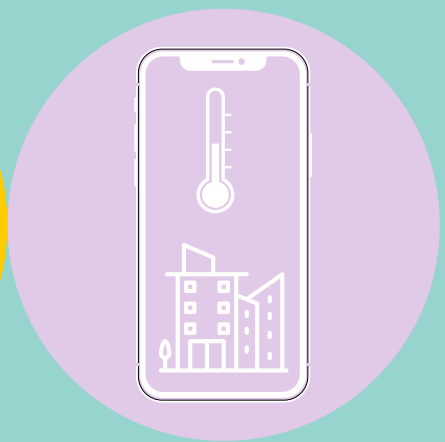
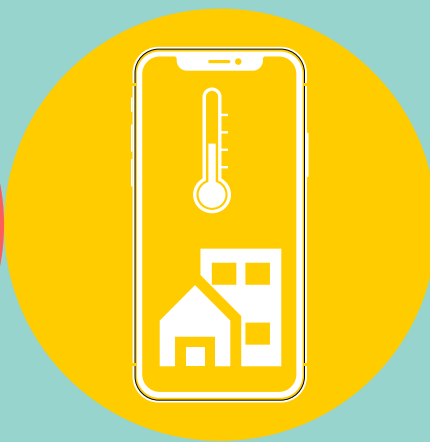


POLICY BRIEF

Profiling and nudging energy consumers to heat efficiently



NUDGE is set up to analyse people's behaviour, design and test nudging interventions in five EU Member States in households, energy communities and schools. All interventions are rooted in fundamental principles of behavioural science.

In NUDGE, a broad range of methodologies, tools and approaches are used: field experiments and surveys, qualitative and quantitative research methods, stakeholder consultation as well as automated and manual collection of pilot data. Most of the research and experimentation is focused on the design of policies and the formulation of recommendations specific to each country.

Authors:

Niklas Reinfandt and Heike Brugger,
Fraunhofer ISI

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Heating demand plays a major role in Europe's GHG emissions and energy dependency

The **largest share of the household energy consumption** across Europe is **space heating**, with an average of 63% in the European Union (largest share at national level: 81% in Luxembourg). Even in countries with a majority Mediterranean hot-summer climate, such as Portugal, it represents a significant share of final energy consumption (30%).¹

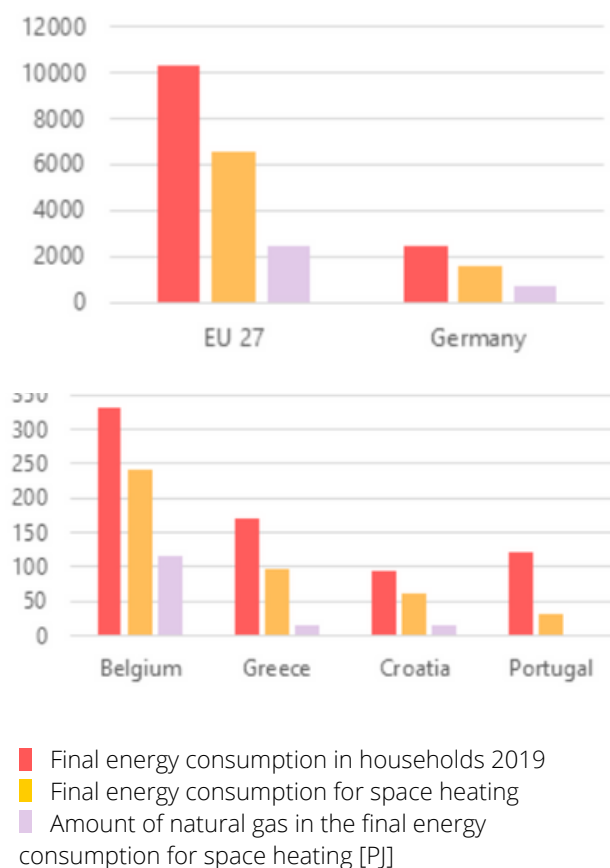
After local climate, the **second most important factor determining energy demand** (even more important than building characteristics) is the **behaviour of household occupants**. This is especially important in terms of heating and cooling. Thus, in order to fully exploit the potential for limiting building energy consumption, an understanding of occupant behaviours is essential.

