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Green transition for vulnerable households? Insights from behavioral science on what works (and what doesn't)

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Energy poverty remains a pressing issue across Europe, particularly as the EU prepares to launch the Social Climate Fund in 2026. This paper serves as a *review*, drawing on behavioral science literature and existing evidence to provide actionable insights and practical guidance for policy-makers on designing and implementing grant schemes that effectively reach households vulnerable to energy poverty. Specifically, we identify cognitive and structural barriers—often overlooked in conventional policy approaches—that prevent vulnerable households from accessing or fully utilizing available financial support. While our recommendations are broadly applicable across the EU, we focus on the case of Cyprus, where energy poverty is high, and previous initiatives have faced significant challenges. By integrating behavioral insights into policy design, we aim to illustrate how grant schemes financed through the Social Climate Fund launching in 2026 can be made more accessible and effective for decision-makers of vulnerable households, ultimately paving the way for a more equitable and green transition.

KEYWORDS

environmental policy, behavioral science, energy poverty, Social Climate Fund, judgment and decision-making, vulnerable households, just transition

1 Introduction

1.1 The energy poverty challenge

As the European Union (EU) accelerates the scale and pace of its climate policies, the immediate and long-term socio-economic effects are becoming increasingly apparent, especially among vulnerable groups (Fuest et al., 2024). One particular challenge is energy poverty, which affects "*anyone who meets, in its housing, particular difficulties to have the necessary energy to meet its basic energy needs because of the inadequacy of its resources or of its housing conditions*" (Viola, 2021). Evidence shows that low-income households are disproportionately affected, and they tend to have higher energy needs due to factors such as low energy performance of their dwellings, reliance on high-energy-consuming appliances, or old-technology vehicles (Santamouris et al., 2007).

Energy poverty remains a significant concern for Europe, impacting the wellbeing of 41 million people in 2022, and contributing to hundreds of thousands of excess deaths globally each year (Guevara et al., 2023; Widuto, 2023). The scale of the problem varies across Europe, with between 6.9 and 10.6% of the population affected, depending on

whether the measure considers arrears on utility bills or inability to keep homes adequately warm (de Arriba-Segurado and Bañon-Serrano, 2024; European Union, 2023).

However, the effects of energy poverty are not uniform. Southern European countries experience a disproportionate burden, with alarming rates recorded in several countries: 12% of the households in Italy, up to 19% in Cyprus, 30% in Greece, 26% in Spain and 44% in Portugal (Santamouris et al., 2007; Statista, 2023; European Commission, 2024). These disparities highlight the urgent need for targeted interventions to mitigate the socio-economic consequences of energy poverty and ensure equitable outcomes as the EU transitions toward a greener future.

To alleviate energy poverty, governments can implement a range of immediate and longer-term measures. Short-term solutions such as social tariffs or temporary direct income support provide immediate relief, while targeted structural measures offer sustainable solutions by reducing both the demand for and cost of energy supply. A combination of these approaches is essential to effectively tackle energy poverty and ensure a just, green transition (European Commission, 2023).

To support the implementation of such measures, EU policy-makers established the Social Climate Fund, a new initiative under the European Green Deal (European Union, 2023). Launching in 2026, the Fund will channel a portion of revenues from the new Emissions Trading System (ETS2) to support households and micro-enterprises vulnerable to energy and/or transport poverty, ensuring they are not left behind during the green transition. The Fund targets three key groups: vulnerable households, micro-enterprises, and transport users. Funding will be allocated to investments in energy efficiency and the decarbonization of heating and cooling systems; promotion of zero- and low-emission vehicles and mobility, including support through vouchers, subsidies or zero-interest loans; and mitigating the short-term impact of rising fossil fuel costs on vulnerable groups through unconditional cash transfers. These measures aim to address immediate needs while building the infrastructure and systems required for long-term solutions.

However, two critical questions remain: How can policy-makers ensure that this funding reaches the intended recipients? How can they effectively engage vulnerable groups and increase the likelihood that they apply to the grant schemes supported by the Social Climate Fund?

1.2 The policy challenge

Policy-makers and academics have long recognized the difficulty of encouraging citizens to apply for social funding programs. In the literature on energy poverty, low uptake of grant schemes has been linked to multiple factors, including inadequate outreach, complex application processes, and limited awareness of available funding opportunities (Bertrand et al., 2006; p. 8; Currie, 2004; p. 10). In the case of Cyprus, unofficial information from energy authorities indicates that previous government efforts to support households in energy poverty resulted in less than half of the intended participants applying for funding, leaving more than 55% of vulnerable households unaided.

Reusing the conventional approach is unlikely to work. On top of the usual challenges of poor outreach, ineffective communication and complex, bureaucratic processes that often hinder the uptake of grant schemes (Currie, 2004, p. 11), policy-makers must also consider the growing evidence from behavioral science regarding the unique obstacles faced by vulnerable groups. Notably, prolonged financial stress can significantly impact people's decision-making capacities. Recent studies show that individuals experiencing poverty and income instability tend to exhibit compromised cognitive function, including impaired forward thinking and problem-solving skills (Mani et al., 2013; p. 976). The cognitive capacity it takes to constantly worry about budgeting has been shown to lead to outcomes such as forgetfulness, impulsive spending, anxiety, distraction, and failure to plan ahead, all of which contribute to worse long-term decisions (Mani et al., 2013, p. 980; Ong et al., 2019, p. 7248; Shah et al., 2012, p. 682; Shah et al., 2019, p. 2; Spears, 2011, p. 3; Tomm and Zhao, 2018, p. 482). Of particular importance is the evidence that households in financial distress often struggle with long-term planning, focusing instead on immediate needs. While this is a rational response to financial constraints and uncertainty, it can lead to long-term harm and underutilization of available grants. Forward thinking is crucial to investing in energy efficiency measures because it involves expending resources in the present (money and time) for a higher return in the future. However, the absence of such planning, driven by pressing short-term needs, often results in missed opportunities to leverage available grant schemes. This dynamic, well-documented in the context of energy poverty policy (e.g., Mani et al., 2013), highlights the need for targeted policy interventions.

To sum up the challenge, while low-income households and enterprises tend to have higher energy needs due to low energy performance of their dwellings, at the same time, it's harder for them to prioritize energy saving among more immediate concerns. This dual burden, widely discussed in energy poverty literature (e.g., Bertrand et al., 2006), illustrates the importance of designing policies that not only address financial constraints but also recognize the behavioral factors that shape judgment and decision-making among vulnerable populations.

1.3 About this paper

The aim of this review paper is to help policy-makers in designing and implementing grant schemes backed by the EU Social Climate Fund that can overcome the challenges identified in existing literature on energy poverty policy. By leveraging behavioral science insights, we aim to highlight strategies to successfully reach, appeal to, and convince the intended recipients to apply for financial support. Our analysis draws on behavioral science to identify cognitive and structural barriers that may prevent households in energy poverty ("vulnerable households") from applying for or fully utilizing the available financial support. These barriers, commonly overlooked in traditional policy design, represent a key area for intervention to improve the uptake of energy poverty programs. Our review demonstrates that recognizing how vulnerable households make decisions can enable small, strategic modifications to existing policies (e.g., Bertrand

et al., 2006, p. 8; Cialdini and Trost, 1998; Hershfield et al., 2011; LeBoeuf et al., 2010, p. 48; Neumann et al., 2023; Zhu et al., 2021). Such modifications can ultimately drive greater adoption and impact of the social climate fund across the EU, building on policy recommendations from prior studies (European Commission, 2024).

While the recommendations are broadly applicable across the EU, we focus on the case of Cyprus, where energy poverty remains high and similar energy poverty initiatives in the past faced substantial challenges in uptake. Although detailed empirical data on Cyprus' experience with grants for energy-poor households is limited, we build on insights from the broader energy poverty literature to speculate on how behavioral interventions can improve the absorption of funds. Specifically, we argue that addressing key barriers—such as the complexity of application processes— in cost-effective ways using behavioral science, can enhance the efficacy of these schemes in Cyprus, paving the way for a more equitable and green transition.

