature automatically. Furthermore, these tools detect open windows and stop the heating for as long as they are left open. Averaging about 50€ per appliance, this is a rather low-cost investment that can amortise relatively fast, depending on heating costs and heating behaviour before installing.

Design of the measures

In order to support a mass roll-out of smart thermostats, Member States could create a subsidy scheme and/or deploy these in state-owned facilities.

Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.054 mb/d</b> of oil <b>0.55 mcm</b> per day of gas	This measure contributes to the <b>affordability and accessibility</b> of smart thermostats and <b>lowers the heating bills</b> , which will be disproportionately felt by lower-income groups	This has a limited but positive long-term effect on carbon neutrality, as a thermostat can be applied both to existing technologies but also to future technologies like heat pumps.

How we calculated

For oil: In 2020, 22 million homes in the EU were equipped with a thermostat, according to Statista. This number was only 8m in 2018 and 13.4m in 2019.<sup>54</sup> From these numbers, we carefully derived that it should be at least 30m now and calculated based on that number. According to Statista, there are 195.4 private households in the EU.<sup>55</sup> Hence, around 165.4 million households in the EU are not yet equipped with smart thermostats. These thermostats are able to save up to 10% of energy consumption.<sup>56</sup> According to the European Commission, households consume 192.5 Mtoe of oil.<sup>57</sup> Around 15% of all EU households are heated with oil as of 2019.<sup>16</sup> 15% of 192.5Mtoe of oil would be around 28.875 Mtoe of oil, of which up to 2.8875 Mtoe could be saved by thermostat installation. 1 toe equals 6.841 boe<sup>58</sup>, so 19.75 Mboe could be saved in one year. Thus, this proposal could potentially lead to energy savings of around 0.054 mb/d of oil.

For gas: According to the IEA, the EU could reduce gas demand for heating homes by about 200 mcm of gas per year, so 0.55 mcm of gas per day, just by tripling the current installation rate of smart thermostats, which is currently at around one million homes per year<sup>59</sup>.

Crosscutting measures

**Energy savings campaign**

As experiences from the past have shown (see chapter 3.1), media campaigns can be highly effective for short-term reductions in energy consumption by motivating lifestyle changes. According to an analysis by the European Commission, information campaigns on energy savings are generally effective and can, given that the most effective strategy is chosen, achieve a reduction of participants’ energy consumption by an average of 13.4%.




*Design of the measure*

Member States should roll out a massive public information campaign to appeal to citizens and companies to reduce energy consumption wherever possible. This campaign should be combined with a regular weekly update on current energy consumption, as proposed in XX, to keep the topic in public media.

The following recommendations have been shown to have both short-term and lasting energy saving effects:

- A reduction of the average room temperature by 1°C<sup>60</sup>
- Information and promotion of conscious energy consumption, including information about the energy savings potential of switching off unused lights and devices as well as drying laundry by air rather than in a tumble dryer
- Information about low-tech renovation measures (e.g., roller shutter box insulation, sealing of windows and doors, beneficial effects of carpets for thermal comfort)
- Encouraging companies to provoke a norm change with regards to clothing standards in summer to reduce the cooling needs of office buildings, in particular in Spain and Italy, where electricity mainly comes from gas
- Promote demand flexibility to reduce peak demand<sup>3</sup> (e.g., time programming of washing machines or dishwashers)

*Expected impact*

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.056 mb/d</b> of oil <b>0.027 bcm</b> per day of gas saving	Any campaign needs to recognise that energy consumption rises with income level. Higher-income groups thus have a higher energy savings potential.	Examples from the past have shown that information campaigns can lead to long-term energy savings.

*How we calculated*

According to the European Commission, final energy consumption of households in the EU is 192.5 Mtoe.<sup>57</sup> 11.6% of that came from oil, so 22,3 Mtoe and 32.1% came from gas, so 61,79 Mtoe.<sup>61</sup> 1 toe equals 6.841 boe, so 22.3 Mtoe equal 152.75 mb of oil consumption of households in the EU. 1 Mtoe equals 1.19 bcm of gas, so 61.79 Mtoe equal 73.53 bcm of gas consumption of households in the EU.

An analysis of the European Commission finds that “energy audits and consultation, when individuals are informed about their own energy use and given advice on how to lower their consumption, were the most effective” and save an average of 13.5% of consumer’s energy consumption.<sup>62</sup> 13.5% of 152.75 mb of oil consumption of households in the EU would be 20.59 mb, so 0.056 mb/d of potential oil savings. 13.5% of 73.53 bcm of gas consumption of households in the EU would be 9.93 bcm per year, so 0.027 bcm per day of potential gas savings.




<sup>3</sup> It is in hours of peak-demand that gas power plants are running. Avoiding peak demand could significantly reduce gas consumption in the electricity sector.