Considering the fact that **households** as a whole are **responsible for 25% of greenhouse gas (GHG) emissions**, reducing heating-related energy consumption is an important task which contributes to Europe's overall efforts to reduce GHG emissions. Due to the high energy consumption of space heating described above and the **large share of natural gas** for space heating (EU 38%, Hungary 84,2%, the Netherlands 84.9%, Italy 59.5%), the issue addressed here is also closely interwoven with the consequences of the Russian invasion of Ukraine. Thus, besides the reduction of GHG emissions, the reduction of space heating related energy consumption can also contribute to further highly pressing challenges:

- ▶ reducing dependence on Russian gas/fossil fuels, thus supporting the REPowerEU plan²
- ▶ helping households adjust to high energy prices and save energy to avoid high energy bills this winter

Therefore, aside from measures such as using more energy-efficient appliances or renovating homes, **understanding and changing user behaviour** (e.g. what motivates to turn down the heat) is an essential and impactful part of reducing energy consumption and is the **primary focus of this policy brief**.

Figure 1: Overview of the space heating-related energy use in Europe and the NUDGE-Project countries.



Further remarks: the EU highly depends on natural gas imports from Russia: 75% of natural gas in the EU residential sector used for space heating and 39% of the extra-EU imports of natural gas in 2021 (share of trade in value) came from Russia (Eurostat, 2022).³

1. [Energy consumption in households - Statistics Explained \(europa.eu\)](#)

2. [REPowerEU: affordable, secure and sustainable energy for Europe | European Commission \(europa.eu\)](#)

3. [EU imports of energy products - recent developments - Statistics Explained \(europa.eu\)](#)

What drives behaviour change in people's heating consumption?

One goal of the NUDGE project is to explore which (technical) interventions can motivate the **change of energy consumption behaviour** in households **without the use of financial incentives**. This can be achieved through so-called nudges. **Nudges** are a **way of influencing behavior through interventions and indirect suggestions** (such as push notifications, social comparisons, etc.).

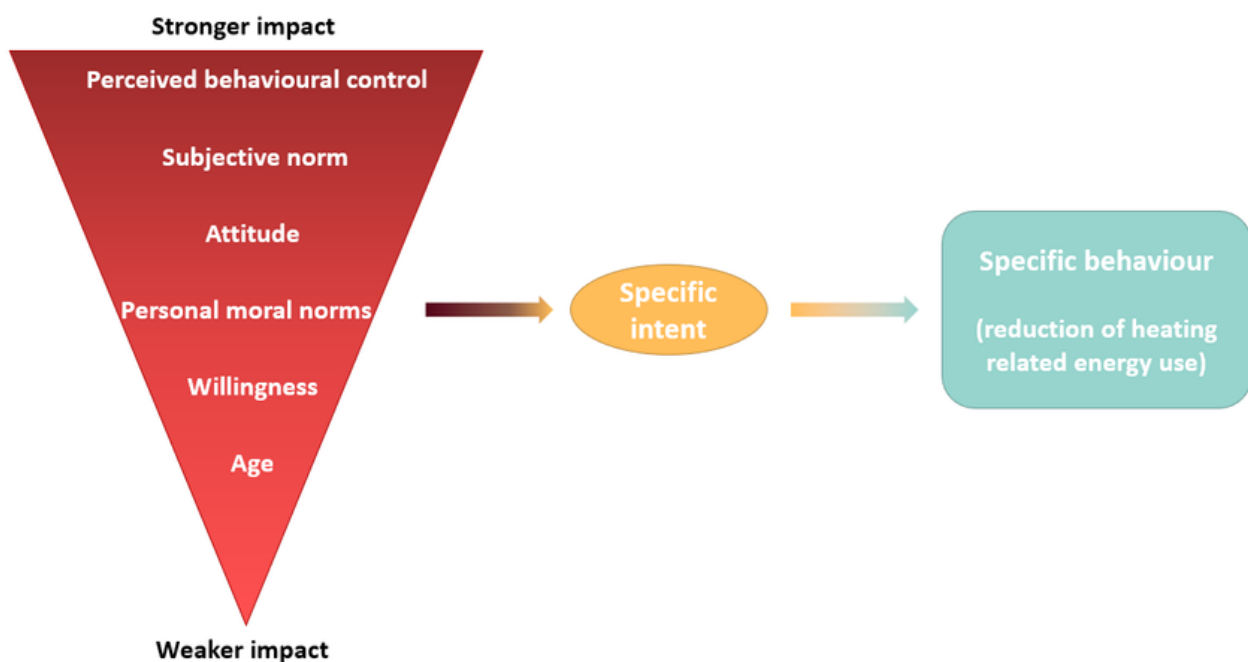
To design effective interventions/nudges, it is necessary to understand **which factors determine people's intent to reduce heating-related energy consumption**.