Cyprus offers an interesting case study for three reasons. First, the country is lagging behind its European counterparts in terms of leveraging behavioral science in policy design, across all areas. From our conversations with policy officials, there is a general lack of awareness about behavioral insights in Cyprus. Psychological and cognitive factors, whether for vulnerable groups or other population segments, are not actively taken into account. Policy-makers are interested but have not yet integrated these insights into their practices. Second, Cyprus's challenge on energy poverty is significant, with 15–19% of population recorded as residing in vulnerable households (European Commission, 2024). In a study of energy poverty dynamics in 27 European economies between 2005 and 2020, Cyprus and Bulgaria were the only two EU countries to feature high in both the cluster of "*Population unable to keep home adequately warm*" and "*Arrears on utility bills*" (Anastasiou and Zaroutieri, 2023). Against this background, the combination of ETS2 with the green taxation reform that the government has committed to adopting raises broader concerns about the socio-economic impact of green policies on the poor. This is particularly salient at a time when the cost of living has become a central element of public debates. Third, unofficial information from energy authorities indicates that previous government efforts to support households in energy poverty resulted in less than half of the intended participants applying for funding, leaving more than 55% of vulnerable households unaided. This evidence underscores the limitations of traditional policy approaches and the potential benefits of behavioral insights in tackling this persistent challenge.

To our knowledge, most behavioral insights studies so far deal either with the uptake of energy efficiency measures, or with the scarcity mindset of financially constrained people. Our study is among the first to explore behavioral insights for a combination of financial constraints and energy-related behavior. As the UK authorities observed a decade ago, behavioral theory has not focused extensively on individuals in fuel poverty, but rather on energy efficiency and the adoption of green behaviors (DECC, 2014); it seems that very little has changed since then. Our paper's aim is to help bridge this knowledge gap in policy-making.

The paper is structured as follows: Chapter 3 serves as an introduction to EU policy-making efforts to combat energy poverty, illustrating the very limited application of behavioral insights by decision-makers so far, as highlighted in the literature. Chapter 4 first provides a short description of how people, in general, make decisions, and the predictable errors in judgement we succumb to. It then explains how these errors, widely discussed in behavioral science research, become even more pronounced for vulnerable people and often result in worse decisions, marked especially by a lack of forward thinking and action-taking. We present three key reasons for this effect—cognitive scarcity, hassle factors and framing—and discuss the evidence from the literature surrounding policy design and implementation. In Chapter 5, we present the case study of Cyprus and the efforts of the government to financially support vulnerable households through the latest grant scheme. We seek to address the main challenge expressed in both the policymaking and academic literature: the low uptake of such schemes. We investigate this context using behavioral journey mapping to identify the main structural and behavioral barriers experienced by vulnerable households on their path to applying for the scheme. Based on our analysis, we offer actionable policy recommendations that incorporate findings from the literature and focus on low-cost amendments to the scheme. In Chapter 6, we discuss the broader lessons from behavioral science for designing and implementing measures that support just transitions in a cost-effective and efficient way, within the overall scope of the social climate fund. These discussions build on the evidence and insights identified throughout the paper, including the gaps highlighted in the existing energy poverty literature.

2 Energy poverty in the EU: a major challenge addressed with conventional policies

2.1 The EU framework on energy poverty

Energy poverty has been defined within the Directive (EU) 2023/1791 as *"a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes."*

The concept of energy poverty was first incorporated into EU law through the Directive on common rules for the internal electricity market (2009/72/EC). Since then, EU has introduced several initiatives, including the launch of the Energy Poverty Observatory (2016) and the inclusion of energy as an essential service in the European Pillar of Social Rights (2017) (Bouzarovski et al., 2021). The 2019 Clean Energy for All Europeans package further obligated member states to identify, monitor, and address energy poverty through National Energy and Climate Plans. In 2020, the European Commission issued its first Recommendation, offering guidance on measuring energy poverty and promoting best practices, with dedicated EU funding for vulnerable groups. As energy prices surged in 2021, the Commission published a toolbox (EU/2021/660) outlining measures that can be taken at national level to support vulnerable consumers. In 2022, the Energy

Poverty Advisory Hub (EPAH) was established to facilitate the exchange of best practices and enhance policy coordination across EU countries.

In 2023, the revised Energy Efficiency Directive (EU/2023/1791) and amending Regulation (EU/2023/955) were published, highlighting the role of National Energy and Climate Plans (NECPs) and Social Climate Plans in alleviating energy poverty. As such, all EU countries were due to submit their updated NECPs by June 2024 and will be expected to submit Social Climate Plans by June 2025 to access the Social Climate Fund (European Commission, 2023). Against this backdrop, the revised Energy Performance of Buildings Directive (EU/2024/1275) came into force in May 2024, further suggesting EU countries to include specific plans for addressing energy poverty in their National Building Renovation Plans as well as including information-related actions, among others.

2.2 Conventional policies to address energy poverty

To address households in energy poverty within the policy framework mentioned above, EU countries have been using a combination of conventional policies addressing affordability and structural changes. To address affordability, countries implemented income and price support schemes, inter alia, in the form of social tariffs, rebates on bills and tax cuts, and temporary unconditional cash transfers (European Commission, 2023; Jové-Llopis and Trujillo-Baute, 2024; Martini, 2023). In terms of structural measures that address the root causes of energy poverty, countries have notably launched grant schemes to help vulnerable households pay for energy efficiency (such as roof insulation) and renewable energy improvements (such as photovoltaic panels). Another useful tool has been low-interest loans and initiatives, including public guarantees promoting green mortgages, to assist households in overcoming the significant upfront expenses (European Commission, 2023).

2.3 The limited use of behavioral insights

While the EU's Competence Center on Behavioral Insights supports EU policymaking through research, expert assistance and trainings for capacity building, each country is seeking and incorporating behavioral insights at their own pace. For instance, the United Kingdom (though no longer an EU member) is a global pioneer in creating the first team to apply behavioral science within their government. Likewise, many countries around the world and Europe are increasingly integrating behavioral insights into public policy, as monitored by the OECD database (Hubble and Varazzani, 2023). Countries such as Australia, Canada, Singapore, and the Netherlands have become leading examples, using behavioral science to improve tax compliance, healthcare, energy efficiency, and public service delivery. Even so, due to limited capacity and the novelty of behavioral science as a methodology for policy-making, behavioral insights expertise is scarce and does not cover every policy design, nor is it present within every department.

Even countries whose governments are accustomed to using behavioral insights, may have made very limited use of them within the context of energy poverty. For example, the Sustainable Energy Authority of Ireland (2025) has established a behavioral insights unit to inform its policies, but has only recently launched a study to provide recommendations on how to target energy poor households, with results expected in 2025. The webpage of the Concerted Action of the Energy Efficiency Directive (2025), an EU-funded forum that supports EU Member States and Norway to implement this Directive, contains presentations from countries (a) about energy poverty policies, but none of them applying behavioral insights; and (b) about behaviorally-informed policies for energy efficiency, but not addressing specifically the energy poor. In summary, while scientific work has made some progress in combining behavioral insights to support financially constrained people with those to support energy saving behavior, as demonstrated by the literature review provided in this paper, research findings have hardly been translated to real-world policies. As such, the analysis that follows regarding the case of Cyprus in Chapter 5, is by no means restricted to Cyprus and our recommendations can be considered by other countries, upon being tested in the local context.

Next, we look at why and how behavioral insights can significantly strengthen conventional policy-making to combat energy poverty.

3 The behavioral science of energy poverty: theory and empirical evidence

3.1 How people decide

The human information processing system is rather idiosyncratic and complex—more so that policy-makers tend to realize. Research in behavioral economics has aggregated and built upon a plethora of cognitive, social and psychological factors that predictably influence judgment and decisions. The following paragraphs briefly explain some of these key factors.

3.1.1 Bounded rationality

Bounded rationality refers to our capacity to make perfectly rational choices that is essentially limited by constraints in our cognitive processing power, finite time and incomplete information (Simon, 1990; p. 15). These cognitive and environmental constraints lead us to use mental shortcuts (known as heuristics) for making many of our decisions on a daily basis. Reliance on heuristics can lead to systematic errors (known as cognitive biases), that are best understood as predictable deviations from rationality (Tversky and Kahneman, 1974; p. 1124).

3.1.2 Loss aversion

People weigh losses more heavily than gains of equal size. As a result, they often concentrate on risks, costs or potential downsides associated with adopting new behaviors or energy efficiency measures such as retrofitting (DellaValle, 2019; Frederiks

et al., 2015; Schleich et al., 2019). Loss aversion is also responsible for the endowment effect (our tendency to regard something we currently "own" as more valuable) and the reluctance to depart from the status quo (Tversky and Kahneman, 2000, p. 342).

3.1.3 Framing effect and communication

The framing effect refers to the variance in people's decisions based on how the same factual information is presented, leading to inconsistent choices. This happens because people do not generate direct responses based on objective experiences; instead, stimuli are mentally interpreted, construed, and understood (or misunderstood). In other words, perceptions of reality (and not reality *per se*) influence behavior (Frisch, 1993; p. 399). The framing of messages can have a significant impact on how they are received. For example, research shows that framing the same choice in terms of losses instead of gains may alter a decision made in the context of household energy savings (Pothitou et al., 2016). Moreover, the messenger's likability can influence how much attention the message receives, while the emotions evoked by the message can affect people's sense of self-efficacy (belief in our ability to succeed) and motivation to take action (Bandura, 1982; p.134).