**Ban on energy intensive cryptocurrencies**

Design of the measure

We recommend an EU-level ban on the energy-intensive method of crypto mining referred to as “proof of work”. For instance, Bitcoin, relying on “proof of work” technology, used 130 TWh worldwide, 5% of that in Germany<sup>63</sup>, in August 2021. Banning the mining method “proof of work” and instead nudging the industry towards the less energy-intensive “proof of stake” model could cut down the sector’s energy usage significantly.

Expected impact

<b>Energy savings potential</b> 	<b>Social impact</b> 	<b>Transformative potential</b> 
<b>0.032 mb/d of oil equivalents</b>	We consider this measure to be compatible with social objectives, as the regulation of cryptocurrencies has no direct impact on social concerns.	This measure ensures that the environmental impact of cryptocurrencies is limited in the long term.

How we calculated

Bitcoin’s energy consumption has been rising so quickly that reliable sources are hard to find, since numbers dating some months ago are already quite outdated. According to estimates from the platform Digiconomist’s Bitcoin Energy Consumption Index, Bitcoin’s energy consumption is at 200 TWh per year globally as of April 2022.<sup>64</sup> In August 2021, about 12.5% of Bitcoin’s energy consumption was mined via IP addresses from the EU, according to the Cambridge Bitcoin Electricity Consumption Index.<sup>65</sup> However, uncertainties persist due to VPN usage and the lack of data on other cryptocurrencies, which make estimations difficult. Because Bitcoin is still dominant<sup>66</sup> and because Ethereum, the second most important cryptocurrency, is already on the move to shifting its proof-of-work method to the proof-of-stake method<sup>67</sup>, we will focus on Bitcoin. We worked with an estimated 10% of global Bitcoin energy consumption in the EU to compensate for VPN usage. This leads to an energy consumption of about 20 TWh in the EU, which is 11.764 mboe (1tWh = 588235,29 mb). We directly translated from TWh to oil equivalents, assuming that free energy resources in general can contribute to replacing Russian energy, not just saving oil. According to climate groups, Bitcoin’s energy consumption could easily be reduced by up to 99.9% with a basic software change, using the ‘proof of stake’ method instead of the energy-intensive ‘proof of work’ method<sup>68</sup>. Thus, almost all of the 11.767 mb of oil equivalents that Bitcoin consumes per year, or 0.032 mboe/d could be saved in the EU.



## 6. Proposals for EU-level measures

Above, we have demonstrated the necessity of demand-side measures, their potential to contribute to energy security, and their co-benefits, for example for equity and health. We further highlighted some possible demand-side measures at the level of Member States.

For many measures, the EU has only limited competency. This is why this chapter presents three proposals for how the EU can support the implementation of demand-side measures, building on existing policy processes at EU level:

- An **EU Inclusive Energy Savings Initiative (IESI)** to support and coordinate Member State activities in energy demand reduction. IESI includes reduction targets for primary energy demand and the introduction of national energy saving plans
- An **EU Energy Consumption Communication** on at least a weekly basis to highlight the most important variables in the current situation and best practices for energy saving measures, ensuring through the frequency of communication that both citizens and policymakers remain aware of the importance of action
- An **EU Energy Savings Package** that raises the level of ambition of the legislative proposals currently discussed under the Green Deal and proposes fast-tracking measures which could effectively reduce oil and gas consumption

### 6.1 The EU Inclusive Energy Savings Initiative (IESI) as a multi-level governance approach to boost Member State action

With REPowerEU, the EU has proposed an important package to ensure energy security in the Union. However, the focus on supply-side substitution and diversification runs the risk that a gap of about 1 mb/d of oil and more than 700 TWh of gas ([see chapter 2.2](#)) remains to free the EU from its dependence on Russian energy imports. An energy savings strategy within REPowerEU can help close this supply-side gap.

We propose, therefore, that within REPowerEU, the Commission launches an Inclusive Energy Savings Initiative (IESI) that

1. **coordinates and supports Member State efforts to cut down demand** for Russian gas and oil through demand-side measures
2. proposes **demand-side measures at the EU level**, where EU competency applies

In doing so, the initiative would incorporate different Member State and EU competencies and harness their ability to implement measures with short-term or medium- to long-term effect.

**In our view, the initiative is easy to implement and does not require additional governance structures** but can be integrated into existing bodies for coordinating Member State action. Two options are available. Firstly, the Initiative could be coordinated by the body responsible for the EU's joint gas purchases. In this sense this body would not only coordinate gas supply, but also Member State efforts to deal with gas shortages. In this case, the Commission could propose **the amendment "Coordinated energy saving plans" to the Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply**.

Alternatively, the IESI could be integrated into the European Semester. For example, the bodies of the Recovery and Resilience Facility can be used for coordinating Member State action, who gathered important knowledge on coordinating and guiding member state efforts with the development of the National Recovery and Resilience Plans.

