When Eligibility is Not Enough: Understanding Non-Take-Up of Energy Subsidies

Lessons from France's Energy Voucher Policy

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October 1, 2025

Abstract

Non-take-up of minimum income benefits is a widespread phenomenon in European countries, with rates exceeding 30%. While the automatization of benefit allocation helps reduce non-take-up, it remains insufficient. This paper evaluates the efficiency of the 2022 French Energy Voucher policy, focusing on the determinants of non-take-up despite automatic allocation, driven by the income effect and cognitive load (administrative burdens). Using data from the European Union Statistics on Income and Living Conditions (EU-SILC), the analysis first applies a logistic regression to identify factors associated with non-take-up among eligible households who did not use the energy voucher. In a second step, a doubly robust difference-in-differences estimator (Sant'Anna and Zhao) is employed to estimate the average treatment effect for eligible households who did use the voucher, in terms of energy welfare (heating consumption, difficulties paying bills, and subjective financial stress). Results show that 34% of eligible households did not use the voucher. Two distinct mechanisms explain non-take-up: (1) households near the eligibility threshold renounced participation due to transaction costs consistent with an income effect, and (2) poorer households faced cognitive load barriers, reflecting difficulties with administrative procedures. Among households that did use the voucher, no significant effects were observed on energy-related outcomes, suggesting that the policy's limited financial support undermines its effectiveness. Overall, the Energy Voucher scheme appears suboptimal, prioritizing broad coverage over targeted impact. Policy efficiency could be improved by narrowing eligibility criteria, increasing voucher amounts, and providing complementary support for energy-efficiency investments. By highlighting the role of income and cognitive load effects in non-take-up, this paper contributes to the literature on public policy efficiency and the design of social assistance programs.

Keywords: Energy poverty, energy policy, energy voucher, household behavior, France, EU-SILC

JEL codes: D91, H31, I32, I38, Q48

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I thank Chloé Le Coq and the seminar participants at the Climate Policy – Research in Action Day workshop organized by DIW, as well as the CNRS Thematic School on Public Policy Evaluation, for helpful comments and suggestions.

1 Introduction

Social spending as a share of public expenditure has reached unprecedented levels in response to the socio-economic challenges of the past decade (OECD, 2025). However, social benefits and other support measures remain central to ongoing debates due to their high financing cost, especially when compared to their effectiveness in reducing poverty, promoting (dis)incentives to work, and targeting beneficiaries (Moffitt, 1992; Haushofer and Shapiro, 2016; Banerjee et al., 2021; Steinbacher, 2024). This debate was particularly revived in Europe during the severe energy crisis of 2021-2023, when the European electricity benchmark price increased by 281% between 2021 and 2022 (European Commission, 2022[2]). In response, policymakers across Europe urgently prioritized energy security and introduced exceptional support measures for households. A total of €651 billion was allocated by European countries to shield consumers from rising energy costs. Social benefits became the primary instrument for addressing the energy crisis, both in terms of public expenditure and the variety of state aid provided (Sgaravatti et al., 2023).

This paper investigates non-take-up determinants of energy subsidies to protect households from poverty, in a context of exponentially increasing public expenditures on support measures. France offers a particularly illustrative case, as its government was among the first to respond to the energy crisis with substantial state aid. Starting in October 2021, the government reinforced the existing Energy Voucher scheme by providing a one-off €100 payment to the 5.8 million households already receiving energy vouchers and by expanding eligibility (Sgaravatti et al., 2021). The energy voucher is a means-tested payment designed to help households cover energy bills. It is sent automatically by post once a year. On average, 17.8 million households received an energy voucher between 2022 and 2023 (DREES, 2023[3][4]). The Energy Voucher policy was considered as the most effective energy subsidy due to its broad household coverage and the simplicity of its administrative process. Nevertheless, this paper highlights that 40.04% of eligible households did not use their energy voucher (see Figure 1 and Table 3). This finding raises the question of why a significant share of households facing the energy crisis did not make use of a policy specifically designed to be simple and effective. To answer to this question, the analysis relies on microdata from the European Union Statistics on Income and Living Conditions (EU-SILC), a longitudinal survey that covers a four-year period and collects data on income, poverty, social exclusion, and living conditions at both individual and household levels. As a

[2] European Commission. (2022, July 8). High volatility and geopolitical tensions impact electricity and gas market developments in Q1 2022. Available at: https://commission.europa.eu/, last accessed August 29, 2025.

[3] Research, Studies, Evaluation, and Statistics Directorate (2023, September). Minima sociaux et prestations sociales – Édition 2023. Available at: https://drees.solidarites-sante.gouv.fr/, last accessed August 29, 2025

[4] French Ministry for the Ecological Transition (2023, April 21). Début d'envoi des chèques énergie pour l'année 2023 aux 5,6 millions de ménages bénéficiaires. Available at: https://www.ecologie.gouv.fr/, last accessed August 29, 2025.

first step, a logistic regression is employed to characterize households that used energy vouchers and those that did not, in order to analyze household behavior in response to financial support and to identify the main factors influencing their decisions — particularly non-take-up. In a second step, the effect of the energy voucher on households that actually used it is estimated using a difference-in-differences model.