3.1.4 Social norms and influence

When uncertain, individuals tend to look at how others behave to determine their own actions, what is referred to as social norms: the accepted rules of behavior. Social norms influence us in various situations, from dress codes, language usage, customs to values. They are one of the strongest drivers of human behavior and decision-making because of our need for belonging as well as the need to maintain a positive image of ourselves (Baumeister and Leary, 1995; p. 497; Cialdini and Trost, 1998). As a result, if we perceive that a certain behavior we're contemplating is the norm, we are more likely to do it, and vice versa. For example, as more homes in a neighborhood install rooftop solar panels that are highly visible, social norms start to gravitate toward solar panels being seen as normal and appealing and, in turn, more people in that neighborhood install solar panels (Curtius et al., 2018; Scheller et al., 2022). Likewise, studies show that the majority of people say they're willing to fly less, to walk and cycle more, or to repair and reuse products, but, because they don't consider these behaviors to be very common, they do not engage in them sufficiently (Behavioral Insights Team, 2023).

3.1.5 Paradox of choice and decision fatigue

People often believe that having more options is better, but oftentimes, too much choice makes decisions more difficult in terms of the cognitive effort required, and may lead to decision fatigue (where, paralyzed by too much choice, we choose not to decide). Various studies show how the presence of multiple alternatives can lead to increased decisional conflict and reduced adoption (Botti and Iyengar, 2006; p. 26). For instance, in a study involving shoppers in an upscale grocery store, the availability of 24 jams compared to six led to significantly lower purchase rates (Sethi-Iyengar et al., 2004; p. 84). A similar pattern emerges when consumers are faced with energy choices. One such study involves a randomized field trial conducted by Xcel Energy in the US, which assessed the impact of emphasizing a few best energy-saving options versus providing a full list of recommendations. The group that received focused recommendations implemented more measures and achieved higher energy savings than the control group, suggesting that highlighting key options helps mitigate decision fatigue and improves energy-saving outcomes (ACEE, 2014, p. 328). Another interesting example, though not in the field of energy, helps to demonstrate the occurrence of this effect across the population, irrespective of educational attainment and professional background. Expert physicians, faced with the choice of prescribing medication for a patient with osteoarthritis, were more inclined to reject a new medication when choosing between two options rather than just one (Redelmeier and Shafir, 1995; p. 302).

3.1.6 Hyperbolic discounting and intention-action gap

Hyperbolic discounting is the tendency for people to prefer smaller, immediate rewards over larger, delayed rewards, with the degree of preference decreasing as the delay occurs further in the future (Ainslie, 1991; p.334). One of the key consequences of this overly focus on the present in the intention-action gap: the discrepancy between what people plan to do, and how they ultimately behave. For example, people know that taking the time to fill an application for government funding will likely have important long-term financial benefits, but fulfilling current needs (like taking a rest after a long day) feels more gratifying in the moment. This leads to procrastination and postponement, even for tasks considered important. For example, a study covering 3% of the Danish working-age population finds a significant gap between individuals intending to switch electricity providers and those actually doing so. The observed intention-action gap can be explained by present-biased individuals who procrastinate and quickly forget to switch (Gravert, 2024). In fact, there's plenty of evidence that seemingly minor details that increase the difficulty or effort required for a task (referred to as "friction costs" or "hassle factors") can determine whether someone completes the task or postpones it, potentially indefinitely (Behavioural Insights Team, 2014; p. 9).

As evident from the examples provided above, such predictable errors in judgement and decision-making are in no way exclusive to the uneducated, inexperienced or poor; they apply to everyone. People who live in comfort are susceptible to the same idiosyncrasies as those who live in poverty. However, as we demonstrate next, in the context of poverty, the room for mistakes is limited, and these errors frequently exhibit more noticeable effects, often resulting in more unfavorable outcomes (Mullainathan and Shafir, 2013; p. 18). Next, we present the key literature surrounding how vulnerable people decide.

3.2 How vulnerable people decide and policy implications

Up until the advent of behavioral economics, social scientists regarded the behaviors of the vulnerable either as rational reactions to their prevailing circumstances (low income, little education, poor health, few lending options etc.), or as the result of personality traits (such as deviant values and low self-control; Bertrand et al., 2006, p. 8). The first view presumes that people are highly rational: they hold consistent, well-researched beliefs that are grounded in solid evidence, and they pursue their goals efficiently, making minimal mistakes and requiring no assistance. The second view attributes to the vulnerable a range of inherent psychological and attitudinal deficiencies, leading to misguided views, ineffective behaviors, and flawed choices, thus necessitating paternalistic guidance.

But findings from behavioral economics have revealed that neither of these standalone views is sufficient to explain the nuances of decision-making among vulnerable people. Instead, the way all individuals make decisions is intricate, adaptable, and influenced by the surrounding context, as described in the previous paragraphs. Like people from other backgrounds, vulnerable individuals possess the fundamental cognitive and psychological traits, which result in predictable errors in judgment and decision-making. Only, in the case of the vulnerable, there is little room for error, causing these behaviors to appear more pronounced and often resulting in worse outcomes (Bertrand et al., 2004; p. 419).

We proceed to examine three specific ways in which vulnerability can critically harm judgment and decision-making, and discuss the implications for policy design in each case.

3.2.1 Scarcity impairs cognitive ability and accentuates short-term thinking

In 2013, Mullainathan and Shafir introduced the concept of cognitive scarcity. Defined as "*a subjective sense of having more needs than resources,*" it implies a change in the way people think and act as a result of the feeling of having insufficient resources to meet their basic needs (Mullainathan and Shafir, 2013, p. 83). Importantly, cognitive scarcity has been linked to suboptimal decision-making: if individuals, on top of bounded rationality, are also experiencing some form of resource deprivation, then their ability to make good decisions decreases. Much like busy people struggle to manage their time effectively, those in poverty or with maxed-out credit cards can fail to manage their finances rationally. This happens because people experiencing cognitive scarcity are more susceptible to tunneling, cognitive overload and hyperbolic discounting (van der Veer et al., 2024; p. 27).

Tunneling is about directing most of the attention toward what is scarce and, consequently, ignoring other information (since the ability to concentrate and retain information is limited by available working memory capacity). In the case of the vulnerable, tunneling implies that their attention is allocated to pressing financial demands, like this week's groceries, at the expense of less urgent demands, such as an investment in home renovation and renewable energy, even if these expenses will translate into savings in the future. When faced with scarcity, reducing that scarcity becomes a dominant goal, overshadowing other equally important but less urgent objectives. As Shah et al. (2012, p. 682) aptly explain "*When money is abundant, basic expenses (e.g., groceries, rent) are handled easily as they arise... But when money is scarce, expenses are not easily met. Instead of appearing mundane, they feel urgent. The very lack of available resources makes each expense more insistent and more pressing. A trip to the grocery store looms larger, and this month's rent constantly seizes our attention. Because these problems feel bigger and capture our attention, we engage more deeply in solving them.*"

Cognitive scarcity also overloads the brain's capacity by taxing the available mental bandwidth, thus interfering with executive functioning and the ability to make sound judgements and decisions. Ongoing anxiety and worry about insufficient resources and coping with demands increase the cognitive load (Gennetian and Shafir, 2015; p. 4; van Dijk et al., 2022). This cognitive load impairs decision-making in people experiencing scarcity, making it harder to utilize executive functions such as selective attention and self-control (Mani et al., 2013, p. 976).

People under financial scarcity are also found to be more present-oriented and less patient compared to those in affluent situations (Shah et al., 2015; p. 402). They tend to discount future rewards more steeply, shifting their time orientation toward a present-time horizon, versus a future-time horizon (de Bruijn and Antonides, 2022, p. 5). As a result, forward thinking is largely absent from their decisions, causing them to overlook critical information and make suboptimal decisions (Shah et al., 2012, p. 682).