As a result of a large survey with 3129 respondents from 29 European countries, **6 important factors** could be identified and ranked according to their impact (see figure 2):

Perceived behavioural control (perceived ability to perform an activity), along with **subjective norm** (perceived social pressure to engage in an activity), are the two most important factors to consider if we want to understand and predict the intent to reduce heating-related energy consumption and to develop effective measures.

Attitude (impacted by financial concern, loss of comfort, energy knowledge and environmental concern), as well as **personal moral norms** (positively influenced by both the awareness of the consequences of an action for society and ascription of responsibility) and **willingness** (how positive is the perception of a person who performs the activity, and how similar to this person do you consider yourself to be) also contribute to intent, albeit to a lesser extent, while **age** has a small but negative impact on the intent.

Figure 2: Factors determining people's intent to reduce heating-related energy consumption



How can policies address changes in heating behaviour?

On this basis, some general implication on how to design effective nudges or related policies to have an impact on the most relevant factors can already be obtained:

Therefore, the status of information requirements, which allows consumption data to be reported as rarely as on an annual basis, should be altered through policies.

Improving perceived behavioural control



Designing **information campaigns** and policies that directly address the customers is important to increase the perceived behavioural control (e.g., enabling easy and low-threshold access to information on **how to** achieve a specific goal; encouraging action by **showing examples** and enabling customers to take informed decisions). Additional suggestions of concrete and practical measures such as lowering the temperature by one degree,⁴ switching off heating in unused rooms etc. can have a positive impact on habit formation and thus facilitate behaviour change.



If the European and national level is too far away from the customers to have a decisive influence, it is essential to use policy measures to **address intermediary actors** (such as energy service companies or energy utilities) and to hold them responsible, where practicable, to increase the perceived behavioural control of customers. Possible measures could include **additional information on invoices** or promoting the introduction of **smart meters**.



To allow customers to make informed decisions, **consumption data must be available to them in a timely and accessible manner** so that they can directly observe the impact of the energy saving measures they take.

Improving the impact of subjective norms



Emphasising the saving behaviour of others when attempting to reduce individual consumption can be an important component of possible measures. The current efforts to reduce Europe's energy dependency and to handle the high energy prices offer an opportunity to **closely link energy-saving behaviour with the individual's contribution to this goals**. Showing survey results, such as what percentage of people think energy conservation is important now, could be an important lever to reinforce the intent to reduce heating-related energy use.

Improving attitudes



The results suggest that strategies to positively influence environmental and financial issues can have a positive impact on attitudes toward reducing energy consumption. However, care must be taken to **address fears of a loss of comfort** – it is important to ensure that consumption reductions affect comfort as little as possible.