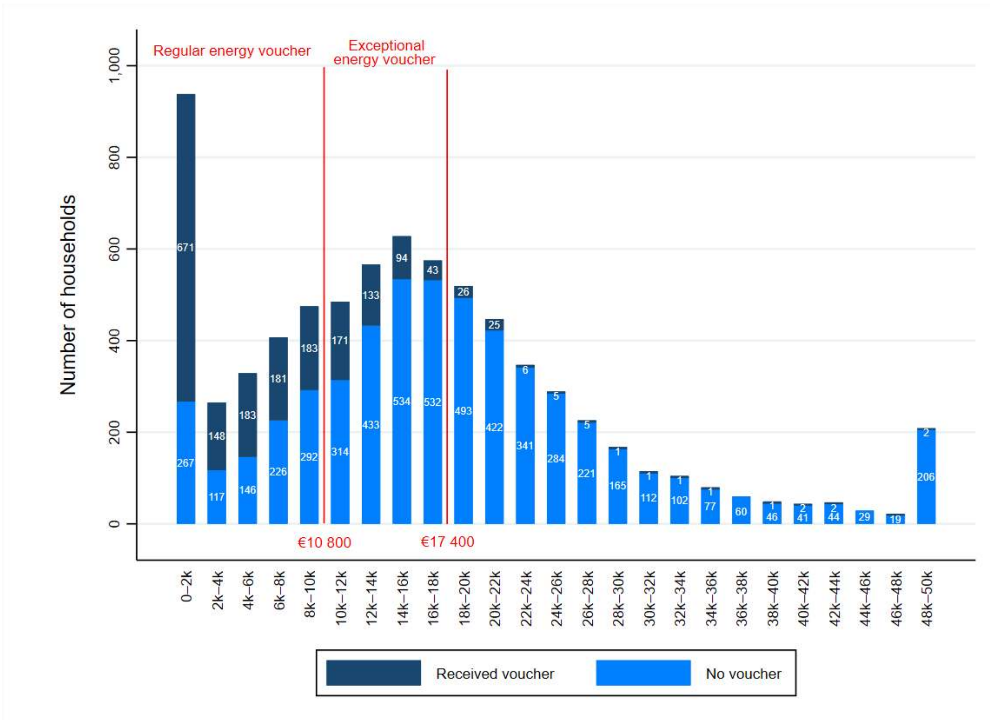

Figure 1: hare of households reporting receipt of the 2022 energy voucher by income bracket

By examining why some eligible households ignore or decline financial assistance within a representative sample of French households, this paper finds two main mechanisms behind the non-use of the energy voucher: an income effect and a cognitive load effect. Although the voucher is sent automatically to eligible households, the scheme has three main limitations. First, the amount is not directly credited to bank accounts; households must manually activate the voucher, either by entering a code on their energy provider's website or by sending it by post. Second, newly eligible beneficiaries (those who were not eligible the previous year) must complete the administrative process themselves via the Energy Voucher website. Third, the average voucher amount is relatively modest, at approximately 148 euros (DREES, 2023[5]). Consequently, for some households, particularly those just below the minimum income threshold for eligibility, the perceived effort required to benefit the voucher (understanding the procedure, creating an online account with the provider,

[5] Research, Studies, Evaluation, and Statistics Directorate (2023, September). Minima sociaux et prestations sociales – Édition 2023. Available at: https://drees.solidarites-sante.gouv.fr/, last accessed August 29, 2025.

calling a helpline, etc.) outweighed the monetary benefit. This transaction cost barrier is especially relevant for relatively higher-income beneficiaries within the eligible group. As the energy voucher policy has been expanded, a significant portion of eligible households have received smaller voucher amounts (around 50 euros). For these households, the perceived gain is even lower relative to the effort involved, making them less likely to use the voucher. On the other hand, transaction costs driven by an income effect cannot fully explain why some very poor households failed to use their energy vouchers. For these households, every euro is critical. The analysis suggests that non-use among the lowest-income households is more likely due to barriers such as lack of information, limited access to a computer or the internet, and administrative difficulties, including language barriers, complex procedures, or mistrust of public institutions.

This paper contributes to the literature on optimal subsidy schemes targeting low-income households (Banerjee et al., 2021; Giuliano et al., 2020; Alberini et al., 2020; Barrella et al., 2021; Kröger et al., 2023) and emphasizes the importance of non-financial barriers in explaining non-take-up (Currie, 2004; Finkelstein and Notowidigdo, 2019; Baekgaard et al., 2021; Ko and Moffitt, 2024; Thornton and Iacoella, 2024). Only a few studies have examined French energy policies (Charlier and Kahouli, 2019; Kahouli and Okushima, 2021; Rüdinger, 2023; Chaton, 2025), and none have assessed the effectiveness of the Energy Voucher Policy. To the best of current knowledge, no study has specifically evaluated the impact of the Energy Voucher policy in France, compared to the benefits energy price cap policy well documented in the literature. Rüdinger (2023) shows that the French tariff shield was economically effective, contributing to a lower inflation rate. By December 2022, France's inflation rate stood at 6.7%, compared to the European Union average of 9.2% and 9.6% in Germany. Nevertheless, Cornuet (2022) found that the benefits of the tariff shield and fuel rebate amounted to €420 euros for the richest 10% of households, compared to only €180 for the poorest 10%. This raises important questions about the targeting and efficiency of such support measures, particularly whether they adequately compensated income losses among low-income households. Moreover, existing literature on Energy Vouchers, mainly focused on the Spanish program *Bono Social Eléctrico* (Alvarez and Tol, 2021; Barrella et al., 2021; Bagnoli and Bertoméu-Sánchez, 2022; Cadaval et al., 2022; Llorca and Rodriguez-Alvarez, 2025), generally concludes that their efficiency is low. The recent study by Llorca and Rodriguez-Alvarez (2025) finds that although the Spanish Energy Voucher contributes to reducing energy poverty, its impact is limited and inefficient, as the most vulnerable households face barriers that prevent them from fully benefiting. These findings align with those of Bagnoli and Bertoméu-Sánchez (2022), Cadaval et al. (2022), Alvarez and Tol (2021), and Jové-Llopis and Trujillo-Baute (2024), who report that the Bono Social Eléctrico has either no statistically significant effect on energy poverty or only a modest one. Unfortunately, these results are not unique to Spain. In England for instance, income support policies such as the Winter Fuel Payment, Cold

Weather Payments, and the Energy Bill Support Scheme have shown very limited impact on low-income households not in energy poverty, and only modest effects for those who are (Galvin et al., 2024). Finally, we highlight a significant phenomenon of non-take-up, which is rarely addressed in the literature (Currie, 2004; Llorca and Rodriguez-Alvarez, 2025; Ko and Moffitt, 2024).

2 The French Energy Voucher Policy

The energy voucher has been introduced in 2018 as a new forme of state aid to help low-income households to pay their energy bills. This measure replaces the social electricity and gas tariff, which offered a reduction in energy subscription prices for low-income households. This policy change has corrected two major drawbacks : the tariff was applied only to households using electricity as energy source, and the non-take-up rate was significant. That is why, the Energy Voucher Policy pursues two main objectives:

- To provide fair and equitable assistance to all modest-income households, regardless of their heating energy source ;
- To improve the targeting of beneficiaries to significantly reduce the non-take-up rate though automatic allocation.