Overall, cognitive scarcity renders people more susceptible to forgetting things, impulsive spending, anxiety, and failure to plan ahead, perpetuating negative situations or leading to even worse longer-term outcomes (Mani et al., 2013, p. 980; Ong et al., 2019, p. 7248; Shah et al., 2012, p. 682; Shah et al., 2019, p.2; Spears, 2011, p.3; Tomm and Zhao, 2018, p. 482). Research indicates that the effects are significant. For instance, being poor reduces a person's cognitive capacity by more than losing one night of sleep (Mullainathan and Shafir, 2013, p. 181). It is not that the poor have less bandwidth; rather, it is that the experience of poverty reduces anyone's bandwidth. A pertinent illustration can be found in a study on sugar cane farmers. The researchers observed that when sugar cane farmers have a profitable crop, they are considerably more adept at solving IQ problems. However, during the period preceding the harvest, when farmers are under financial stress, when they must decide whether to pay rent, purchase food, pay for an illness, or to allocate funds for other purposes, the low-level stress associated with these decisions has a detrimental impact on their IQ, resulting in poorer performance on IQ tests (Mullainathan and Shafir, 2013, p. 122). In an energy-related example, a study conducted in Metsovo, Greece, found that energy-vulnerable households, particularly those unable to keep their homes warm, showed signs of cognitive scarcity by being less likely to monitor their electricity consumption, or perform maintenance on their heating systems, and often chose short-term discounts on energy bills over long-term savings (Kaliampakou et al., 2021, p. 17).

In terms of policy implications, the considerable impact of cognitive scarcity among vulnerable populations implies the need for policy-making efforts to double down on both effectively reaching the intended groups in their communication efforts (thus,

raising awareness), and also prioritizing simplicity and ease, in order to avoid taxing people's brain (so that people are more likely to seriously consider the program).

3.2.1.1 Raising awareness

Studies show that individuals are often uninformed about programs for which they qualify (Bertrand et al., 2006, p. 8; Currie, 2004, p. 10). Policy-makers are encouraged to revisit the traditional channels of communication and make them more relevant and accessible for the vulnerable populations they are targeting.

3.2.1.2 Increasing appeal

Studies also show that the credibility, trustworthiness, and overall perception of a message is significantly influenced by the characteristics of the person delivering it, such as their expertise, authority, attractiveness, and relatability—a tendency deemed as the "messenger effect." In general, most politicians around the world tend to carry low credibility and relatability scores with citizens. Instead, when nationally-recognized experts or local community personalities are chosen as messengers, the Sustainable Energy Authority of Ireland finds that households are more likely to engage in energy efficiency subsidy and support programs (Sustainable Energy Authority of Ireland, 2018; p. 21).

3.2.1.3 Increasing comprehension

Programs and schemes are often hard to understand, since they are rarely written from the perspective of the applicant. For policy-makers, adjusting mechanisms and processes in order to enhance the visibility and clarity of incentives can be highly beneficial in addressing these challenges. With respect to comprehension of benefits, simplicity matters. When individuals with lower economic status encounter unfamiliar, threatening, or stigmatizing situations, such as filling out a funding application, these circumstances can deplete their cognitive resources. With fewer resources available for processing relevant information, they become more easily overwhelmed by complex processes, too much information, irrelevant information, information portrayed in a strange order, use of complex or uncommon words, lack of easy access to help and so on. This means that the way the application process, the benefits, costs, and other relevant information are framed and presented matters even more.

3.2.2 Hassle factors and reward uncertainty significantly inhibit action

While hassle factors (seemingly minor details that increase the difficulty or effort required for a task) might be perceived as inconsequential by classical economists, they can have a significant negative impact on program take-up, especially for individuals with limited resources (Bertrand et al., 2006, p. 16). Similar in how we procrastinate by delaying routine medical checkups because of the physical distance to a public health facility, individuals with lower economic status may delay signing up for welfare programs due to the perceived hassle factors that get in their way (van Dort and Moos, 1976). Such hassle factors can include, inter alia, dealing with bureaucracy, complex intricate forms and numerous requirements.

Hassle factors exacerbate people's tendency to procrastinate. As discussed earlier, procrastination is amplified when there is an asymmetry between the costs that someone has to pay now and the rewards expected in the future (hyperbolic discounting). In the absence of forward thinking on account of cognitive scarcity, procrastination can be profound. Even if an individual is convinced of the benefits of a certain action, they may keep delaying it because of the hassle involved; sometimes, the delay may be indefinite. Moreover, in the presence of uncertainty (if people have no way of knowing whether they will receive aid, how much they will get, and how much they will be able to save in the future) the certain costs of applying to a program will further outweigh the uncertain far-away rewards, amplifying the likelihood of inaction.

Research on the effect of hassle factors is impactful. In a study focusing on tetanus vaccination, participants received persuasive communications regarding the risks of tetanus and the importance of getting inoculated and were informed about where to go for a tetanus shot. While follow-up surveys indicated that the communication effectively changed beliefs and attitudes, only 3% of the participants took the step to get vaccinated (intention-action gap). In contrast, when participants were also given a map of the campus, with the infirmary circled, and were encouraged to decide on a specific time and route to get there, 28% of them got inoculated (Leventhal et al., 1965). Another study focused on increasing the number of students who apply for college financial aid in the United States. When students received hands-on support for completing the application, including pre-population of the form with information from government databases, applications for financial aid increased by 33%, and the impact was biggest for lowest-income families (Bettinger et al., 2009). A notable energy-related example is a behavioral trial conducted in the UK which examined how reducing hassle factors influenced the adoption of home insulation in the loft area. The trial found that simplifying the process by providing easy-to-fill forms, arranging home visits in advance, reducing paperwork and offering turnkey solutions—where the insulation service cleared belongings from the loft area before insulation, resulted in a higher likelihood of considering roof insulation (DECC, 2011, 2013).

In terms of policy implications, research on the effect of hassle factors can reveal some key directions for policy-makers.

3.2.2.1 Reducing hassle factors

Since seemingly minor situational changes that make it easier and less uncertain for an individual to apply to a scheme can have a large impact, policy-makers can direct efforts to the cost-effective tasks of simplifying and enhancing the user-friendliness of application forms. By investing in small changes, such as reducing complexity and increasing clarity, policy-makers can make these forms more accessible and understandable, potentially facilitating higher participation in welfare programs (Behavioural Economics Team of the Australian Government, 2020). One such example is the inclusion of a "passport page" that acts as an executive summary, addressing the most key aspects that are likely to interest the intended audience (Behavioural Insights Team, 2015).

3.2.2.2 Timely reminders

Reminding people at the right time can be a simple yet effective strategy to enhance program uptake by directing attention to the opportunity that is currently available. When combined with concrete deadlines for sign-up, reminders can help

mitigate procrastination and inaction. Tied to this strategy are implementation intentions (a personal statement of when, where and how someone will perform the desirable action), which can help people plan ahead and increase their commitment.

3.2.2.3 Proactive outreach

Another measure involves governmental or nonprofit agencies proactively reaching out to at-risk populations, inquiring about their program enrollment status, and assisting them with the initial steps of the application process (e.g., by pre-filling or pre-populating some information in the forms to help them get started). This proactive outreach can be instrumental in overcoming inertia and encouraging individuals to complete the rest of the application process.

3.2.2.4 Visualizing benefits

Mitigating the effect of reward uncertainty by offering data on case studies and tangible estimates of the benefits can help people visualize the rewards. Visualization creates a connection between our present and future selves, and has been shown to help people behave in desirable ways, such as increasing their retirement savings (Hershfield et al., 2011). This can be best achieved when tapping onto the power of social norms, as discussed in the next section.

3.2.3 Presentation affects ease of decision-making and likelihood of action

Beyond the need for simplicity and clarity, research points to other aspects in which the way information is framed and presented affects how it is perceived, processed and interpreted by the intended recipients. One key aspect is the framing of opportunities aligned with loss aversion, emphasizing what will be lost rather than what will be gained. Because of the asymmetry in our perception of gains and losses, framing that emphasizes the losses associated with maintaining an energy-inefficient household by, e.g., *"savings lost from not installing solar panels or roof insulation"* is likely to be more effective than an alternative frame that highlights the benefits or *"savings gained."*

Further, the stigma associated with participating in certain programs is often cited as a significant barrier, and relevant research has delved into the significance of identity salience in decision-making processes (LeBoeuf et al., 2010, p. 48). Individuals derive their identity, to a large extent, from the social groups they belong to, and they may switch between different identities based on context. For instance, a woman might see herself primarily as a mother when with her children and as a professional while at work, allowing her to function differently in her various roles. This is because different identities evoke distinct values and ideals. As such, addressing people as "vulnerable" is likely to accentuate their discomfort with their current status.