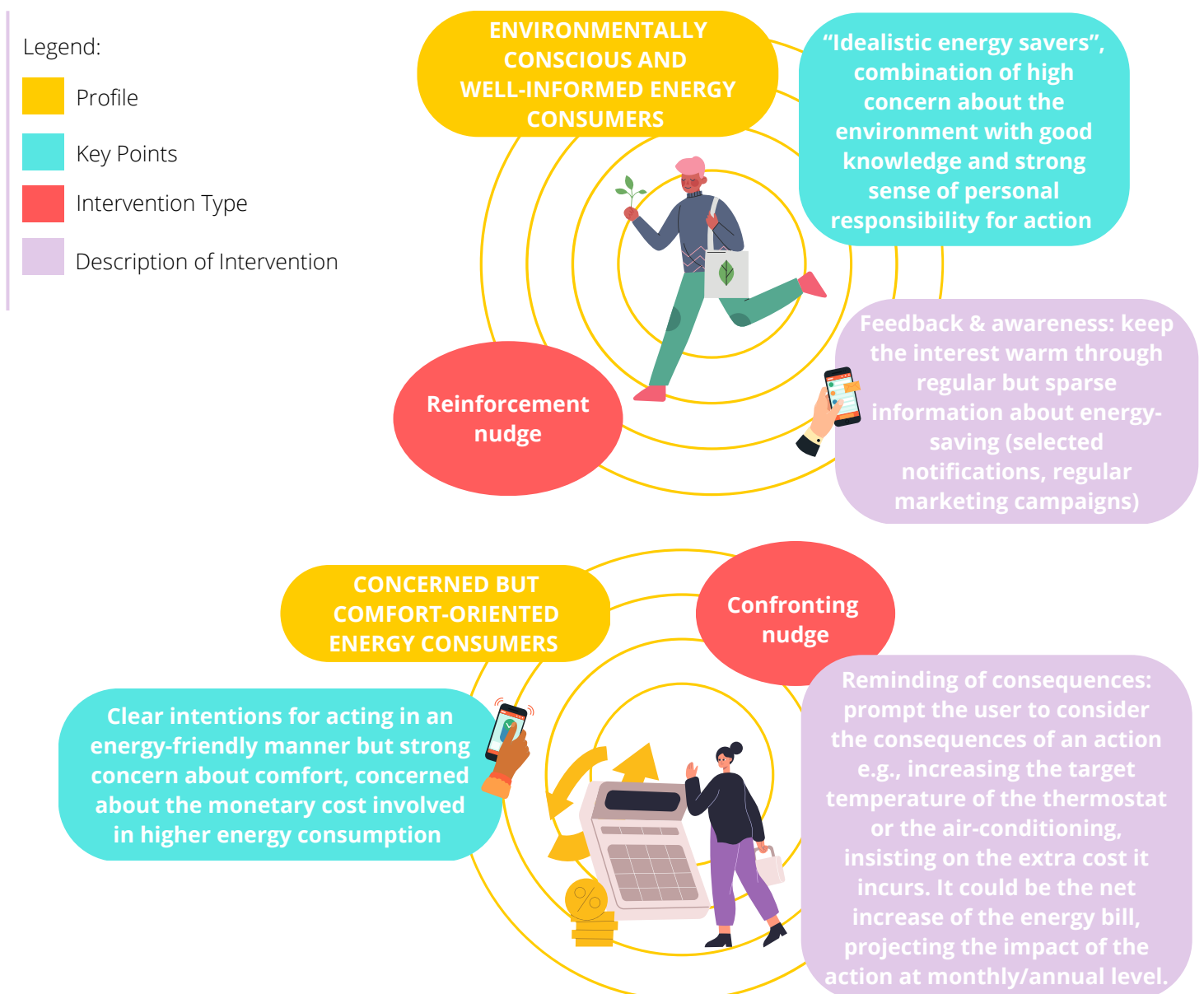
4. [Playing my part \(europa.eu\)](https://europa.eu).

How can people be nudged towards heating efficiently?