The energy voucher is a means-tested payment allocated based on income criteria of the n-2 year — the reference tax income (RTI)[6] — and household composition, measured in consumption unit (CU)[7]. Since its introduction, the RTI eligibility threshold has been progressively increased, from €7 700 per CU in 2018 to €10 800 per CU in 2022. This threshold is equivalent to a reference tax income of €22 680 for a couple with two children. The table 1 shows the 2022 energy voucher amounts by reference tax income and consumption unit. The General Directorate of Public Finances automatically compiles the list of eligible households each year and send the energy voucher by post in the spring. The entire process is designed to be as simple as possible in order to maximize the number of beneficiaries who will claim their entitlement. After receiving the voucher, households can use it either by posting it to their energy supplier along with an energy bill, or by using the official energy voucher website. Beneficiaries have one year to use the energy voucher.

[6] The reference tax income is the total income of the tax household, including both taxable and non-taxable revenues. Service-public.fr, *What is the reference tax income ?*, last updated July 25, 2024, available at: https://www.service-public.fr/particuliers/vosdroits/F13216 (accessed August 1, 2025).

[7] The consumption unit (CU) allows for comparison of living standards between households of different sizes and compositions from year n-2. It is calculated as follows: 1 CU for the first adult in the household, 0.5 CU for each additional person aged 14 or over, and 0.3 CU for each children under 14. The French consumption unit follows the OECD equivalence scale. INSEE, *Consumption unit (UC)*, definition C1802, last updated December 16, 2022, available at: https://www.insee.fr/fr/metadonnees/definition/c1802 (accessed August 1, 2025)

RTI per CU (euros per year)	<5 600	5 600–6 699	6 700–7 699	7 700–10 799
1 CU	194	146	98	48
1.5 CU	240	176	113	63
2 CU or more	277	202	126	76

Source: French Court of Audit (2022), The Energy Voucher — Communication to the Finance, General Economy and Budgetary Control Committee of the National Assembly.

Table 1: Voucher amount based on Reference Tax Income per Consumption Unit in 2022

With the energy voucher, households can cover two types of expenditure. First, energy expenditures related to heating and hot water consumption, including electricity, natural gas, liquefied petroleum gas, heating oil, wood, and biomass. Second, expenditure related to energy-saving renovation work. However, this second option was considered a failure by the French Court of Audit: only about 900 vouchers have been used for renovation work — roughly 0.001% of all vouchers uptake. Various reasons explain this lack of interest. Even when accumulated over three years, the voucher covers only a small share of renovation costs. Moreover, beneficiary households have very low incomes, making their priority the payment of energy bills rather than improving the energy efficiency of their homes, particularly as most are renter. Finally, the existence of other financial schemes for energy renovation, offering larger amounts of aid, has contributed to marginalizing the use of the energy voucher for this purpose.

In 2022, 5 773 000 households benefited from the energy voucher, with an average amount of 149 euros per households. Moreover, in response to the energy price crisis, an exceptional energy voucher was issued in 2021 and 2022. Distributed in December of the given year, the exceptional energy voucher provides an additional 100 euros payment to regular energy voucher beneficiaries and to all households with a reference tax income per UC between 10 800 euros and 17 400 euros, covering 23 192 200 additional households. Table 2 shows the characteristics of eligible households in 2022 for both voucher types issued in 2022. Single adult without children represented 47% of regular voucher beneficiaries, and 46% of its eligible households had a RTI below 5 600 euros per consumption unit.

	Regular energy voucher	Exceptional energy voucher
Number of consumption units (CU) in the household		
1 CU	47%	37%
1.25 CU to less than 2 CU	34%	46%
2 CU or more	19%	17%
Reference tax income per consumption unit (CU)		
Less than €5 600	46%	9%
€5 600 to less than €6 700	9%	2%
€6 700 to less than €7 700	9%	2%
€7 700 to less than €10 800	36%	8%
€10 800 or more	–	79%
Number of households	5 773 000	28 965 200

Source: DREES (2024), Social minima and social benefits– 2024 edition, Overview of DREES, Chapter 36: The energy voucher.

Table 2: Characteristics of households receiving the 2022 energy voucher

According to the Finance, General Economy and Budgetary Control Committee of the National Assembly (2024), the usage rate reached 82.6% this year, compared to 78.4% in 2018, the first year of the policy implementation (see Figure 2). The usage rate is continuously increasing but seems to stabilize around 80%, which is relatively high for an automatically allocated benefit (French Court of Audit, 2022).

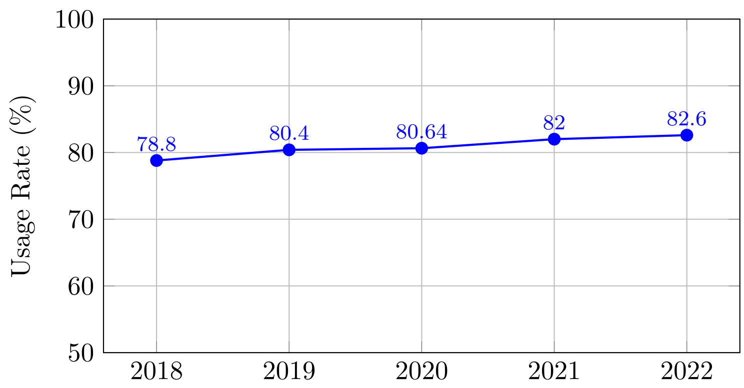

Figure 2: Energy voucher usage rate since 2018

Factors of non-take-up were studied during the experimental phase in 2016 and 2017, two years before the official implementation of the Energy Voucher Policy, in a evaluation report commissioned by the Ministry for Ecological Transition and Territorial Cohesion[8]. The project was piloted in four French departments and followed by a survey among beneficiaries to better understand benefits and limitations of the voucher. The non-take-up rate averaged 21% in 2016 and 37% in 2017. Five main factors could explain non-take-up. First, 75% of energy vouchers are used within one month of being sent, after this period of time, the risk of forgetting or lacking time to use the voucher increases. Second, some eligible households do not receive their energy voucher, due to loss or non-delivery by the postal service, often caused by technical issues or address changes between the year of the tax declaration (n-2) and the voucher mailing. Third, misunderstanding of the process. Fourth, loss of the voucher or refusal by energy suppliers. Fifth, voluntary non-use, such as lack of need or rejection of assistance.