Moreover, tapping on the power of social norms is crucial but requires caution. Social norms are one of the strongest drivers of human behavior and decision-making because of people's need for belonging, as well as the need to maintain a positive image of ourselves (Baumeister and Leary, 1995, p. 497; Cialdini and Trost, 1998). But there's two things to consider. First, messages aimed at encouraging socially beneficial behavior can easily have unintended consequences. As Cialdini (2001) shows, there is a natural inclination to mobilize action against a problem by portraying it as disturbingly widespread. For example, "*A large part of the funding is still available. Apply now!*" While these claims may be true and well-intentioned, they overlook a crucial aspect: embedded within the statement is the fact that most others have chosen *not* to apply to this scheme—and this fact has the potential to undermine the whole message. Thus, crucial for the success and effectiveness of policy conduct and implementation is the necessity to frame messages and design contexts in ways that not only convey accurate information but also elicit the intended interpretation.

The second thing to consider regarding social norms is that the decision to apply to a welfare program will include considerations such as if other people in the community intend to apply (or have applied) and the potential stigma associated with such programs (LeBoeuf et al., 2010, p. 48). Research clearly demonstrates that altering familiar behaviors often requires addressing social pressures and constraints emanating from peer groups—forces that could act as formidable obstacles but, if harnessed correctly, could also be powerful catalysts for success (Lewin, 1951). To that end, introducing information within the context of small discussion groups can be significantly more effective than conveying the same information through one-way communications, such as lectures. For instance, a study advising rural mothers to administer cod-liver oil to their infants showed that compliance increased from around 20% after individual consultations to 45% when the information was presented in six-person discussion groups (Bertrand et al., 2005; p. 10). Similarly, a study conducted in a shared college residence in China demonstrated that promoting visible group behaviors have a much stronger influence on individual energy-saving behaviors than direct feedback or instructions aimed at encouraging energy efficiency (Zhu et al., 2021). The reason behind these findings is that, at the individual level, persuasive information struggled to counteract the influence of group norms and expectations. Conversely, introducing the same information within newly created groups and visible behaviors facilitated the development of new norms, effectively communicated through public support and shared intent.

A final presentational aspect that is often overlooked is choice overload, or the presence of multiple alternatives, which can lead to increased decisional conflict and reduced adoption, as shown in various studies (Botti and Iyengar, 2006, p. 24). Combined with the impact of cognitive scarcity on mental bandwidth, the effect of choice overload may amplify in the case of vulnerable groups, leading to decision paralysis. Numerous studies grounded in behavioral economics support the adverse effects of choice overload on vulnerable populations and provide cost-effective solutions. For instance, in a field experiment in South Africa, researchers explored the impact of subtle variations in the description of a loan process on the decision to accept a loan offer. They found that a one-example description of the loan terms (loan size, terms and monthly repayments) resulted in higher acceptance rates than a version of four examples (Bertrand et al., 2005, p. 14). The effect was so large that the simpler (one example) description of the offer had the same positive effect on uptake as dropping the monthly interest on these loans by more than two percentage points.

The policy implications arising from framing and presentation effects are numerous.

3.2.3.1 Tapping into loss aversion

Policy-makers can frame the cost of non-participation in a social program as an ongoing loss rather than a forgone gain, thereby amplifying its perceived impact. For instance, "*Every month you go without solar panels costs you X money.*". Such loss-framed messages have the potential to elicit greater responsiveness compared to their gain-framed counterparts, such as "Getting solar panels helps you save money." For example, a field experiment in Switzerland investigating the adoption of photovoltaic panels in residential buildings found that loss framing (financial opportunities missed due to lack of solar panels) led to a 15-percentage point increase in adoption (Neumann et al., 2023, p. 6).

3.2.3.2 Appealing to the right identities

For funding schemes intended for individuals with lower economic status, it is suggested that promoting these services should align with identities such as "head of family" or "working provider," which might elicit a more positive response from the intended recipients. An example of how careful identity selection led to program success is that of the Earned Income Tax Credit program. By explicitly appealing to individuals' identity as "taxpayer" rather than as "poor" or "vulnerable," policy-makers gained a bigger response (Bertrand et al., 2005, p. 14).

3.2.3.3 Harnessing the power of social norms

To help reshape social norms, policy-makers can communicate the scheme through organized discussion sessions within newly created groups, to facilitate the development of new norms and shared intent. Moreover, instead of emphasizing the lack of interest in a scheme (negative social norms), policy-makers can utilize dynamic social norms by drawing on statistics that show more and more people in the relevant income categories are applying to the scheme over time. What's more, making the communication specific to a municipality or area, helps people identify even more with the message. This can be illustrated by the Bits and Bobs program in Norfolk, UK, which aimed to reduce household water consumption by sending letters encouraging residents to sign up for a water-saving program. Households receiving a letter with a local stamp (an illustration of a locally iconic windmill and indication that many other local residents had already signed up for the program) were approximately twice as likely to sign up (Lede et al., 2019, p. 111).

3.2.3.4 Avoiding choice overload

Limiting choices can remove much of the burden in decision-making processes and, thus, policy-makers can improve the uptake of policies by removing some alternatives that lead to decision paralysis. For example, asking people to choose between the three different options of roof insulation and/or solar panel installation can inhibit the decision-making process. Instead, a proposal could be made, depending on their situation. Moreover, switching people from an optional mindset ("*This is something I could do*") to a required mindset ("*This is something I'm supposed to do*") can lead to improved application rates. By removing the sense of optionality, the path of action (e.g., filing an application) becomes clear and normalized, freeing people from feeling like they should weigh their options or seek out further information from (costly) experts to choose what to do.

3.3 Behavioral insights for unconditional cash transfers

Alongside structural measures funded through grant schemes, the efficient utilization of the Social Climate Fund also rests on the design of unconditional cash transfers, the research on which is mixed. Many researchers and policymakers have argued that providing people with more money, like in the form of unconditional cash transfers (proverbially, with no strings attached), should help address cognitive scarcity mindset and generally improve the recipients' financial wellbeing, psychological wellbeing, cognitive capacity, and health. Indeed, research in low-income countries has shown that cash transfers often (though not always) improve individuals' outcomes, for instance by increasing consumption and food security (e.g., Baird et al., 2011).

However, other research shows unconditional cash transfers might not consistently yield positive outcomes, particularly when they are one-time occurrences and involve relatively modest amounts typical in high-income nations. For example, a recent study shows that receiving cash can also highlight its absence by making recipients' unmet needs more salient (Jaroszewicz et al., 2022). According to this research, receiving cash can cause recipients to consider the ways in which they could spend that cash, that is, think more deeply about existing financial obligations and potentially uncover new ones. This, in turn, can cause greater distress.

Studies have identified five key principles that determine the success of unconditional cash transfers: fairness, assurance, practicality, sufficient size to impact household income, and popularity (Hulme et al., 2014). First, *fairness* refers to the transfers and grants being perceived as fair, in that most citizens agree on the choice of who receives money and who does not. This becomes difficult because of poverty dynamics: a household identified as vulnerable 3 months ago (when the household head was sick and unable to work) may not be vulnerable today. Conversely, a household identified as not being poor 3 months ago may now be facing destitution after the income-earner loses a job contract. Second, *assurance* means that recipients must be certain that the money will arrive every month (or at pre-specified periods) and that their families can depend on it. Only then will family heads be able to make long-term plans. Third, *practicality* is directly related to the previous two principles, and implies that there must be a system to fairly identify recipients and ensure they regularly receive their grant. This requires having an adequate number of sufficiently trained civil servants to oversee and audit the system, and a reliable, secure banking or cash distribution system to deliver payments. Fourth, the transfer must be "*not pennies*." Grants must be large enough to cause a real change in behavior. In more industrialized countries where the cash poverty line and cost of living are higher, it requires a considerable amount of money to make a meaningful difference. Indications are that grants should ideally be not $<$20% of household consumption and where this level is not met the grants are unlikely to have the desired effect. And finally, the fifth

condition is *popularity*. Any social protection or grant program must be politically acceptable and popular enough to win votes. Only then will it be implemented by politicians.

4 Case study: Cyprus's grant scheme for "vulnerable households"

4.1 Cyprus and the social climate fund

As a beneficiary of the Social Climate Fund (SCF)—a *e*65 billion fund reserve under the European Green Deal—Cyprus is allocated *e*131 million for the period 2026–2032. Including the national contribution of Cyprus, the total minimum funding will be *e*174.7 million, of which up to 37.5% can be used for direct income support for vulnerable households and transport users (SCF Regulation, Article 8). The remainder will finance projects such as energy efficiency improvements, building renovations, low- or zero-emission mobility, and measures to reduce greenhouse gas emissions and mitigate energy poverty (SCF Regulation, Article 7). While generous financial incentives exist, previous experience—both from Cyprus and other countries—shows that the response of vulnerable households even to generous financial incentives to improve energy efficiency in their dwellings has been low (Bertrand et al., 2006, p. 8; Currie, 2004, p. 10).