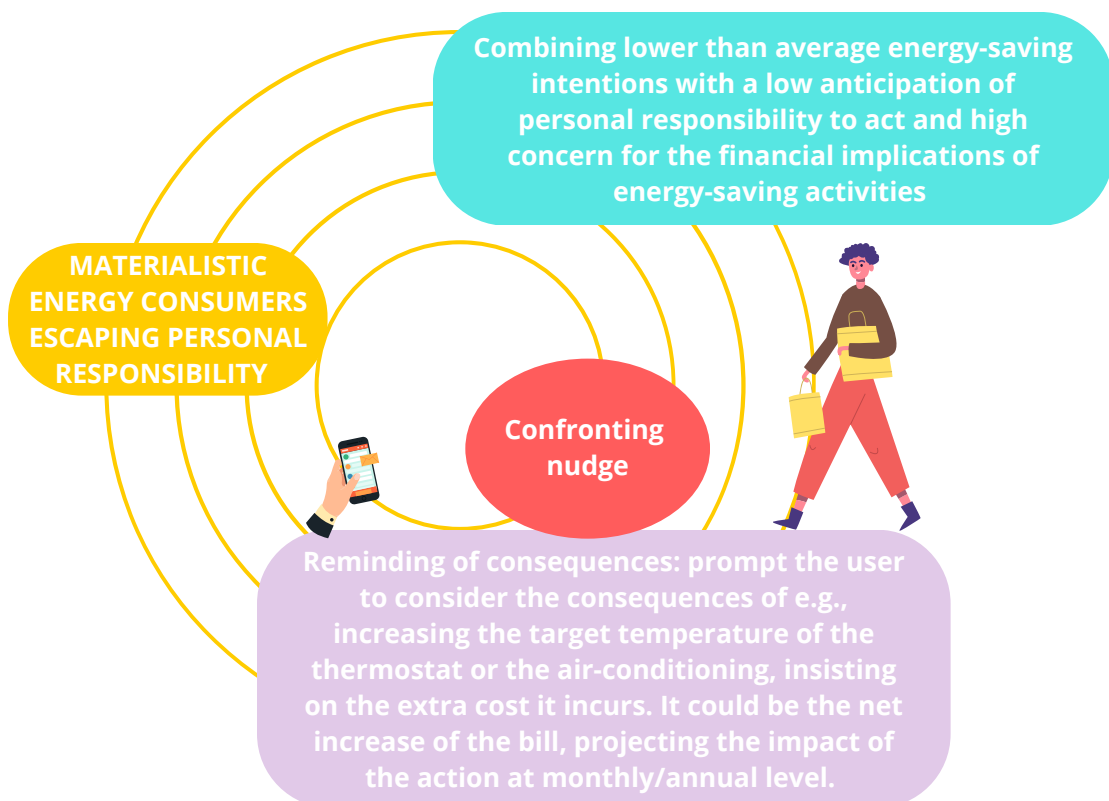
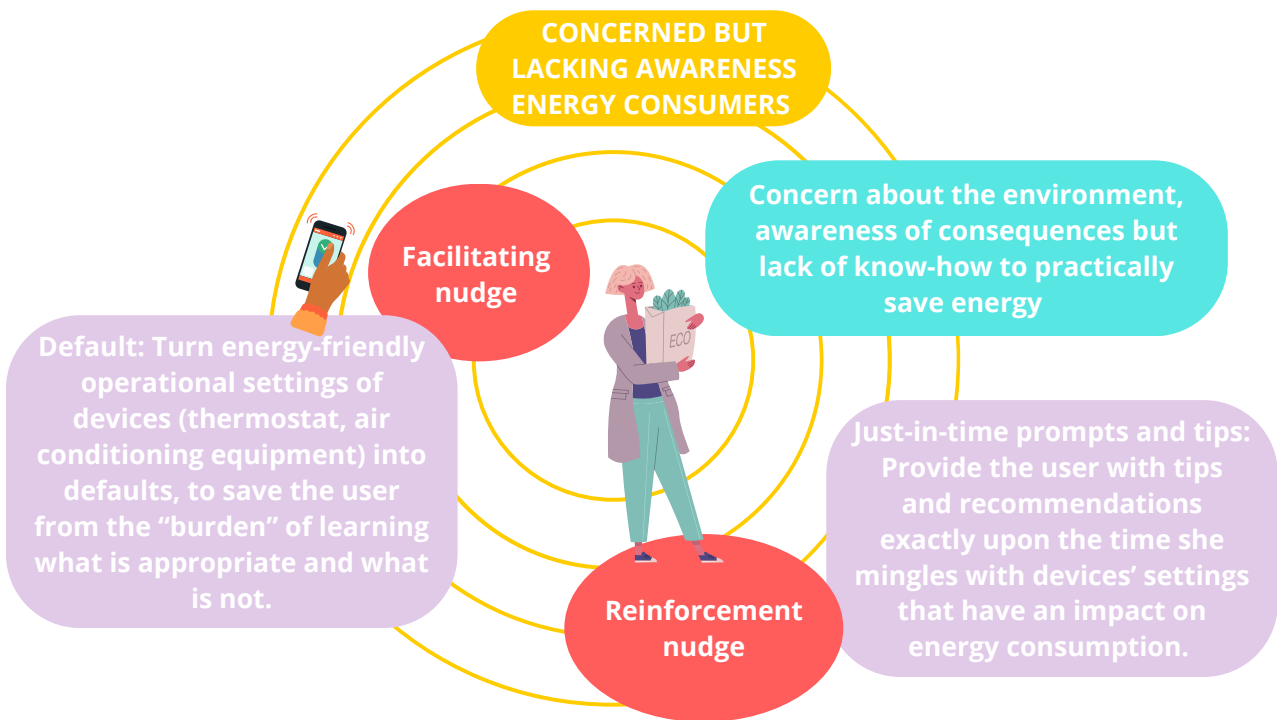
Due to the complicated **interplay of the six factors**, resulting in different profiles of energy consumers, a wider range of intervention types is needed to address all of them and to ensure successful nudges and design effective policies. Therefore, the creation of **energy-user profiles** and the mapping of users to those profiles would allow the creation of **different interventions tailored to users' behaviour**.