Thus, the Energy Voucher Policy aims to reduce energy poverty but faces limitations reducing its effectiveness. The motivation for simplicity had led to eligibility criteria based only on household income, making the targeting of those most in need less effective. As a result, it is just as much a form of social assistance for households with the lowest standard of living, not all of which are in a situation of energy poverty. Moreover, the French Court of Audit confirms poor readability of beneficiary documents. Compared to social tariffs, the energy voucher is more politically visible but less clear in practice. Social tariffs were often seen as energy suppliers' initiatives, while the energy voucher is clearly a public policy measure, sent with a ministerial letter. However, this letter remains too complex for many beneficiaries.

3 Literature review

The explosion of electricity and gas prices between 2021 and 2023 has increased the interest of European governments in energy access issues and their consequences on poverty. Indeed, the proportion of households affected by energy poverty, also called fuel poverty (Bouzarovski and Petrova, 2015), has grown significantly. The growing focus on vulnerable groups and good governance reflects both a recognition of governments' responsibility in supporting these populations and the shortcomings of the current system (Stojilovska et al., 2022).

[8] Ministry for Ecological Transition and Territorial Cohesion, *Evaluation of the energy voucher trial (evaluation report of the energy voucher pilot, established by Article 201 of Law No. 2015-992 of August 17, 2015)*, December 2017, available at: https://www.ecologie.gouv.fr/sites/default/files/documents/Rapport%20evaluation%20cheque%20energie.pdf (accessed August 1, 2025).

3.1 Energy price increase: households' behavior and fuel poverty

Higher energy prices can significantly increase the share of energy expenditures in household income, particularly during the cold winter months. Moreover, these price increases have a greater impact than those of other goods because energy demand is relatively inelastic. For instance, the costs associated with monitoring energy expenditures and adjusting consumption may make households reluctant to adapt their behavior in response to small energy price changes. The work of Kilian (2008) describes two complementary mechanisms through which household energy consumption is directly affected by energy price changes:

- Higher energy prices reduce the share of available income for other spending, leaving households with less money after paying their energy bills ;
- Consumption of goods that require energy tends to decline even more, as households postpone such purchases in an effort to save energy.

In addition to these mechanisms, poorer households allocate a larger share of their income to energy expenditures. As a result, the consequences of rising energy prices are unequal: low-income households are disproportionately affected by energy crises, thereby exacerbating inequalities (Kilian, 2008; Ersado, 2012; Bouzarovski and Petrova, 2015; Kröger et al., 2023). For example, in Armenia, households in the poorest quintile spend twice as much (6.5%) of their budget on heating compared to those in the richest quintile (3.4%) (Ersado, 2012). This share can be further exacerbated, as shown by Kröger et al. (2023) in the case of Germany, where the proportion of income spent on gas increased from 6.78% to 11.70% for households in the lowest income decile following the 2022 gas price shock. Moreover, since heating during the winter is essential, poor households have no choice but to devote a higher share of total expenditures to heating. However, factors such as income level, unemployment, or geographical location can reinforce poverty because of rising energy prices. For instance, Halkos and Gkampoura (2021) find that electricity prices remain the primary driver of energy poverty, as higher electricity prices are directly correlated with higher levels of energy poverty.

However, energy demand is not completely inelastic. Even without structural modifications to their homes (such as insulation), households are able to reduce their energy use in response to rising tariffs. Based on panel household-level data for Ukraine, according to Alberini et al. (2020), when energy prices double, energy consumption decreases by 7% to 22%, all else being equal. Similarly, Deryugina et al. (2020) show with a difference-in-differences approach on Illinois communities that electricity demand exhibits stronger reductions in the long run than in the short run, highlighting the importance of dynamic adjustments. In fact, during the winter of 2013, 30% of French households restricted their energy consumption due to high energy costs (Kahouli and Okushima, 2021). These adjustment behaviors can also be strongly influenced by public interventions, especially by providing consumption information and teaching households how to manage their usage (Allcott, 2011).

3.2 Fuel poverty factors and inequalities between households

Households are not equally affected by an energy crisis. Their vulnerability largely depends on social and economic factors. Heterogeneity in household responses to rising energy prices is primarily explained by income level, a determinant consistently highlighted in the literature (Ersado, 2012; Schulte and Heindl, 2017; Charlier and Kahouli, 2019; Alberini et al., 2020; Kröger et al., 2023; Yoon, 2024). Since energy is an essential good, price increases disproportionately affect lower-income households, degrading their quality of life and contributing to energy poverty. Indeed, fuel-poor households are often concentrated in the lowest income deciles (first and second), as shown by Yoon (2024) and Schulte and Heindl (2017). These households generally exhibit higher price elasticity, meaning they are more sensitive to energy price increases. This sensitivity reflects their ability — or necessity — to adjust consumption through various strategies in order to meet basic energy needs with limited financial resources (Charlier and Kahouli, 2019; Alberini et al., 2020). However, fuel poverty is not always synonymous with income poverty. According to Charlier and Kahouli (2019), 27.25% of fuel-poor households in France are also income-poor, while 20.21% of non-fuel-poor households live above the income poverty threshold. This highlights that low income is a strong driver of energy poverty, but not the only one.

Other contributing factors relate to household characteristics. Education plays an important role: households with a respondent educated beyond undergraduate level are less likely to experience fuel poverty, compared to those who did not complete high school (Best and Sinha, 2021). Similarly, households receiving social benefits are at higher risk. Among those that received energy assistance between 2011 and 2014, the likelihood of failing to pay their energy bill on time in 2015 was about nine percentage points higher (Best and Sinha, 2021). In addition, receiving unemployment benefits is also associated with a greater risk of energy poverty (Best et al., 2021). Household composition — size, individual characteristics, and behavioral factors — also shapes energy consumption (Charlier and Kahouli, 2019). For instance, younger households often display stronger environmental awareness, which can increase commitment to energy-saving behavior, while everyday practices such as leaving lights on for extended periods tend to raise the likelihood of fuel poverty (Best and Sinha, 2021; Corbos et al., 2023).

