

Confronting the energy crisis: changing behaviours to reduce energy consumption

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Russia's war of aggression against Ukraine is strongly impacting energy prices worldwide. While relatively mild weather avoided rationing over the 2022-23 winter in European countries, challenges remain in securing sufficient storage levels for the 2023-24 winter (OECD, 2023). In some countries, high prices have already incentivised some demand reductions from firms and households. However, as argued in our recent paper (Cavassini and Papa, 2023), the crisis calls for additional changes in behaviour to accompany long-term technical and structural solutions to lower gas and electricity demand.

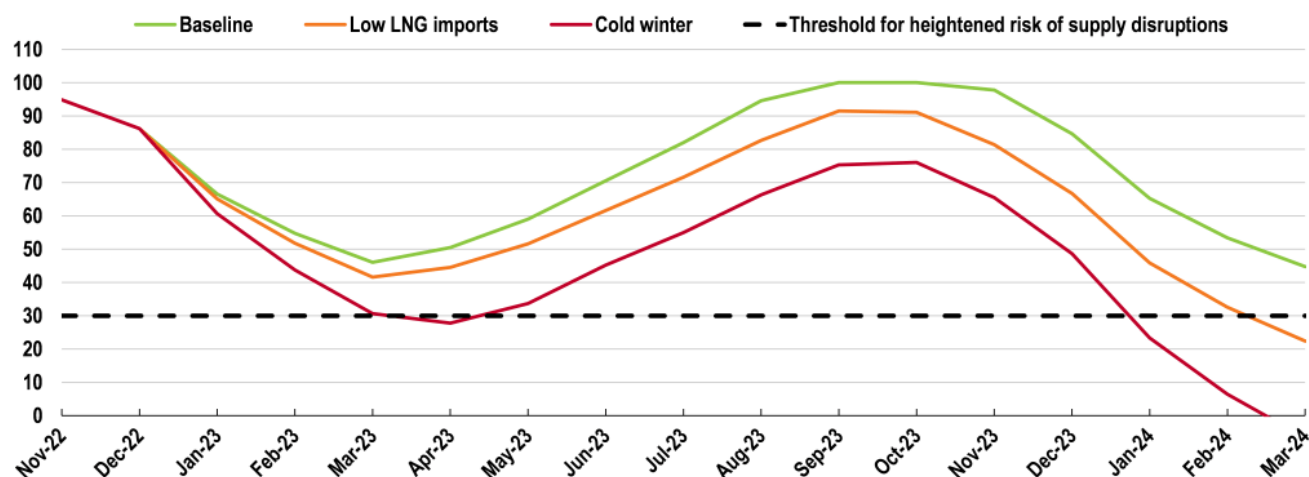
The current energy crisis calls for significant changes in behaviour

Diversifying energy sources and reducing energy demand will be critical. Some of these changes will take time to be implemented, such as improving buildings' energy efficiency. However, the current crisis also calls for policies leading to more immediate demand reduction (Haas, Kozluk and Sarcina, 2022) (**Figure 1**).

Figure 1. Without demand reductions, Europe may risk gas supply interruptions

EU + UK gas storage level development

Stylised scenarios, % (as of 5 Jan)



Note: For all scenarios, assuming 90% storage levels at the end of November; no imports from Russia from November 2022 and domestic production at average 2019-2021 levels. In the baseline, we assume “10% reduction” in gas demand relative to the 2017-21 average consumption, imports from other sources at 28 bcm/month, of which 13.5bcm/month from LNG imports. “Cold winter” assumes consumption at the maximum 2017-21 levels, a 10% reduction in gas demand relative to the maximum 2017-2021 levels and imports from other sources, incl. LNG imports, as the baseline. Low LNG imports assumes 12bcm/month of LNG imports starting from 2023 and a 10% reduction in gas demand relative to the 2017-21 average consumption.