The IESI consists of four key pillars, which will be described in detail below:

Proposal for the <b>EU inclusive energy savings initiative (IESI)</b> consisting of			
<b>Short-term reduction targets for energy consumption</b> for gas, oil, and electricity	<b>National energy saving plans</b> to be submitted to the European Commission by October 2022, as an appendix to the National Climate and Energy Plans	<b>EU Guidance on National Energy Saving Plans</b> , including best-practice examples	<b>Guidance on</b> <ul style="list-style-type: none"> <li>• <b>potential/risk assessment of energy demand reduction measures</b></li> <li>• energy savings potential</li> <li>• overview about expected equity impacts</li> <li>• <b>whole-of-government approach to policy design</b></li> </ul>

### Reduction Targets for Energy Consumption

As part of IESI, the European Commission can propose **short-term reduction targets for energy consumption** for gas, oil, and electricity. The targets aim to close the remaining gap with regard to Russian primary energy imports and their supply substitution potential.

Two options for these target exist:

- a) The targets are included in the Energy Efficiency Directive (EED) 2012/27/EU for the EU level, without Member State-specific targets. Thereby, the targets would function as interim targets for the 2030 target of -32.5 % energy consumption set out by the EED. A short-term target could ensure energy savings of 15% by 2023. The EU would aim to achieve this target through the aggregate efforts on Member State level indicated in the National Energy Saving Plans (see second pillar).
- b) The target is translated to Member State level, thereby taking into account different levels of dependency on Russian primary energy imports and varying abilities to implement these measures. The size of required demand reductions better incorporates transmission bottlenecks within EU gas and oil transmission networks. Not all reductions equally help to reduce reliance on Russian gas. For example, gas available in Spain is difficult to transfer to Germany.

### National Energy Saving Plans

Independently from EU-wide or Member State-specific targets, we propose that Member States have to hand in National Energy Saving Plans (NESPs) by October 2022. In these NESPs, Member States have to submit measures through which they aim to achieve the targets. The aim of these plans is to introduce demand-side measures with short-term effects on reducing demand for energy and gas as fast as possible. These kinds of measures are difficult to implement at EU level due to long negotiations and limited EU competency.

In these plans, Member States outline national demand-side measures. Member States specify:

- how much energy consumption is expected to decrease through a certain measure,

- how they aim to take into account the differing social implications of planned measures in terms of burdening low-income households and vulnerable groups, and
- propose measures to mitigate those implications, if necessary.

The European Commission will assess the submitted plans. Depending on the chosen option for the energy savings target, either:

a) The EU aggregates Member State efforts; if the target is not met, all Member States have to tighten their measures (*collective EU target*).

b) Member States are called to revise measures if their assessed reduction potential is insufficient (*national targets*).

NESPs could be an appendix to the National Climate and Energy Plans and coordinated by the procedures of the European Semester. The process builds on the existing knowledge and experience within the Effort Sharing Regulation, the European Semester, and the National Recovery and Resilience Plans.

### EU Guidance on National Energy Saving Plans

As a third step, the Commission should provide guidance and best-practice proposals for measures to be included in the plan. The Commission's country desks can do this by supporting Member States with guidance on how energy saving targets can be achieved. This includes

- a list of priority measures, and
- guidance on the concrete design of measures which have the highest energy saving potential and at the same time entail beneficial implications for energy poverty.

Regarding the former, we have provided a list of eight highlighted measures that meet these criteria in the preceding chapter. A more comprehensive list of measures which have thus far been proposed in the current context can be found in the appendix. This list could be further expanded based on research literature from the last decades on energy conservation/savings, lifestyle and behavioural changes, and energy sufficiency.

Regarding the latter, we have provided guidance on how to **apply a whole-of-governance approach** in developing these measures to ensure that measures are coherent across various political priorities, including, for example, the reduction of energy poverty<sup>69</sup> as formulated in COMMISSION RECOMMENDATION (EU) 2020/1563 on energy poverty. Notably, for equitable policy outcomes, it is key that energy saving and transition policies are complemented with policies to address both energy poverty as well as high-income emissions reduction potential.

Moreover, any lock-ins into fossil infrastructures need to be avoided. The 'Do No Significant Harm' principle can provide a helpful tool to prevent environmental risks. The application of this principle can also contribute to the overall policy coherence of these plans. In their NRRPs, EU governments have already exemplified how this principle can be operationalised.