Housing quality is another crucial determinant of vulnerability. According to Best et al. (2021), targeting based on both welfare status and housing tenure provides significant advantages for identifying households at risk of energy poverty. Renter status is positively associated with the likelihood of fuel poverty, since renovation decisions differ largely by tenure (Ástmarsson et al., 2013; Best et al., 2021; Kröger et al., 2023). While homeowners base renovation decisions on life-cycle cost considerations, renters depend on landlords — this is the so-called *landlord-tenant dilemma* (Ástmarsson et al., 2013). In this context, incentives are misaligned: landlords finance efficiency investments, while tenants bear the cost of heating (Ástmarsson et al., 2013; Chaton, 2025). As a result, owner-occupied homes are more likely to undergo energy performance renovations, leading to lower energy bills compared to rental properties. Consequently, Neuhoff et al. (2013) show that homeowners generally pay less for gas per square meter than renters. Thermal building regulations therefore play a central role in improving residential energy efficiency. For example, households living in buildings constructed after 2001 or equipped with insulation benefit from significantly lower heating costs. Yet only 40% of low-income households live in insulated dwellings, compared to around 70% of high-income households in Germany (Kröger et al., 2023). Lack of insulation increases both objective (higher energy expenses) and subjective (low indoor temperatures) dimensions of fuel poverty, often forcing households to raise energy use and thereby exacerbating payment difficulties (Best and Sinha, 2021). Housing type also matters: households in multifamily buildings tend to have less elastic energy demand (Alberini et al., 2020), while electricity heating is more common in flats and new buildings (Charlier and Kahouli, 2019). These mechanisms are also linked to the direct rebound effect (Sorrell et al., 2009), whereby efficiency improvements make energy services cheaper and therefore encourage higher consumption. This partly explains why efficiency gains do not always translate into lower energy poverty rates.

Location further affects vulnerability. The impact of rising energy prices varies between urban centers, small towns, and rural areas, depending on reliance on gas and other fuels, as well as the share of energy in total household spending (Ersado, 2012; Schulte and Heindl, 2017).

3.3 Public policies in response to the energy crisis

Energy compensation policies existed in several European countries before the onset of the crisis, with total expenditures reaching 792 billion euros in Europe (Sgaravatti et al., 2021). Countries with a longer tradition of addressing energy poverty, and an earlier legal definition of it, such as France and the United Kingdom, tend to have more targeted measures (Stojilovska et al., 2022). In his work, Simshauser (2023) identifies four broad categories of policies aimed at addressing energy issues:

- **Price-based policies**: tariff design and pricing mechanisms that reduce costs or improve price efficiency, such as discounted tariffs for vulnerable households ("social tariffs") ;
- **Quantity-based policies**: improvements to housing insulation, energy-efficient appliances, or rooftop

solar PV, which lower the quantity of energy purchased by enhancing efficiency ;

- **Income-based policies**: targeted subsidies designed to reduce the energy cost burden, often as cash transfers or direct credits on utility bills ;
- **Tariff structure-based policies**: block tariffs, which benefit low-use pensioner households but are less favorable to low-income families with higher consumption.

The sharp increase in energy prices has raised questions about the optimal design, targeting, and effectiveness of these measures. A central issue is whether they adequately compensate for income losses among low-income households. Social tariffs, for instance, are relatively pro-poor, with higher coverage of the lowest-income deciles and lower coverage of the richest (Giuliano et al., 2020). However, their effectiveness can be undermined when financed through higher energy prices for other consumers, which may push borderline households into energy poverty (Simshauser, 2023). More broadly, income- and price-based policies do not move households out of energy poverty in the long run. They are considered palliative rather than curative, as they fail to address structural causes and do not reduce overall consumption or emissions (Charlier and Legendre, 2021). Quantity-based schemes can also be limited, as they may not be well understood by households or may depend on owners' decisions (Simshauser, 2023).

A challenge in the literature is the targeting of vulnerable households. Increasing targeting precision can achieve similar distributional outcomes at lower fiscal cost (Alberini et al., 2020; Giuliano et al., 2020). According to Best et al. (2021), income criteria alone are often insufficient. Incorporating wealth or household characteristics, such as tenure status, improves effectiveness. For example, Galvin et al. (2024) show that income support in England has little impact on heating expenditure among low-income households, as additional income is often allocated to other needs or savings. While such measures mitigate price shocks, they may also reduce incentives for households to cut costs through behavioral adjustments or efficiency improvements (Kröger et al., 2023). Information campaigns can therefore play an important role in promoting behavioral change and improving understanding of energy use (Allcott, 2011; Charlier and Legendre, 2021).

In the long run, improving the energy efficiency of dwellings remains the most effective strategy for reducing household energy costs (Charlier and Legendre, 2021; Kröger et al., 2023; Galvin et al., 2024). A large-scale renovation policy would significantly reduce disparities in heating costs relative to income, with particularly strong benefits for low-income households, whose budgets are most constrained (Kröger et al., 2023). Such structural measures should be combined with short-term support for vulnerable households, who are often unable to invest in efficiency improvements and tend to live in low-quality housing. In these cases, subsidies remain essential (Charlier and Legendre, 2021).

In France, curative measures have been implemented to help fuel-poor households pay their bills, such as the energy voucher, affordable fuel pricing, and assistance with arrears. Preventive measures have also targeted housing quality, including insulation and double glazing (Charlier and Kahouli, 2019). Rüdinger (2023) show that the French tariff shield was economically effective, helping contain inflation: by December 2022, inflation was 6.7% in France, compared to 9.2% in the EU and 9.6% in Germany. Nevertheless, distributional outcomes were unequal: Cornuet (2022) estimate that the tariff shield and fuel rebate benefited the richest 10% of households by about 420 euros, compared to 180 euros for the poorest 10%. Overall, the tariff shield limited inflation (average 5.6% in 2022–2023) and supported growth (1.9% per year on average), but at a substantial fiscal cost of 58 billion euros annually (around 2% of GDP). This measure proved more effective than alternative scenarios such as wage indexation or direct redistribution, but its main limitation was environmental: by subsidizing energy consumption, it failed to encourage savings (Langot et al., 2023). The French policy response thus smoothed consequences on households, particularly the poorest, but raises ongoing questions about targeting efficiency and long-term sustainability.

3.4 The energy voucher against the energy crisis

Energy vouchers are widely used across Europe as a tool to mitigate energy poverty. Their effectiveness has been extensively studied, with most evaluations focusing on the Spanish program *Bono Social Eléctrico* (Alvarez and Tol, 2021; Barrella et al., 2021; Bagnoli and Bertoméu-Sánchez, 2022; Cadaval et al., 2022; Llorca and Rodriguez-Alvarez, 2025). Empirical studies generally show that energy vouchers reduce energy poverty only modestly. Llorca and Rodriguez-Alvarez (2025) highlight that the most vulnerable households face barriers that prevent them from fully benefiting from the voucher, such as administrative barriers or the lack of information. Similar conclusions are reported by Alvarez and Tol (2021), Bagnoli and Bertoméu-Sánchez (2022), Cadaval et al. (2022), and Jové-Llopis and Trujillo-Baute (2024) who find either no statistically significant effect or only a limited reduction in energy poverty.