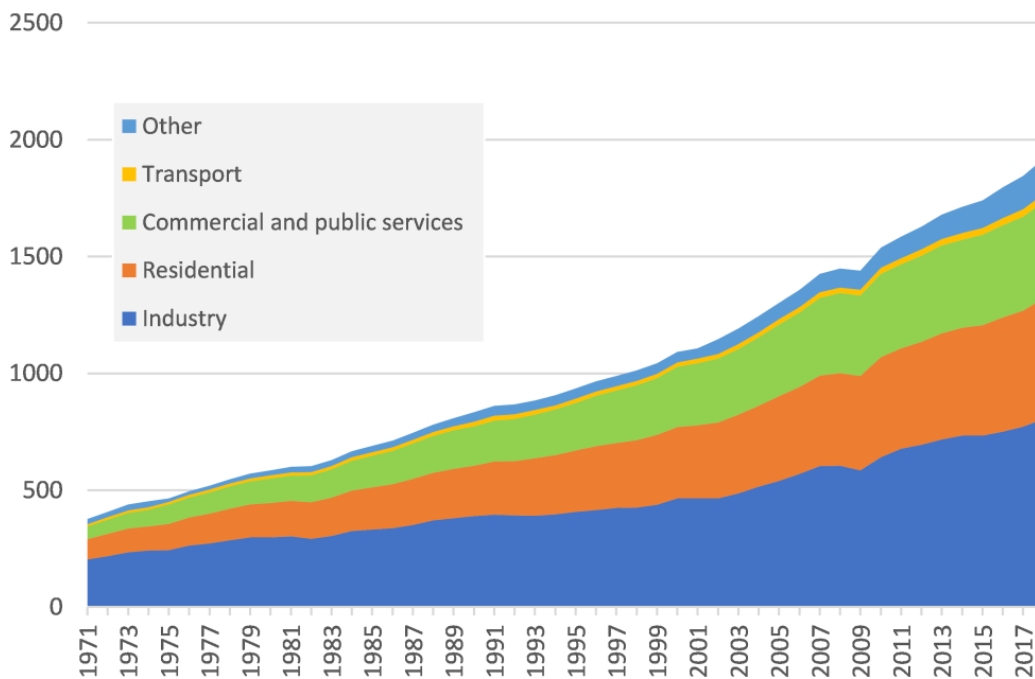
Source: Update of OECD Ecoscope Blog (Haas, Kozluk and Sarcina, 2022_[2]) .

Some of these actions will need to come from changes in the behaviour of households, which account for almost 24% of energy consumption in the EU, with an even higher share in winter (OECD, 2022) (**Figure 2**).

Figure 2. Households account for a large share of electricity consumption

Electricity total final consumption by sector

1971-2018 (Mtoe)



Notes: Other includes agriculture, fishing and non-specified sectors.

Source: (IEA, 2021).

Reducing households' energy use can not only help curb the current crisis, but, if sustained over time, it can also support the transition to net zero. Identifying the psychological factors that influence energy conservation behaviour is particularly important, because changing behaviour is the result not only of responses to prices but also of expectations, habits, and biases (Carrus, 2021).

How to facilitate a behavioural response to energy savings?

A range of structural and psychological barriers make it hard for consumers to change their energy consumption. For example, inattention, sheer habit or emulation can create a gap between the intention to reduce energy consumption – *I will turn off the light when I exit the room* – and the actual action – *but in fact I leave it on*. The capacity of individuals to process information can also be a barrier. Information campaigns that are not sufficiently clear on what can be done can be difficult to act upon.

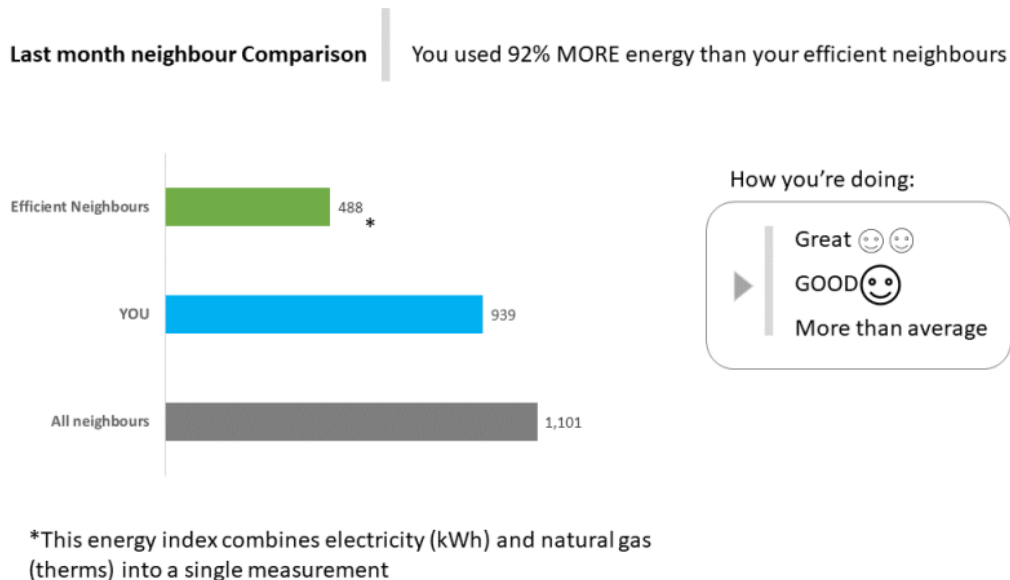
There are, however, ways of counteracting these behavioural