In the following, the six different types of energy users who were identified in the project are introduced, along with types of intervention that are likely to have an effect on their behavior. Based on this, a **balanced policy mix** can be established, which can successfully contribute to a reduction of heating-related energy use with the help of nudges.

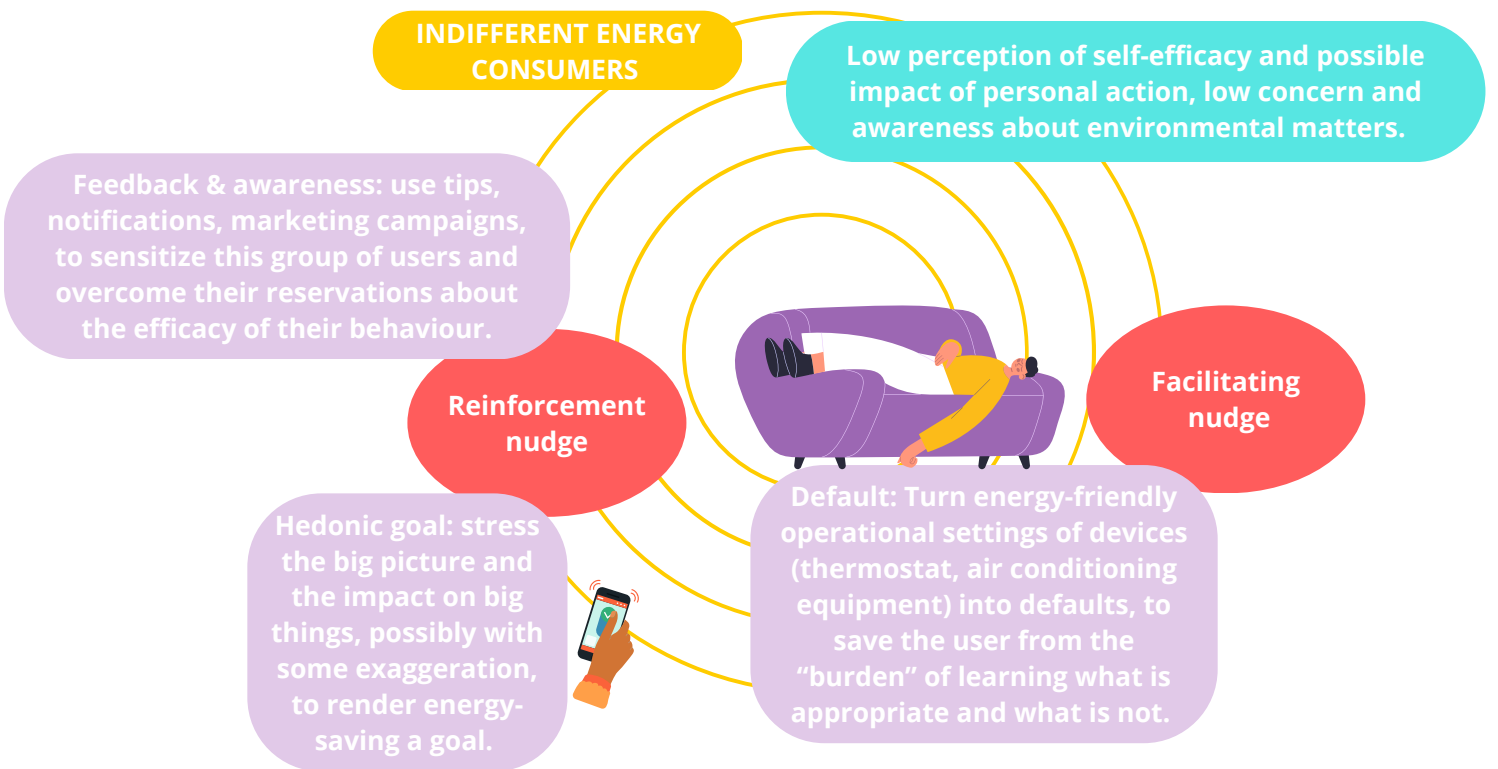
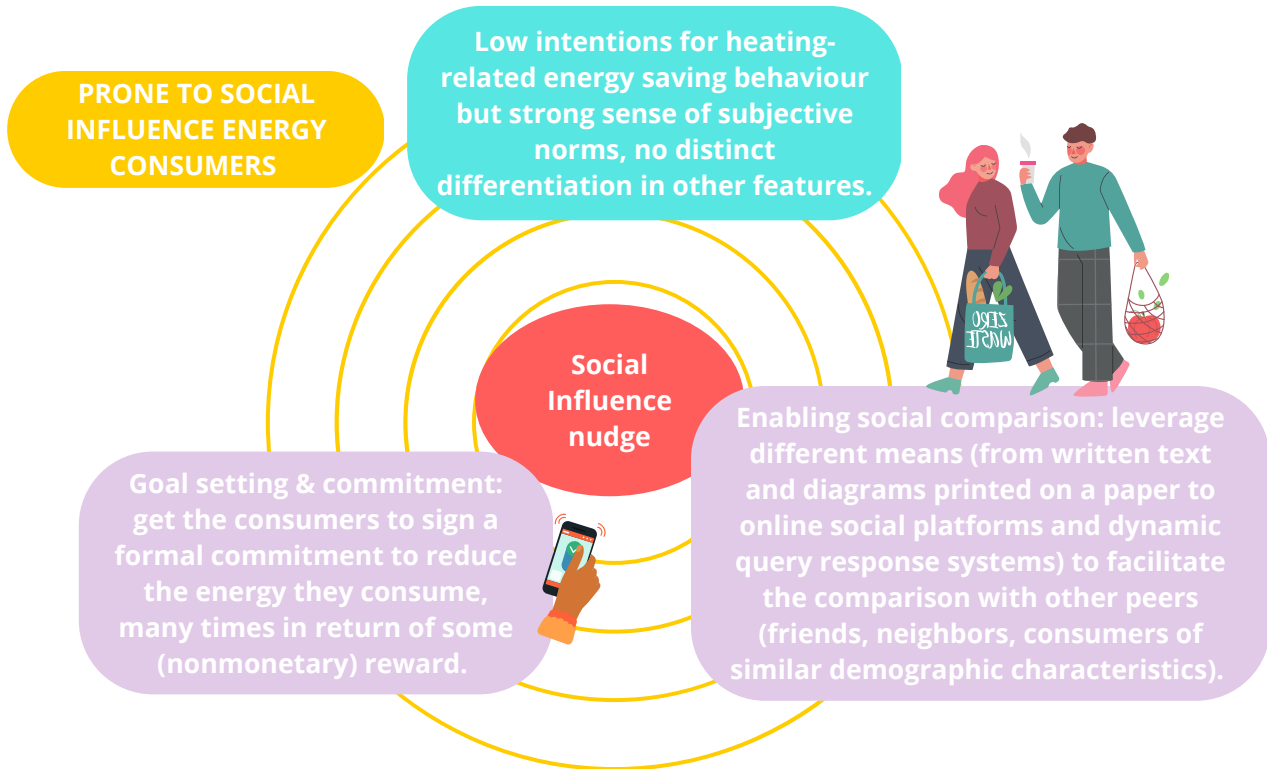
Figure 3: Adapted from NUDGE Deliverable D1.1, Profiling of energy consumers: psychological and contextual factors of energy behaviour, September 2021.



How can people be nudged towards heating efficiently?



How can people be nudged towards heating efficiently?



Key learnings from studying behaviour changes in heating consumption

The behaviour of household occupants is the second most important factor determining energy demand (even more important than building characteristics).

People differ in their energy using profiles (including their motivations to use or save energy) and therefore require different approaches to nudge them towards energy efficiency.

People's motivation to change behaviour depends on the following six factors: Perceived behavioural control, subjective norm, attitude, personal moral norms, willingness, age.

Policy design shall make an assessment of the impact of policies on the various types.

Further Reading

- ▶ [Nudge • Nudging consumers towards energy efficiency through behavioural science \(nudgeproject.eu\)](#)
- ▶ NUDGE Deliverable D1.1, [Profiling of energy consumers: psychological and contextual factors of energy behaviour](#), September 2021



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PROJECT COORDINATOR

Filippos Anagnostopoulos,
Institute for European Energy and Climate Policy - IEECP
Contact: filippos@ieecp.org.



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