In the United Kingdom, income support programs such as the Winter Fuel Payment (WFP) and Cold Weather Payments have been extensively studied. Overall, the evidence suggests that their impact on energy poverty is modest and largely limited to short-term relief. Galvin et al. (2024) find that such transfers have little effect for low-income households not already in energy poverty, and only modest benefits for those who are, as vulnerable households often allocate part of the additional income to other essential needs rather than energy consumption. Communication and labeling also matter: Beatty et al. (2014b) show that households are more likely to spend the transfer on heating when it is explicitly presented as a fuel payment rather than as an equivalent cash transfer. Furthermore, Beatty et al. (2014a) highlight a *heat-or-eat* trade-off among the poorest older households, who are unable to smooth energy spending during severe cold periods and consequently reduce food expenditures. Finally, using a regression discontinuity design, Angelini et al. (2019) find no consistent evidence that the WFP leads to warmer homes or measurable well-being improvements, suggesting that any temperature or health effects are unlikely to be large at the aggregate level.

Several key points emerge from this literature regarding the limitations and potential of energy vouchers. First, in terms of targeting and access, the most vulnerable do not always receive vouchers, due to restrictive administrative criteria, lack of information, or the complexity of the application process (Bagnoli and Bertoméu-Sánchez, 2022; Cadaval et al., 2022; Llorca and Rodriguez-Alvarez, 2025). Second, regarding the amount of aid and its actual effect, the financial support is often insufficient to significantly reduce the share of income spent on energy (Alvarez and Tol, 2021; Jové-Llopis and Trujillo-Baute, 2024; Galvin et al., 2024). Third, when compared with other instruments, vouchers tend to be less effective than direct subsidies or well-targeted social tariffs, especially for highly vulnerable households (Bagnoli and Bertoméu-Sánchez, 2022; Cadaval et al., 2022). Finally, in terms of their impact on consumption and behavior, vouchers generally have little effect on reducing consumption, since they do not alter structural conditions or incentivize investment in energy efficiency (Beatty et al. 2014a; Beatty et al. 2014b; Angelini et al. 2019).

3.5 A public policy challenge: non-take-up

A first key issue is targeting and access. A significant share of eligible households do not claim available social benefits, a phenomenon documented in the literature as *non-take-up* (Van Oorschot, 1991; Hernanz et al., 2004). Barriers include administrative complexity, lack of information, and psychological frictions such as stigma or perceived social judgment (Moffitt, 1983, 1992; Currie and Gahvari, 2008; Bhargava and Manoli, 2015). Moffitt (1992) highlights that welfare programs may unintentionally create disincentives and social stigma, further reducing participation, while Currie and Gahvari (2008) emphasize that the form in which transfers are provided (cash vs. in-kind) influences the likelihood of take-up. Empirical studies show that these factors systematically prevent some of the most vulnerable households from accessing the support to which they are entitled (Bruckmeier and Wiemers, 2012; Bargain et al., 2012; Ko and Moffitt, 2024). For energy vouchers, this suggests that administrative hurdles, program design, and information gaps may similarly reduce take-up among the poorest households.

A second critical dimension concerns the amount of aid and its actual effect. Even when households claim benefits, the transfer may be insufficient to substantially reduce the share of income devoted to essential expenditures, including energy (Hernanz et al., 2004; Meyer and Mittag, 2019; Ko and Moffitt, 2024). Partial take-up combined with limited transfer amounts diminishes the overall impact on poverty alleviation.

Vulnerable households allocate resources received to other pressing needs, constraining the potential effect of the support on energy consumption or energy poverty. This conclusion is supported by both theoretical arguments and empirical analyses, including field experiments and register-based studies (Bhargava and Manoli, 2015; Bargain et al., 2012).

Finally, structural and comparative considerations indicate that non-take-up is a persistent feature of social programs across countries. Reviews of OECD countries show that take-up rates vary widely depending on program design, eligibility rules, the form of benefit provision, and the information available to households (Hernanz et al., 2004; Currie and Gahvari, 2008; Ko and Moffitt, 2024). Administrative simplifications, clearer communication, and better integration of survey and administrative data can improve coverage (Meyer and Mittag, 2019; Currie and Gahvari, 2008). These findings emphasize that energy vouchers, like other social benefits, require careful design to maximize uptake; otherwise, a substantial share of intended beneficiaries may not receive support, limiting the effectiveness of the program in alleviating energy poverty.

4 Data and methodology

4.1 The European statistics on income and living conditions survey (EU-SILC)

This paper bases the analysis on the European statistics on income and living conditions survey (EU-SILC) by Eurostat[9]. The EU-SILC is a self-reported database on income, poverty, social exclusion, and living conditions on European individuals and households. EU-SILC provides longitudinal data on household-level changes over time, observed annually over a 4-year period. The French survey includes variables on labor, education, health, dwelling's characteristics, household composition, energy consumption, and daily difficulties met. For this article, information from 2020 to 2023 waves are used.

This paper focuses on households reporting whether they received an energy voucher (*reduced utility cost* variable). In the 2023 database, respondents declare their financial situation and public support received for the year 2022. In order to compare self-reported answers with the real allocation of energy vouchers, only households observed from 2021 (income declared for 2020) to 2023 (energy voucher declared for 2022) are considered. Consequently, the analysis in this paper focuses on the restricted sub-sample of panel households observed from 2021 to 2023 — the working sample. For robustness checks, a second restricted sample is used,

[9] The data used in this article come from the French section of the EU-SILC community system, available on request from Quetelet-Progedo-Diffusion — a portal providing access to data distributed by the Archives des Données Issues de la Statistique Publique (ADISP) and the Datalab of the Institut national d'études démographiques (Ined). These data are equivalent to those provided by Eurostat but include around one hundred additional variables, allowing for more detailed analysis.

including 4-year panel households from 2020 to 2023, as well as all of households interviewed in 2023.

The full sample accounts for 17 041 households among them 44.4% are observed over a 3-year period (2021 to 2023) and 22.8% are observed over a 4-year period (2020 to 2023).

To avoid risk of selection bias from working on a restricted sample, it is important to examine the reported share of energy voucher recipients. Figure 3 presents the distribution of declared energy voucher among the interviewed population for the three samples. The share of energy voucher recipients reaches approximately 25% in all three samples, which suggests that selection bias can be rejected.