The revised National Energy and Climate Plan of Cyprus specifies that 19.3% of the cumulative end-use energy savings for 2021–2030 should be achieved through implementing energy efficiency measures targeted at people affected by energy poverty or otherwise vulnerable (Republic of Cyprus, 2023a). As a next step, Cyprus is required to submit its Social Climate Plan (SCP) to the European Commission by June 30, 2025. This plan will outline the country's policies on: (1) green investments in energy efficiency-related building renovations (i.e., grant schemes), (2) temporary direct income support, and (3) targets, total costs, monitoring and implementation plans and accurate data.

Cyprus has already started implementing several measures, as outlined in the draft revised National Energy and Climate Plan. Namely, social tariffs for reducing VAT on electricity from 19 to 5% for vulnerable households for a specific period (Republic of Cyprus, 2023a; p. 26); direct transfers by making lump-sum payments to families based on income and household size; financial aid for residents of remote areas (Kyprianou and Serghides, 2020, p. 313); electricity disconnection protection for all vulnerable consumers during critical times (Republic of Cyprus, 2023a, p. 305); and grants to replace old electrical appliances with new, energy-efficient ones (4,503 applications were received between December 2021 and June 2022; Andreou and Koutsampelas, 2022).

While such policies are relatively simple to implement and can contribute somewhat to the alleviation of energy poverty, they are suboptimal for three key reasons. First, they only alleviate symptoms of energy poverty without offering sustainable solutions. Second, they fall short of addressing the structural and behavioral barriers experienced by vulnerable households. Third, they tend to be more expensive for the government in the long-term while lowering the main impetus for households to become energy efficient.

All these measures have been inherently based on the rational choice model of neoclassical economics, which assumes households make optimal energy-related decisions that maximize expected benefits, following an analytical comparison of costs and benefits associated with all the available options. However, as discussed in Chapter 4, this approach fails to consider how the context and barriers (structural and behavioral) are likely to affect the decision-making process of vulnerable households when adopting energy-efficiency solutions.

Behavioral science provides a critical lens to understand why households do not always respond to the financial incentives the way policy-makers expect them to, even when the economic benefits are clear. To uncover the causes of low participation in the grant schemes, we apply behavioral journey mapping to examine the process of applying for a Grant Scheme from the perspective of a vulnerable household. In the following sections, we identify and discuss potential reasons for low uptake of grant schemes by vulnerable households and provide actionable recommendations to ensure that the limited resources of the SCF are used efficiently.

4.2 Behavioral analysis of Cyprus's grant scheme for "vulnerable households"

We focus on the most recent Grant Scheme in Cyprus, titled "Encouraging the Use of Renewable Energy Sources and Energy Saving in Residential Buildings 2024–2025" (as translated from Greek), which was announced in January 2024, has a total budget of €90,000,000 and it will remain open until Dec 12, 2025 (or until the budget is exhausted) (Cyprus's Grant Scheme, 2024). By providing financial incentives, this Grant Scheme aims to encourage the utilization of renewable energy sources (photovoltaic panels) and energy saving measures (roof insulation) in existing residential buildings owned by natural persons. While targeting the entire population, this Grant Scheme has specific provisions for vulnerable households for installing photovoltaics (a grant of €1,250 per kW, with a maximum grant ceiling of €6,250) and roof insulation (75% grant and a maximum grant amount of €3,750 or €37.50 per sq.m.; RES Fund, 2024).

Despite the attractive features of the Scheme, the challenge of program adoption by the intended recipients remains. Previous government efforts with the "Save and Upgrade Program," which was implemented in 2021–2023, received more than 10,000 applications. Yet, only 6.7% of its beneficiaries were identified as vulnerable electricity consumers (Republic of Cyprus, 2023b). This low rate is particularly problematic, as 15–19% of households in Cyprus are estimated to be in or at risk of energy poverty—a proportion that has likely increased given the increase in fuel prices and shrinkflation pressures on the consumers over the past year (European Commission, 2022; Statista, 2023). This challenge is also echoed in our consultations with Cyprus policy-makers, who have expressed concern regarding the scheme's appeal, given the low application rates from vulnerable households to date.

To address this challenge, we undertake an in-depth analysis of this new Scheme, adopting the perspective of a vulnerable household. Within the framework of a behavioral journey map, we outline the key steps and sub-steps that vulnerable households need

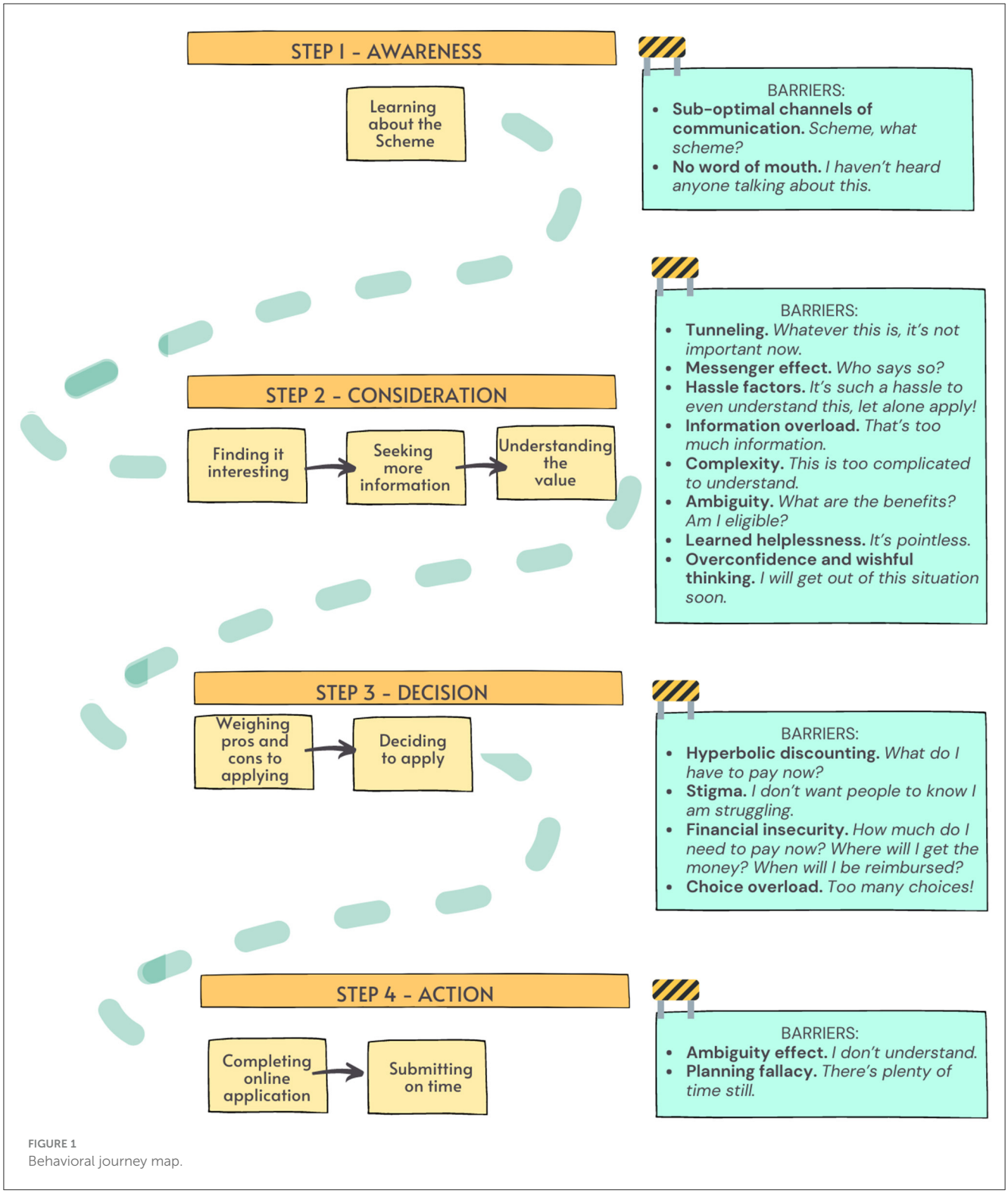

FIGURE 1
Behavioral journey map.

to take in order to apply to the Scheme. At each step, we identify potential barriers, both structural and behavioral.

The four key steps, as depicted in Figure 1, are Awareness, Consideration, Decision and Action. Step 1—Awareness involves the decision-maker of the vulnerable household learning about the scheme (e.g., through the news, social media, or word of mouth). Step 2—Consideration is about finding the scheme interesting and relevant enough to pay attention to it, allocating resources (time, energy, mental bandwidth) to seek more information, as well as understanding clearly the value the scheme can offer to their household. Step 3—Decision is about favorably weighing the Scheme's potential benefits against the hassle required to apply

and making the conscious decision to apply. Step 4—Action involves accessing and completing the online application, within the deadline provided. Taken together, these four steps depict the journey of a vulnerable household from before knowing about the Scheme to actually applying to it.