## 6.2 Regular communication of EU energy consumption

In the context of the proposed measures and to gain visibility, the European Commission could immediately start an energy consumption briefing every Monday. The frequency could be increased to daily briefings in winter, if energy shortages become more pressing. The purpose of this measure is to

increase awareness and attention among citizens, companies, and policymakers, thereby incentivising additional savings. An example for such a communication would be the briefings by Member States on infection and hospitalisation rates during the COVID-19 pandemic. The briefings consist of four parts:

1. Current energy consumption for oil, gas, and electricity at the EU level,
2. Information on the level of gas storage in the EU
3. Highlighted Member States which have achieved particular energy savings or other measures which contribute to energy security, and
4. Best practices to save energy at the household level.

### **6.3 An EU Energy Saving Package for EU level implementation**

To achieve energy savings in the medium-term, we further propose an EU Energy Saving Package. Medium-term proposals focus on buildings and the transport sector as these are still heavily reliant on fossil fuels. While we call them medium-term, they require short-term decisions to fulfil their potential within the next 3-5 years. For the proposals, we rely on our own work and the growing body of energy sufficiency and sustainable lifestyles research. In areas of EU competence, the Commission would put forward an Energy Saving Package by July to be adopted before the winter. The package outlines a series of measures<sup>4</sup> that can be implemented on an EU level and, apart from a handful of cases, have primarily medium-term effects. The measures aim for harmonising across Member State regulation and overcoming barriers for reducing fossil fuel consumption.

The European Union should not only aim to tackle the present crisis but also the climate crisis. When the IESI, NESPs, and other measures are implemented successfully and when the war in Ukraine hopefully comes to an end, gas prices could decrease again in the medium-term. In this context, the Commission should plan ahead and **implement safeguards against a rebound that would render the reduced fossil fuel consumption temporary**. Therefore, as part of the package, the EC should require Member States to propose **national phase-out dates for natural gas and plans to dismantle gas distribution networks in 2023**<sup>5</sup>. Energy saving plans can then be used to create a sustainability lock-in, providing citizens and companies with a clear signal to move away from fossil gas.

#### **Buildings**

##### Ecodesign

The Ecodesign and Energy Labelling Directives (Directive 2009/125/EC and Regulation (EU) 2017/1369) are still the most successful policy tools to reduce energy demand in Europe. In the following text, we propose that the EC uses the Ecodesign Directive to significantly reduce household gas demand by applying ambitious proposals for three product groups.

- **Phase-out of gas boilers**

While the decision of the Commission seems to be already taken the EU should reconsider the phase-out of gas boilers EU-wide. The current political context could be favourable to find majorities in the Council for this measure. A phase-out date for gas boilers is necessary to reach the necessary phase-out of fossil gas in 2040 in buildings<sup>70</sup>. Three considerations are important to come to this conclusion: 1) The average lifetime of a heating system installed today is 20 years. 2) Green gases will remain scarce and expensive in the medium-term. Green gases produced will be necessary to decarbonise industry, shipping and aviation. They will not be available for heating

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<sup>4</sup> In the context of the Green Deal but with increased ambition.

<sup>5</sup> Industry, shipping and aviation will need green hydrogen in the next decades to substitute gas, kerosene and oil. However, green hydrogen will remain too expensive and scarce to use for heating homes or private cars. Gas infrastructure will need at least major refurbishment to transport green hydrogen to industrial centers of Europe because hydrogen is an extremely volatile gas.

private households, for which 3) a viable, highly-efficient alternative exists: heat pumps. The EU should therefore implement a phase-out of new gas boiler installations by 2023. With this measure the EU would achieve a gradual reduction of gas consumption with every replaced gas boiler. **The complete potential of this measure amounts to the current level of gas consumption for heating of about 132.76 bcm (current imports from Russia: ca. 190 bcm).**

- **Phase-out of gas hobs and -ovens**

Gas hobs and -ovens are not only unsustainable because of their CO<sub>2</sub> emissions. They also endanger the lives of European citizens<sup>71</sup> because of NO<sub>x</sub> emissions. Hobs and ovens are regulated since 2015 under EU Ecodesign and Energy Labelling directive. While cooking only accounts for 6 % of household energy consumption, **fossil gas needs to be phased-out by 2040<sup>71</sup>. This means also that gas hobs will need to be replaced by then.** For cooking an easy and widely accepted alternative to replace gas exists with electric and induction cooking hobs.

In the context of the energy crisis, climate change and health benefits the EU should take the opportunity to phase-out gas hobs and ovens with the current review of the regulation<sup>72</sup>. Thereby, the EU can save 5,32 bcm of fossil gas per year, in case all gas hobs are replaced.