barriers.

Successful information campaigns tend to provide a set of clear and actionable guidelines, which can be important for emergency situations (Cornago, 2022). For example, after the 2011 earthquake and tsunami hit the Fukushima nuclear power plant in Japan, the government launched an information campaign to encourage households to save energy. Government and energy utilities disseminated checklists of energy saving tips with simple actionable steps, complemented by technical support to commercial and industrial consumers (Institute of Energy Economics, Japan, 2021). Overall, the campaign led to 15% less electricity being used in 2011 relative to the previous year in the most affected regions. This was achieved without price increases (Kimura and Nishio, 2016).

Social norms are strong determinants of action and can influence the effectiveness of information campaigns. For example, a study on the role of beliefs in energy conservation found that the belief that neighbours were reducing energy consumption correlated highly with energy saving efforts, a finding which has often replicated in real-life applications (e.g. **Figure 3**) (Jachimowicz, 2018).

Figure 3. Sample of redesigned energy bill emphasising social comparison



Who are your neighbours?

■ **All neighbours:** Approximately 100 occupied, nearby homes that are similar in size to yours (avg 1,104.337 sq ft) and have electric heat

■ **Efficient neighbours:** The most efficient 20% from the "All neighbours" group

Source: (Jachimowicz, 2018_[9])

Behavioural change can also be promoted through a combination of price mechanisms (time of the day pricing) and user-centric technologies. A study conducted by the OECD in 2018 showed that smart meters providing real-time feedback on electricity consumption, price and expenditures induced households to reduce electricity demand by an average of about 3%, with results increasing to around 4% over a five-month period (OECD, 2019).

Table 1 presents possible responses that build on behavioural sciences and can be used to counteract different behavioural barriers affecting energy consumption.

Table 1. Examples of behavioural barriers that can affect energy consumption in the short and long term and possible responses

Behavioural principles affecting short-term action	Possible behavioural interventions
Social norms – tendency to conform to the behaviour and beliefs of others in the social network. For example, individuals are more likely to conserve energy if they think others in their network are doing it.	Social norms interventions (e.g. energy savings motivated by shared sense of solidarity for Ukraine).
Status quo bias – aversion to changing one's habits, such as habitual heating temperatures at home.	Providing feedback on consumption; changing defaults.
Intention-action gap – discrepancy between one's intentions and actions, such as an awareness of climate risks which does not translate in specific energy conservation action.	Goal setting.
Forgetfulness – attention is limited and easily distracted, such as forgetting lights on at home.	Reminders.
Costly information acquisition – knowledge of which energy behaviours to adopt might not be easily available to consumers and they will not pro-actively search for it.	Communication and awareness campaigns.
Behavioural principles affecting long-term action	Possible behavioural interventions
Optimism bias – predisposition to systematically overestimate the probability of positive events and underestimate the probability of negative events. For example, tendency to attribute the highest level of severity to environmental risks that are geographically far.	Communication and awareness campaigns.
Present bias – tendency to underestimate risks perceived to be far in the future, as climate change.	Commitment devices and goal setting.
Risk misperceptions – tendency to misinterpret the likelihood of complex events, such as climate disasters or energy shocks.	Changes in defaults; communication and awareness campaigns.

Source: OECD elaboration from (Andor and Fels, 2018), (Feygina, 2010), (Gifford, 2011), (Mol, Jantsje M., et al., 2020), and (OECD, 2019b).