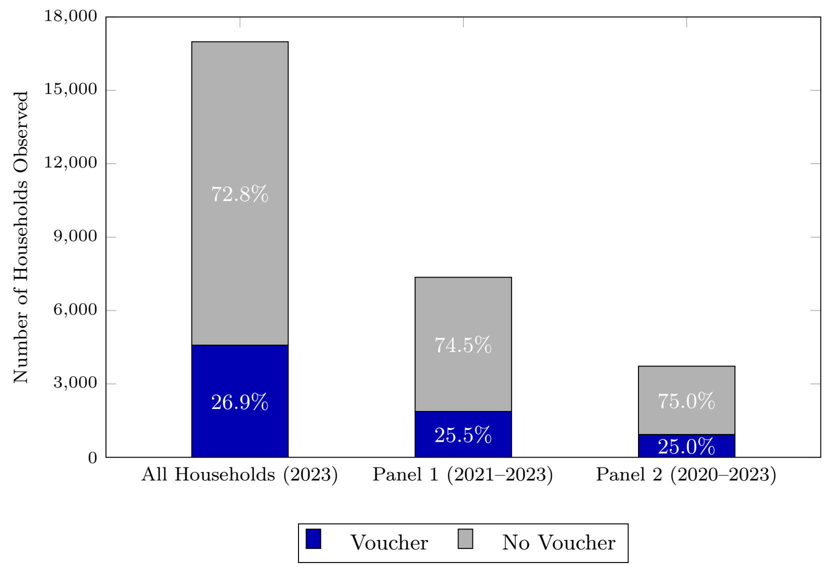

Figure 3: Distribution of 2022 energy voucher among households

4.2 A prediction of energy voucher allocation

In the EU-SILC database, households self-report if they received an energy voucher. However, comparing declarations to income reveals a significant share of low-income households reporting not to have received the payment. Table 4 shows the income distribution for four different income measures — total gross income per CU, total disposable income per CU, total disposable income before social transfers other than old-age and survivor's benefits per CU, and total disposable income before social transfers including old-age and survivor's benefits per CU — comparing households reporting the energy voucher (blue group) with those not (red group). Recall that the Energy Voucher Policy targets the 20% of households with the lowest income and vouchers are automatically sent. Theoretically, most eligible households should have received them. Therefore, the blue distribution should appear to the left of graphs and the red distribution to the right, without overlap. Table 4 highlights a paradox where some low-income households report not benefiting of the energy voucher.

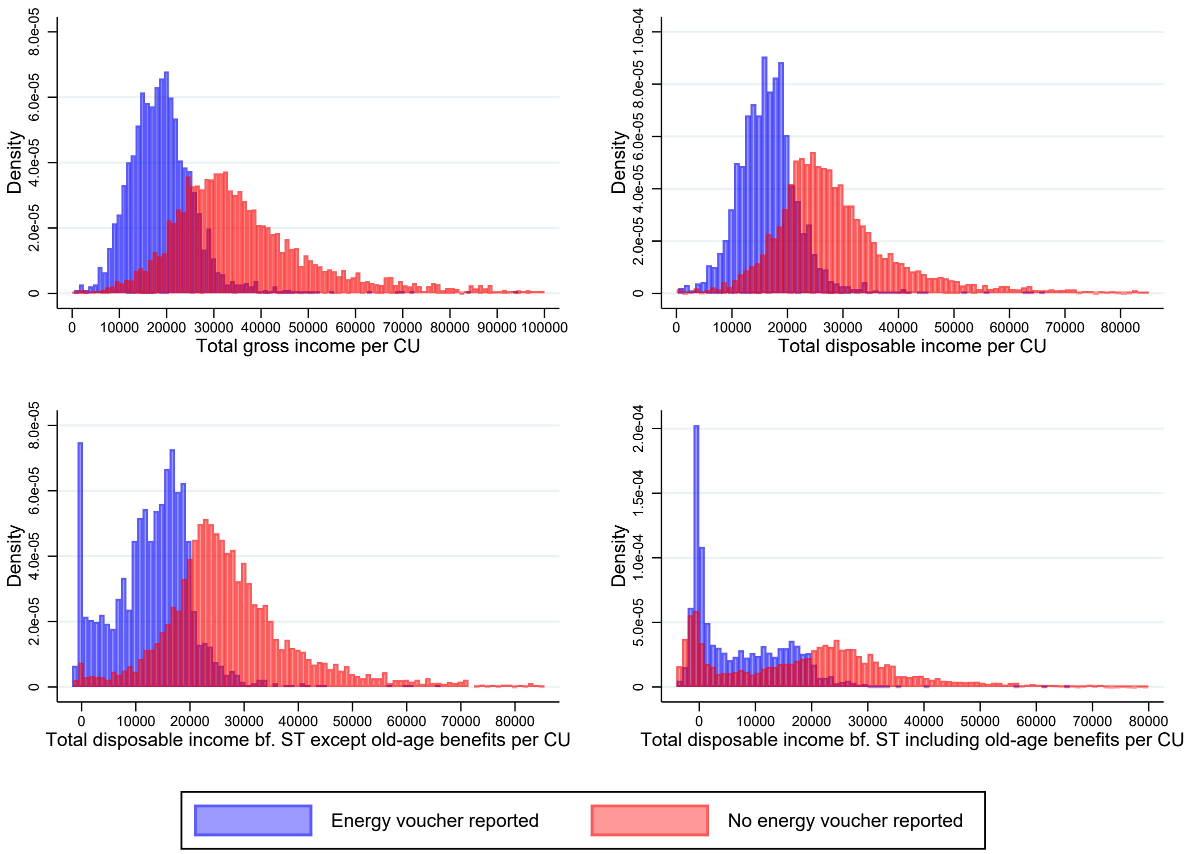

Figure 4: Income distribution of households by energy voucher receipt declaration across four income measures

Based on two hypotheses — (1) all eligible households received their financial support due to automatics allocation, and (2) household reporting not receiving the energy voucher actually did not used it (forgetting, misunderstanding, loss, or voluntary non-use) — four categories of households can be drawn :

- **True positive (TP)**: Household reporting receiving the energy voucher and eligible ;
- **False positive (FP)**: Household reporting receiving the energy voucher but not eligible ;
- **True negative (TN)**: Household reporting not receiving the energy voucher and not eligible ;
- **False negative (FN)**: Household reporting not receiving the energy voucher but eligible.