- **Energy-saving shower heads and taps as the standard**

The EU should start a fast-track process to ban all non-water-saving shower heads and taps as soon as possible. To speed up the effects the EU and governments should urge citizens with a potential campaign to buy new energy saving shower heads. By reducing energy and water consumption significantly a shower head can pay off within one year<sup>73</sup>. Only using efficient taps and showerheads could save a staggering 2,500 million cubic metres of water every year in the EU. This would suffice to comfortably meet all the annual water needs of 35 million citizens. **More importantly the EU could save 6 million tons of oil equivalent of energy for water heating.<sup>72</sup>**

### Renovation

Triggering a fast and comprehensive ‘renovation wave’, alongside the deployment of renewables, is key to achieving the 2030 climate targets of the EU and to reducing energy consumption. Europe needs **strict minimum energy performance standards (MEPS)** that lead to the renovation of the worst-performing buildings first. Trigger events such as the sale of a building need to be established as invoking an obligation to renovate the building. Furthermore, the EC should propose a legally binding definition of “deep renovation” that complies with a primary energy need between 60 and 80kWh/m<sup>2</sup>/year after the renovation works<sup>74</sup>. **If all buildings were renovated with the requirement to reach 70 kWh/m<sup>2</sup>/year of useful energy (energy needs), the overall energy needs in the entire stock would be reduced by 43% in the EU.<sup>75</sup>**

To achieve these savings, the EU has to act fast and increase the speed of renovations. A 3.3% deep renovation rate is needed to reach 100% deep renovation for the EU building stock by 2050<sup>6</sup>. Finally, the EU needs to take steps beyond renovation towards the transformation of our daily lives, as expressed by the European Commission through the New European Bauhaus initiative.

### IPCEI for Heat Pumps

Heat pumps are the most promising alternative for gas boilers to heat European households in the future. Heat pumps today are fully developed, have been utilised even in the cold climates of northern Europe, and are the most efficient technology available for heating. All that is missing is a skilled workforce for the installation of heat pumps and production capacities. An Important Project of

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<sup>6</sup> In the past years never a renovation rate significantly higher than 1 % was achieved, counting all renovations not only deep renovations.

Common European Interest (IPCEI) is a powerful tool of the EU. As proven by the example of the IPCEI for battery production in Europe, IPCEIs help build up production capacities in a timely manner. An IPCEI to support and accelerate the production and installation of heat pumps in Europe would be a strong signal to free the EU from its dependence on fossil gas. An IPCEI for heat pump production would foster cross-border cooperation and can support joint investments into key value chains. Such an IPCEI would furthermore be a strong signal to professionals to expand their skills and would foster demand in the labour market for such skilled workers.

## Transport

### Fleet standards

Cars are consuming a large share of European petrol imports, even while a solution already exists: electric vehicles. The share of electric vehicles is continuously increasing. Both manufacturers such as Volvo and Opel and Member States such as the Netherlands, Slovenia, Denmark, and Ireland have announced bans for new ICEVs starting in 2030 (or even earlier).

Europe has to accelerate the phase-out of petrol and should therefore **increase fleet standards (Regulation (EU) 2019/631) for cars and light utility vehicles to at least a 100 % reduction of emissions by 2030 compared to 2021**. This would mean an EU-wide ban of new ICEVs. To facilitate this, Europe needs a massive rollout of electric charging infrastructure. In line with such an increase in ambition, the CO<sub>2</sub> limit for 2025, with the addition of a binding interim target in 2027, needs to be adapted to create a realistic path for manufacturers over the next few years.

### Foster multi-modal mobility

Trains and multi-modal mobility options can reduce oil consumption by substituting private car trips and flights in the EU. However, while European borders in the Schengen area can be crossed without a passport by car and plane, this is unnecessarily difficult when travelling by train. Navigating cross-border schedule information and train bookings as well as other modern mobility services requires a lot of passion and motivation from EU citizens. Furthermore, when arriving at the destination, citizens might want to use local car- or bike-sharing for their mobility needs. Today, citizens are obliged to install an assortment of apps and might then be confronted with difficult registration procedures. Furthermore, the prices of different providers are difficult to compare. The solution is not something revolutionary. It has existed in the form of booking platforms for flights for years. What is needed is an obligation by the EU for mobility providers to offer platforms for booking and scheduling options for their services.

**We therefore recommend that the EU acts fast now in order to enable and facilitate citizens' low-emission travel.** The Commission should therefore fast-track the upcoming delegated regulation "[EU-wide multimodal travel – new specifications for information services](#)"<sup>75</sup> through a highly ambitious proposal. By January 2023, mobility service providers should be obliged to provide APIs that allow for scheduling and booking procedures by independent platforms. This would increase transparency and competition in the internal market and empower consumers to more easily select the lowest-emission option to travel.

## 7. Conclusion: Addressing energy shortages requires the EU to lead the way

It is now the immediate task of EU governments to mitigate the social impacts of oil and gas price increases and prepare Europe for a scenario in which energy security can be guaranteed, even without Russian fossil energy sources.