Conclusions

Governments should already concentrate on energy saving measures that will prepare us for the next winter. The choice of message that policymakers send to consumers, how and when the information is provided to households and through which channels can make a difference in changing consumption behaviours. The effectiveness of these campaigns and actions should be monitored to gauge evolutions in behaviours and identify solutions to behavioural barriers.

References:

Andor, M. (2018), *Behavioral economics and energy conservation—a systematic review of non-price interventions and their causal effects*, *Ecological economics* 148 (2018): 178-210.

https://www.researchgate.net/publication/331999076_Behavioral_

Economics_and_Energy_Conservation_-
_A_Systematic_Review_of_Non-
price_Interventions_and_Their_Causal_Effects.

Carrus, G. (2021), *Psychological predictors of energy saving behavior: A meta-analytic approach.*, *Frontiers in Psychology*, 12, 648221. <https://www.frontiersin.org/articles/10.3389/fpsyg.2021.648221/full>.

Cavassini F. and Papa F. (2023), *“Confronting the energy crisis: changing behaviours to reduce energy consumption”*, OECD Policy Responses on the Impacts of the War in Ukraine. Available at: <https://www.oecd.org/ukraine-hub/policy-responses/confronting-the-energy-crisis-changing-behaviours-to-reduce-energy-consumption-5664e8a9/#back-note-d1e350>.

Cornago, E. (2022), *HOW TO SAVE ENERGY IN A SMARTER WAY*, Center for European Reform. <https://www.cer.eu/insights/how-save-energy-smarter-way>.

Feygina, I. (2010), *System justification, the denial of global warming, and the possibility of “system-sanctioned change”*., *Personality and social psychology bulletin*, 36(3), 326-338. <https://journals.sagepub.com/doi/abs/10.1177/0146167209351435>.

Gifford, R. (2011), *The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation.*, *American psychologist*, 66(4), 290. <https://psycnet.apa.org/doiLanding?doi=10.1037%2Fa0023566>.

Haas, Kozluk and Sarcina (2022), *Emergency plans and solidarity: Protecting Europe against a natural gas shortage*, OECD Ecoscope. <https://oecdecoscope.blog/2022/10/21/emergency-plans-and-solidarity-protecting-europe-against-a-natural-gas-shortage/>.

IEA (2021), *Electricity total final consumption by sector*,

1971-2019, IEA, Paris
<https://www.iea.org/data-and-statistics/charts/electricity-total-final-consumption-by-sector-1971-2018>, IEA. Licence: CC BY 4.0.

Institute of Energy Economics, Japan (2021), *CERT Thematic Discussions: The role of 'behavioural aspects' for reaching net zero emissions by 2050*, https://iea.blob.core.windows.net/assets/d65c0edb-50fc-46e4-90db-d7df8933af4d/1.Naoko_DOI_ImpactofSetsuden.pdf.

Jachimowicz, J. (2018), *The critical role of second-order normative beliefs in predicting energy conservation.*, *Nat Hum Behav* 2, 757–764 (2018).
<https://doi.org/10.1038/s41562-018-0434-0>.

Kimura, O. and K. Nishio (2016), *Responding to electricity shortfalls: Electricity-saving activities of households and firms in Japan after Fukushima.*, *Economics of Energy & Environmental Policy*, 5(1), 51–72.
<https://www.jstor.org/stable/26189398>.

Mol, Jantsje M., et al. (2020), *Insights into flood risk misperceptions of homeowners in the Dutch River Delta.*, *Risk analysis* 40.7 (2020): 1450-1468.
<https://onlinelibrary.wiley.com/doi/full/10.1111/risa.13479>.

OECD (2023), *OECD Economic Outlook, Interim Report March 2023: A Fragile Recovery*, , OECD Publishing, Paris,
<https://doi.org/10.1787/d14d49eb-en>.

OECD (2022), *Emergency plans and solidarity: Protecting Europe against a natural gas shortage*, OECD, Paris.
<https://www.oecd.org/economy/outlook/Briefing-Note-Gas-Emergency-Plans-and-Solidarity.pdf>.

OECD (2019), *Delivering Better Policies Through Behavioural Insights: New Approaches*, , OECD Publishing, Paris,
<https://doi.org/10.1787/6c9291e2-en>.

OECD (2019b), *Tools and Ethics for Applied Behavioural Insights: The BASIC Toolkit*, OECD Publishing, Paris, <https://doi.org/10.1787/9ea76a8f-en>.

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