As expected, within each step, there are various potential obstacles, both structural and behavioral. Step 1—Awareness is about learning about the scheme. This can be obstructed by *sub-optimal channels of communication* that do not serve to reach the targeted audience. For example, the Ministry's social media sites have very low traffic. The proportion of Cypriots who watch the 8 o'clock TV news has also fallen drastically over the last decade, which means that traditional communication channels are no longer effective in reaching people. In addition, the social norms and potential stigma associated with identifying as a "vulnerable" household can prevent the news about the Scheme from spreading via *word of mouth* as people might shy away from talking about it.

Step 2—Consideration has three sub-steps and, at each one, the decision-maker is up against different obstacles. First, vulnerable households in Cyprus must find the scheme interesting and relevant for them in order to pay attention to it. One key obstacle to that is *tunneling*. As we've seen, cognitive scarcity can lead to tunneling, causing people to focus on immediate concerns (like paying for food, clothing and their children's needs) and neglecting other things that are further away in the future (like becoming more energy efficient and saving money on electricity in 9 months' time). In addition, there's the *messenger effect*, whereby the credibility, trustworthiness, and overall perception of a message is significantly influenced by the characteristics of the person delivering it, such as their expertise, authority, attractiveness, and relatability. Picking messengers, such as Cypriot politicians (who tend to carry low credibility and relatability scores with citizens—a global phenomenon) can inadvertently undermine communication efforts for energy efficiency.

Once people pay attention to the scheme, they must decide whether to allocate their resources (time, energy, mental bandwidth) to seek more information. One key obstacle here is the presence of *hassle factors*. Hassle factors include public servants not answering phonelines and website links leading to generic homepages. These factors signal (and portray) an unsupportive environment, discouraging citizens from choosing to actively seek more information. Another hassle factor may be the need to relocate until the energy efficiency renovations are completed, which may appear daunting in the face of constrained financial resources. Another obstacle is the provision of *too much information*. Cyprus's Grant Scheme bundles funding for all households with that for vulnerable households. As such, from the perspective of a vulnerable household, there's a lot of irrelevant information that they need to sift through before finding out what is relevant to them. Hassle factors and information overload can easily lead to procrastination and indefinite delay in applying to the Scheme.

Allocating time to understand the Scheme may not be enough to ensure appropriate understanding, if the Scheme is written in a technical, complex and ambiguous language. To clearly understand the value the Scheme can offer to their household, which is the last sub-step in Step 2, there's two more obstacles to overcome. First, there's *complexity* which can be seen, for example, in the use of difficult and unclear language, that resembles the way EU regulations are written. In addition, the order in which information is presented within the document does not align with what would interest a vulnerable household but reflects more closely what interests a government. Second, there's *ambiguity*. The benefits are not clear and no examples, case studies or statistics are provided. The eligibility criteria are not straightforward either. Those who are potentially interested need to find out and understand two types of information on eligibility criteria: a) socio-economic criteria set by the Ministry of Energy, Commerce and Industry, and b) technical information to identify which category they can be eligible for (e.g., total electricity consumption in the past year, the time that the building permit is issued). Such ambiguity can be a deal-breaker for considering the Scheme seriously.

Taken together, all these obstacles can deter Cypriots from actively considering applying for the Scheme (Step 2). An overarching obstacle at this phase is *learnt helplessness* mentality. Decision-makers of vulnerable households may feel that there is nothing they can do to improve their living conditions no matter how hard they try, and that these structural solutions are out of their reach. If this is the case, they will not consider going after any such long-term solutions, and rather stick to their status quo. At the other extreme, people may believe that they will soon get out of poverty or get a better-paying job. *Overconfidence and wishful thinking* can lead them to underestimate the cost of not considering the Scheme today, because they think they will not be needing any financial aid tomorrow.

Step 3—Decision is about favorably weighing the Scheme's potential benefits against the hassle required to apply, and then making the conscious decision to apply. In weighing the costs and benefits, one key obstacle here is *hyperbolic discounting*. Comparing upfront costs with far away, uncertain benefits can make the Scheme seem unattractive, especially when everyday living expenses loom large. This lack of forward thinking is exacerbated by the presence of hassle factors like bureaucracy and administrative burdens in the Cypriot government. Another obstacle here is the *stigma* associated with being labeled as "vulnerable." When this suggested identity is made salient, it can heavily weigh on the cons side of whether to apply, especially considering the tight-knit Cypriot community.

Once people decide that the benefits outweigh the hassle, they still need to bring themselves to consciously decide to apply. What can act as a significant obstacle here is *financial insecurity* about how much they need to pay in advance, where they can get the money from and when they will be reimbursed. Access to finance can be difficult, as low-income households are usually not considered by banks and other credit institutions as credible customers for lending to. Cypriot banks are still struggling with non-performing loans and exhibit great reluctance to lend. Moreover, people may be phased out by *choice overload*. The Scheme alone forces people to choose between three options (photovoltaic panels, roof insulation or both). Then, since vulnerable households are more likely to be tenants than owners, they need to decide whether to go after the scheme themselves or reach a consensus over split incentives with the owner. In addition, people may be caught up in thinking about competing options in

the form of other available schemes. In the absence of transparency, proper planning and information on the broader picture of such schemes, decision-makers may stall to see if a better scheme will come along. Taken together, all these different choices place a heavy burden on the decision-maker, which may lead to decision paralysis (no decision taken).

Step 4—Action involves completing the online application and submitting it on time. Some key obstacles that govern these two sub-steps are *ambiguity* (unclear instructions, mis-labeled links, wrong dates, multiple documents, language barriers) and, again, *hassle factors* (for example, to ask something you need to submit an online form). Finally, there's the obstacle of *planning fallacy* where people may underestimate the time it takes to complete an action, leaving it until the last moment, thereby missing the deadline.

Having identified these key obstacles in the Cyprus Grant Scheme, next, we propose solutions in the form of actionable recommendations to overcome or mitigate them, with the goal of increasing participation to the Scheme.

4.3 Actionable recommendations

Based on the analysis of the structural and behavioral obstacles to the adoption of the Cyprus Grant Scheme as identified in the behavioral journey mapping in the previous section, and the insights from the literature review in Chapter 3, we provide the following recommendations.

4.3.1 Re-think channels of communication to increase awareness and consideration

Cypriot policy-makers can increase awareness to the Scheme, by utilizing communication channels that are more relevant and accessible to the targeted population. For example, word of mouth is a powerful communication channel since people are more likely to pay attention to people they already know and trust. To boost word of mouth, policy-makers can replace lectures and monolog-style presentations with discussion sessions within relatively small, newly created groups among the targeted population, to help reshape social norms and alleviate stigma. Moreover, what can also help increase the chances of the Scheme being considered is assigning civil servants who have already formed a relationship with vulnerable households (such as the welfare department) as messengers.

4.3.2 Re-think content of communication to increase consideration

Cypriot policy-makers can grasp people's attention more effectively by tapping onto the power of social proof. This can happen, for example, by communicating examples of people who have already applied to the Scheme, carefully selecting those who bear similarities to the targeted population, such as the problems they face and village they live in. Use of positive social norms and in-group identity can also happen through the sharing of statistics and messages such as "*More and more of your fellow citizens in the municipality of Strovolos are applying.*"

4.3.3 Re-think framing of communication to increase consideration

To overcome tunneling and capture people's attention, policy-makers can try tapping into loss aversion by framing the cost of *not* participating in the Scheme with clear examples of future savings. For example, "*If you live in a 100 sq.m. residence, every month you go without solar panels costs you X money*." This is likely to be much more effective than its mirror message "*If you live in a 100 sq.m. residence, you can save X money every month with solar panels.*" In some cases, the effect of loss aversion on the adoption of energy efficiency measures can even surpass the effect of social norms (Neumann et al., 2023). Further, the time period for portraying the loss (whether weekly, monthly, quarterly etc.) can also have an impact on consideration. For example, if weekly savings are a low number, it's better to communicate savings for a bigger time interval.