**To achieve the goal of energy sovereignty in the EU rapidly, a clear commitment to energy savings and sufficiency, in addition to efficiency measures and the shift to renewables, shows strong potential.** In this paper, we demonstrate that demand-side reduction measures can be effective instruments to cushion the impacts of rising energy prices and address potential energy shortages. In this way, pressures on price increases can be softened due to the decrease in demand. Moreover, we have shown that many demand-side reductions contribute to better health and wellbeing. They can also have a socially progressive effect when equity considerations are taken into account.

**The sufficiency approach supports both short-term energy security and the achievement of the EU's long-term objectives.** It reduces the economic costs of the transition by one third in the long-term and sets the course for transitioning towards sustainable lifestyles and achieving the Green Deal's objectives.

The European environment and climate ministers remind us: *“Now is the time to be bold and to move ahead with determination with the green transition. Any delay or hesitation will only prolong our energy dependence”*<sup>1</sup>. With the EU Green Deal, the journey towards the goal of energy independence has already begun. The task now is to set the sails correctly to achieve this goal as quickly as possible in a socially just manner.

**Our policy design framework provides guidance to ensure that demand-side measures generate strong impacts in a socially acceptable way.** There are many possibilities for action. Some of the measures can be discussed as part of the Fit for 55 package, with others incorporated into the REPowerEU package or integrated into existing processes such as the European Semester and the Recovery and Resilience Facility. What matters is that the concrete design and the combination of demand-side measures create fixes for the short term that last and that ensure affordability and accessibility.

**Historical examples show that reducing energy demand is possible. Today, there is increasing support among the public for this strategy.** Be it the Green Deal, the Fit for 55 Package, or the Recovery and Resilience Facility, the EU has proven that it is able to lead the way. The war in Ukraine is now, tragically, the next crisis in which the EU must prove both its strength and its creativity.

## Annex

For this paper, we conducted a qualitative assessment of 68 proposed measures that were put forward as a reaction to the energy price rise. Each policy proposal was classified along six criteria as either 'negative', 'neutral', 'inconclusive', or 'positive'

- potential to reduce energy consumption,
- social impact, consisting of
  - affordability
  - accessibility
  - progressivity
- transformative impact and avoiding carbon lock-ins
- the speed of implementation

Sector	Policy instrument	Description of measure	Source	energy savings	Affordability	Accessibility	Progressivity	Transformative potential	Speed of implementation
Housing	<b>mandatory reduction targets for enterprises</b>	Enterprises not being able to meet the reduction target need to pay a fine	New Recommendation	Green	Yellow	Grey	Grey	Green	short term
Housing	<b>Rollout of smart heating controls</b>	smart thermostats (subvention)	IEA 2022b	Green	Green	Green	Grey	Grey	short term
Housing	<b>Set EU wide standards for renovations</b>	standards for least performing energy classes	DENEFF 2022	Grey	Grey	Grey	Grey	Grey	medium term
Housing	<b>Training and employment programme for renovation, green hydrogen and heat pump installation</b>	sufficiently skilled workers to renovate houses, expand renewable energies and implement the ramp-up of heat pumps and hydrogen technologies; support scheme to create low-skilled jobs that can help to accelerate the deployment of renovation and heat pump installation	Agora Energiewende 2022	Grey	Grey	Grey	Grey	Green	medium term
Housing	<b>Promotion of building renovation roadmaps</b>	Public funding for renovation roadmaps	DENEFF 2022	Yellow	Yellow	Grey	Grey	Grey	short term
Housing	<b>Building insulation</b>	Insulation methods on heating pipes and windows	Agora Energiewende 2022	Green	Yellow	Grey	Grey	Grey	short-medium term



Housing	<b>Bonus program for deep renovations with a prioritisation to least performing buildings</b>	Priority for least performing buildings; Clear and legally binding definition of “deep renovation” at EU level: comply with primary energy need below 80 kWh/m <sup>2</sup> /year; target boost rate to 3 %	New Recommendation (BUND 2022)							medium term
Housing	<b>Stop subsidies for the installation of gas heating systems</b>	Stop subsidies for the installation of gas heating systems and immediately abolish subsidy standards that are not compatible with the 1.5 degree target	Bund 2022							short term
Housing	<b>Heat pump installations before the winter</b>	Replace as much fossil fuelled heating by heat pumps in 2022	Greenpeace 2022							medium term
Housing	<b>Upscale heat pump production and accelerate installation in 2022</b>	IPCEI programme for expansion of European production capacities Promotion of installation of as many heat pumps as possible before winter with priority to houses built after 2000	Greenpeace 2022, IEA 2022							medium term
Housing	<b>Phase out of gas heating systems</b>	Under Ecodesign gas heating systems should be phased out	<i>New Recommendations, based on Bund 2022</i>							medium term
Housing	<b>Efficient use of heating</b>	Hydraulic balancing and operational optimisation	Agora Energiewende 2022							short term
Housing	<b>Reduction of hot water consumption</b>	Use of water-saving fittings	Agora Energiewende 2022							short term
Housing	<b>Replacement programme for cooking stoves</b>	Replacing gas cooking stoves with electric cooking stoves	New Recommendation							short term
Housing	<b>Increased short-term use of wood stoves and propane heaters</b>	Existing and new wood-fired auxiliary heating systems for the provision of space heating	Agora Energiewende 2022							short term
Housing	<b>Energy saving behaviour with devices and lightning</b>	Reduction of electricity consumption through energy saving behaviour with end devices and lights	Agora Energiewende 2022							short term
Housing	<b>Home and flat-sharing initiative</b>	tax incentives for home and flat-sharing monitored by address registrations	New Recommendation							
Housing	<b>Work from home up to 3 days a week where possible</b>	Work from home up to three days a week where possible	Greenpeace 2022, IEA 2022							short term