4.3.4 Re-think content of the scheme to increase consideration and decision optimality

Key aspects of the content are information overload, complexity and ambiguity which cause cognitive overload and lack of understanding. The antidote is often simplicity. This can involve separating information meant for the general (non-vulnerable) population, avoiding facts that are irrelevant from the applicants' point of view (such as EU regulations and national goals), eliminating complex terms and presenting information in the order that makes sense to the target audience. In addition, mitigating the effect of reward uncertainty by offering data on case studies and tangible estimates of the benefits can help people visualize the rewards. Finally, clear indications should be provided about companies-contractors that are willing to accept being repaid directly by the government funding at a later stage.

4.3.5 Re-think identity evoked to increase consideration and decision optimality

In a tight-knit community such as Cyprus, identities and reputations matter a lot. To account for that, policy-makers should align the Scheme with identities that carry a positive association for the intended participants, such as "head of family," "working provider" or "energy-efficiency ready," which are likely to elicit a more positive response compared to "vulnerable household."

4.3.6 Re-think friction points to increase consideration, decision optimality and action

Hassle factors exist throughout the process and not all can be eliminated, due to resource constraints. However, where possible, it's worth making these seemingly minor changes that make it easier and less uncertain for an individual to apply. A practical, low-cost solution is a "passport page" that provides an executive summary, highlighting the fundamental aspects that should be considered by the intended recipients. Website links should lead to specific documents (instead of generic homepages), and information provided should be checked for its accuracy, clear labeling and language. Personalized help should be made easily

accessible and available by manning the phonelines (or returning calls in a timely manner).

4.3.7 Re-think number of options provided to increase decision optimality

Cypriot policy-makers can reduce choice overload by limiting the number of options people have. Ideally, if policy-makers can establish a predefined list of beneficiaries to the Scheme, then they can switch to automatic enrollments, making application for vulnerable households the default option. By streamlining this process, vulnerable households can be spared the burden of decision-making and excessive information-seeking.

4.3.8 Re-think additional help to increase awareness, consideration, decision optimality and action

Additional help can take the form of proactively reaching out to at-risk populations, inquiring about their program enrollment status, and assisting them with the initial steps of the application process (e.g., by pre-filling or pre-populating some information). Proactive outreach can be instrumental in overcoming inertia and encouraging individuals to complete the rest of the application process. In addition, the establishment of financial intermediaries that can assist vulnerable households in accessing capital would be beneficial, considering banks' reluctance to engage with this demographic. Finally, sending timely reminders can help people overcome procrastination and submit their application on time.

5 Discussion

EU member-countries, like Cyprus, are expected to submit their Social Climate Plans by June 30, 2025, for approval by the European Commission, outlining their policies on: (1) grant schemes for green investments in energy efficiency-related building renovations and (2) unconditional cash transfers for temporary direct income support. While these policies have been a step forward in addressing energy poverty, existing literature highlights their limited effectiveness in engaging vulnerable households due to structural and behavioral barriers (e.g., Bertrand et al., 2006, p. 8; Currie, 2004, p. 10). Many of the EU countries, including Cyprus, have already proceeded with measures such as social tariffs for reducing VAT on electricity, direct transfers to vulnerable households, financial aid for residents of remote areas, electricity disconnection protection, and grant schemes to subsidize energy efficiency measures.

Our paper argues that the design of these policies is usually suboptimal for reaching the intended recipients and bringing about sustainable change in an efficient and, importantly, cost-effective way. As identified in the current energy poverty literature, these policies often lack consideration of how people make decisions and how people experiencing energy poverty respond to structural and behavioral challenges (Bertrand et al., 2006). As such, they insufficiently understand and hence do not address the context and barriers (both structural and behavioral) experienced by vulnerable households when applying for grant schemes.

In the context of Cyprus, our exploration of behavioral science literature reveals significant barriers to adoption of grant schemes (e.g., Mani et al., 2013, p. 980; Ong et al., 2019, p. 7248; Shah et al., 2012, p. 682; Shah et al., 2019, p. 2; Spears, 2011, p. 3; Tomm and Zhao, 2018, p. 482). We identify low-cost, practical measures to increase the reach and uptake of these schemes, supporting the urgent need for a green and just transition. Crucially, our review and recommendations extend beyond simply providing information, since information alone rarely prompts action due to the pervasive intention-action gap, which is well-documented in the behavioral science literature (Ainslie, 1991, p. 334; Gravert, 2024).

The barriers we identify fall into two main categories: structural and behavioral. Structural barriers stem from the design and implementation of grant schemes, such as hassle factors and ambiguity. Behavioral barriers, on the other hand, arise from the decision-making processes of vulnerable households, influenced by phenomena like tunneling and hyperbolic discounting (e.g., Mani et al., 2013). Our review of the literature on energy poverty policies and behavioral science shows that these barriers, while different in origin, share two key characteristics. First, they are often overlooked by policy-makers, as observed in the case with the Cyprus Grant Scheme. Second, addressing them often requires structural adjustments rather than behavioral change. These adjustments tend to be highly cost-effective, demonstrating that recognizing how vulnerable households make decisions enables small, strategic modifications to existing policies, ultimately driving greater adoption and impact.

We provide such recommendations in Section 4.3, which are in line with findings in the energy poverty literature and behavioral science (e.g., Bertrand et al., 2006, p. 8; Cialdini and Trost, 1998; Hershfield et al., 2011; LeBoeuf et al., 2010, p. 48; Neumann et al., 2023; Zhu et al., 2021). Notably, we propose the use of modern communication channels, with proven appeal to the targeted audience, and the selection of appropriate, not convenient, messengers—people who carry credibility, trust and/ or national recognition with the target recipients. We also recommend replacing informational lectures with small-group discussions about the scheme, its benefits and the process to apply. In communicational messages, we highlight the importance of including positive examples of similar others as social proof, and framing messages in terms of the opportunity lost, not what can be gained. Moreover, in writing the scheme, we strongly recommend making the text easy to read by avoiding information overload, complexity and ambiguity. We also emphasize the value in invoking positive identities when calling out to the intended recipients, and proactively reaching out to at-risk populations to invite them to apply and help by pre-filling parts of the form. Last but not least, we propose the elimination of as many friction points as possible (hassle factors) throughout the entire process. In combination with the evidence on unconditional cash transfers and how these programs work best when they are fair, assured, practical, large enough to impact household income, and popular, these recommendations can help policy-makers to design and implement the measures of Social Climate Fund successfully in their countries.

In terms of limitations to our research, we acknowledge the following constraints and challenges. First, one size doesn't fit all, and recommendations need to be tested prior to implementation. While the analysis based on Cyprus can inform other contexts, the energy poverty literature shows that local contexts—including socio-economic, cultural, and policy differences—shape outcomes and may require adaptation (e.g., Mani et al., 2013). The analysis and recommendations based on the case of Cyprus is by no means restricted to Cyprus, in principle, but local context is a powerful determinant of what might work and what won't. European countries with different socio-economic, cultural, and political contexts, energy policies, market conditions and levels of energy poverty may have different schemes, different processes, and hence different barriers to consider and overcome. Second, human behavior is complex and multifaceted, and the three examined factors (cognitive scarcity, hassle factor impact, framing and presentation effects) might not encompass all the elements that influence decision-making in financially vulnerable populations. Moreover, some contextual factors unique to energy poverty in specific countries may not be fully captured, as the literature on this topic is still evolving. Due to unidentified contextual factors, the proposed interventions may have varied effects in real-world settings. Third, economic conditions such as stagnation, recession and shrinkflation can influence the ability to apply some of these recommendations effectively. More broadly, the success of policy recommendations depends on effective implementation, which may face administrative, political, or logistical challenges. Fourth, while we refer to vulnerable households as one group, there is significant heterogeneity within this group that requires further attention. Subgroups may include minimum income beneficiaries, low-income pensioners, families receiving child benefits, patients with chronic and degenerative diseases, and individuals living in unsuitable dwellings with leaks and poor ventilation. To develop targeted and effective recommendations for each subgroup, additional diagnostics are necessary.

To conclude, our paper demonstrates how insights from behavioral science can significantly help policy-makers in designing and implementing grant schemes and unconditional cash transfers backed by the limited resources offered by the Social Climate Fund. These initiatives should effectively reach, engage, and persuade the intended recipients to apply for financial support. A successful implementation of measures addressing energy poverty can both increase social acceptance of green policies and encourage policymakers to provide additional funds to reinforce the benefits of the green transition to vulnerable populations. Our findings align with the existing energy poverty literature that points out the importance of structural adjustments and evidence-based design in ensuring the success of energy poverty policies (e.g., Bertrand et al., 2006). We trust that these insights will be useful to governments worldwide, as they work toward facilitating a just, green transition.

Author's note

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Author contributions

MM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. PS: Conceptualization, Methodology, Writing – review & editing. MI: Investigation, Writing – review & editing. TZ: Conceptualization, Funding acquisition, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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