Housing	<b>Energy efficiency information on heating cost bill</b>	Obligation for landlords to provide information on energy efficiency	DENEFF 2022							medium term
Housing	<b>Energy efficiency improvements in buildings and industry</b>	improving insulation of buildings, boost near-term rate of building retrofits and heat pump deployment; foster annual maintenance checks to optimise efficiency, offer energy efficiency audits and advice to SMEs; more rooftop solar panels, heat pumps, energy savings	IEA 2022b; REPowerEU							medium term
Housing	<b>Mandatory simple and digital energy management</b>	Mandatory in bigger buildings to protect consumers from high energy consumption and high energy cost	DENEFF 2022							short term
Housing	<b>Campaign for energy saving measures in private homes</b>	Energy saving behaviour with devices and lights	Bund 2022;							short term
Housing	<b>Campaign on temporary thermostat adjustment by 1 degree</b>	Voluntarily: campaign for citizens to reduce their room temperature; there are also advocates for a mandatory option	Greenpeace 2022, IEA 2022							short term
Housing	<b>European Energy Saving App</b>	Visualisation of current energy consumption and help to identify saving potential	New Recommendation							short term
Housing	<b>Free energy saving consultations</b>	Free on-site energy-saving consultations for all public, economic and private consumers	Bund 2022							short term
Housing	<b>Efficient lighting regulation</b>	Reduce unnecessary lighting at night and install motion detectors for outdoor lighting;	New Recommendation							short term
Housing	<b>Financial incentives for reducing p.c. living space</b>	financial incentives for living on smaller living space e.g. through property taxes	Pütz, Greens Bielefeld 2022							short term
Housing	<b>Progressive / staggered energy tariffs</b>	Cheap energy up to a certain amount (depending on persons in household), everything above much more expensive (“luxury”)	Environmental Policy Research Center FU Berlin							short term
Housing	<b>Energy saving bonus</b>	Citizens get a monetary bonus if they save energy	University of Osnabrück							short term
Housing	<b>Skilled labour offensive</b>	sufficiently skilled workers to renovate houses, expand renewable energies and implement the ramp-up of heat pumps and hydrogen technologies.	Agora Energiewende 2022							medium term
Other	<b>Ban on energy intensive cryptocurrencies</b>	Ban on any crypto-asset mining activities that contribute substantially to climate change	Pütz, Greens Bielefeld 2022							short term

Other	<b>Energy-management obligation for companies with &gt; 5 GWh/a</b>	Obligation for companies with > 5 GWh/a need to implement a energy management system	DENEFF 2022							medium term
Other	<b>Higher carbon taxes</b>	Carbon taxes will be raised more than planned; taxes will be paid back equally to all citizens	ECONtribute							short term
Transport	<b>Accelerate adoption of electric and more efficient vehicles</b>	Reinforce the adoption of electric and more efficient vehicles for delivery of goods, fleets, and private use	IEA 2022							short term
Transport	<b>Ban on combustion engines for 2030</b>	As part of the ff55 combustion engines can be officially banned by 2030 in the EU to reduce fuel demand	New Recommendation							short term
Transport	<b>Refrain from every 4th leisure trip by car over 20 km</b>	Voluntary measure to avoid every 4th leisure trip by car over 20km	Greenpeace 2022							short term
Transport	<b>Speed limit</b>	Strict reduction of speed limits, in cities as on highways by at least 10km/h	Greenpeace 2022, IEA 2022							short term
Transport	<b>Support program for car sharing and practices that decrease fuel use</b>	An increase of around 50% in the average car occupancy across advanced economies in 1-in-10 trips and adopting best-practices to decrease car fuel use	IEA 2022							short term
Transport	<b>Car limits &amp; incentive programme for smaller energy-saving cars</b>	abolition of company car privilege, adjustment of vehicle tax, introduction of bonus-malus on purchase	Bund 2022							medium term
Transport	<b>European Ride-Sharing app</b>	Develop a European Ride-Sharing app + introduce alternating days in which some cars (according to their registration number) cannot be use. Introduce specific lanes for ride-pooling. Introduce attractive parking lots for ride poolers	New Recommendation							short term
Transport	<b>Promote efficient driving for freight trucks and delivery of goods</b>	Eco-driving techniques as part of the guition and examination process; Optimise vehicle loads and reduce empty travelling	IEA 2022							short term
Transport	<b>Limit private car usage</b>	Alternate private car access to roads in cities and increase car sharing	IEA 2022							short term

Transport	<b>Incentivise public transport usage</b>	Make use of public transport cheaper	Greenpeace 2022, IEA 2022							short term
Transport	<b>Regulate standards for intra EU train booking</b>	implement fast track booking, regulation to ensure interoperability and APIs integration for travel scheduling	New Recommendation							short term
Transport	<b>Discount on public transport</b>	Governments subsidize public transport so that it's use will be cheaper for citizens; Germany introduces ticket for 9€ per month	Government of New Zealand, German Government							short term
Transport	<b>Ride and Car sharing</b>	Integrating real-time IT to optimise empty car seats (e.g., 'Uber', 'Lyft')	Bruegel 2022b							short term
Transport	<b>1 day in 2 driving ban</b>	Even-odd licence plate scheme would prevent cars from operating every other day	Bruegel 2022b							short term
Transport	<b>Ecodriving campaign</b>	Public information campaign to promote fuel efficient driving	Bruegel 2022b							short term
Transport	<b>1 day in 10 driving ban</b>	Passenger vehicles banned from operating 1 day in 10	Bruegel 2022b							short term
Transport	<b>speed limit 90km/h</b>	Temporarily reduce motorway speed limits to 90km/h	Bruegel 2022b							short term
Transport	<b>Dynamic parking pricing</b>	Off-street urban parking metres set at prices to maintain 85% occupancy throughout the day	Bruegel 2022b							short - medium term
Transport	<b>Freight driving training</b>	Education in ecodriving measures	Bruegel 2022b							short - medium term
Transport	<b>Road pricing</b>	Tolling, congestion pricing	Bruegel 2022b							short - medium term
Transport	<b>Car free Sundays</b>	Car driving on Sundays only allowed in exceptions	Greenpeace 2022, IEA 2022							short term
Transport	<b>365-Euro ticket for local public transport</b>	Introduction of a comprehensive 365-Euro ticket for public transport usage	Bund 2022							short term
Transport	<b>Low-priced annual ticket for long-distance public transport</b>	Based on "klimaticket" in Austria	Bund 2022							short term

Transport	<b>Energy Security Tickets for public transport</b>	launch super european interrail tickets and make local public transport 50 % cheaper	New Recommendation							short term
Transport	<b>Accelerator programme for public transportation and EU rail network expansion</b>	Improve accessibility and connectivity of public transportation especially local and regional buses, trains and metros (incl night trains). Improve and digitalise booking systems. Make local trains 50% cheaper	New Recommendation							medium term
Transport	<b>Boost rail capacities (passenger and freight) and increase frequency of public transport services</b>	Increase interoperability and capacity of cross-border rail freight. Enhance loading and circulating patterns for freight	New Recommendation							medium term
Transport	<b>Freight transport by rail</b>	Reduction of train path prices; Enhance harmonisation and interoperability	Greenpeace 2022							medium term
Transport	<b>Ban on short haul flights</b>	Flights up to a certain distance will be forbidden, where train connections below 4 hours are available	Greenpeace 2022, IEA 2022							short term
Transport	<b>Prefer high-speed and night trains to plains where possible</b>	Increase usage of high-speed trains and night trains	IEA 2022							short term
Transport	<b>Regulate standards for multi-modal intra-EU mobility services</b>	Harmonisation of cross-border booking platforms and accelerator programme for public transportation and EU rail network expansion	New Recommendation							short - medium term
Transport	<b>Incentivise bike usage for trips under 20 km</b>	Voluntary measure;	Greenpeace 2022							short - medium term
Transport	<b>Pop up cycling lanes</b>	Implement measures that encourage citizens to use bikes instead of cars or extend measures implemented during covid-19	Greenpeace 2022, IEA 2022							short term
Transport	<b>Programme to boost into cycling infrastructure</b>	infrastructural investments in bike lanes and cycling infrastructure (repair options, parking options); trainings for city planners on cycling infrastructure and on long-term thinking	Greenpeace 2022							

Transport	<b>Avoid business travel when alternatives exist</b>	Reduction of around two out of every five flights taken for business purposes	IEA 2022						short term
Transport	<b>Halt to the expansion of roads and airports</b>	Immediate stop of the expansion of new roads and airports	Pütz, Greens Bielefeld 2022						short term

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