4.2.1 Defining false positives

From the estimated reference tax income, it is possible to predict which households are eligible to the Energy Voucher Policy and comparing the prediction with households self-declarations. Table 3 presents the distribution of true positives — TP (beneficiary and eligible), false positives — FP (beneficiary but non-eligible), true negatives — TN (non-beneficiary and non-eligible), and false negatives — FN (non-beneficiary but eligible). Based on the estimated RTI, 34.44% of households in the working sample are false negatives, while 24.18% are true positives. The main proportion of correctly classified households — true positives and true negatives — represents 64.22% of the sample. The low percentage of false positives and the share of false negatives, which is close to the usual non-take-up rate reported by the government, highlight the consistency of the prediction.

	N	**%**
TP	1 749	24.18
FP	97	1.34
TN	2 896	40.04
FN	2 491	34.44
Observations	7 233	

Table 3: Confusion matrix of 2022 energy voucher allocation

On average, eligible households that used the energy voucher are poorer: 8% are unemployed compared to 2% among FN, 36% have no diploma compared to 24% among TN, there are twice as many tenants, and their reference tax income per consumption unit is lower by 6 000 euros. Other characteristics may also explain why TP used their energy voucher: a higher share of female-headed households, as women are more likely to undertake administrative tasks, and a larger number of children, which may reflect a greater familiarity with applying for social benefits. In addition, 39% of true positives report having received the 2021 energy voucher compared to 6% of false negatives. Several FN households appear to have only recently become eligible — through the Exceptional Energy Voucher Policy — and may not be aware of their entitlement.

To test the predictive accuracy of 2022 energy voucher allocation based on the estimated reference tax income, the procedure was replicated using learning-machine methods. Following the approach of Cadoret et al. (2024), who worked on the same database, two models were implemented: Lasso regression and Random Forest. The results from both models were then compared with those obtain using an Expectation–maximization (EM) algorithm. The strategy relies exclusively on the raw EU-SILC database, without taking into account the estimated reference tax income or any constructed variables for calculation needs. This approach allows to avoid measurement bias in the voucher allocation prediction.

4.3 Logit application: Factors of non-take up

Logit model allows to explain determinants of non-take-up in the context of Energy Voucher Policy. The analysis is restricted to eligible households only, comparing those who declare having received the energy voucher (true positive), to those who declare not receiving it (false negative). The model assume that all eligible households actually received their payment but TP households used it, while FN did not. This logit model is defined in equation 1 in latent variable form and logit results in Section 5 report marginal effects.

The dependent variable measures if the household used its energy voucher or not. For the logit model, the dependent variable is the dummy variable of reduced utility costs variable with 1 the household has their utility cost reduced by the energy voucher, and 2 not, restricted to eligible households.

$$\log\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta_1 \ln I_i + \beta_2 \ln A_i + \beta_3 V_i + \beta_4 S_i + \boldsymbol{\gamma}'\mathbf{X}_i + \boldsymbol{\delta}'\mathbf{D}_i + \eta_{c(i)} + \varepsilon_i \tag{1}$$

The explanatory variables in equation 1 include $\mathbf{I_i}$ the log of total gross income per CU expressed (€), $\mathbf{A_i}$ the log of the energy voucher amount perceived (€), $\mathbf{V_i}$ a dummy variable for having received the previous voucher in 2021 (€) (1 = yes, 0 = no), and $\mathbf{S_i}$ a dummy variable for having applied for social benefits (family-related allowances, minimum income, scholarship, activity bonus, or disability allowance...) at least once the previous year (1 = yes, 0 = no). The probability $\mathbf{P(Y_i = 1)}$ that a household uses its energy voucher is driven by two main effects. The first is an *income effect* determined by the energy voucher size and the household's income. When the voucher amount is relatively low, the effort required to benefit the voucher (understanding the procedure, creating an online account, calling a helpline, etc.) may outweighed the monetary benefit. This mechanism is particularly relevant for households just above the minimum income eligibility threshold — those who can reject a hundred euros, but weaker for the poorer households of the sample — those more in need. The second effect playing an important role is the *cognitive load effect*. Using the energy voucher requires some administrative effort, and empirical evidence suggests that poorer individuals are more exposed to cognitive load, as financial scarcity generates stress and decision fatigue (Mani et al., 2013; Christensen et al., 2020). Familiarity with the procedure mitigates this barrier, that is why households that used the 2021 voucher are more likely to repeat it, and can request an automatic deduction of the energy voucher amount from their future energy bill. Similarly, households accustomed to welfare benefits application are better equipped to complete the required steps. Hence, the model expects that the poorer the households, the more likely they are to use the voucher, in additional to prior experiences with administrative procedures that increase the probability of voucher use.

Two sets of control variables are included. First, individual/household characteristics such as household size, household type (one-person household, lone parent with at least one child, couple without any children, couple with at least one child, and other), computer ownership , and sex, age, education (no diploma, high school diploma, bachelor's degree, and master's degree or higher) occupation status (employed, unemployed,retired, and other), and citizenship (1 = French, 0 = other) of the respond person. Then, dwelling characteristics including number of rooms, tenure status (owner, tenant with a rent, and tenant rent-free), share of income spent on energy expenses (%), year of housing construction (before 1919, 1919 - 1945, 1946 - 1970, 1971 - 1990, 1991 - 2005, and after 2006), energy source used (electricity, gas, oil, wood logs, and other), energy poverty indicator (1 = yes, 0 = no), and the size of city of residence (rural areas, small towns $<$ 20 000 inhabitants, medium towns $<$ 200 000 inhabitants, and big cities). The energy poverty indicator is defined as a household reporting at least one of the following: (i) leaking roofs, damp walls or rotting windows, (ii) delays in electricity bill payments, or (iii) inability to keep the dwelling adequately warm. This composite measure is consistent with standard practice in the energy poverty literature (Alvarez and Tol, 2021; Bagnoli and Bertoméu-Sánchez, 2022; Cadaval et al., 2022; Cadoret et al., 2024).

The probability of using the subsidy may also vary with household and dwelling characteristics. Based on the literature, education is expected to improve budgeting ability and understanding of administrative processes. A higher share of income spent on energy increases energy costs, reinforcing the need for public aid. Insulation is expected to reduce energy expenditure by lowering bills for a given level of energy consumption or improving energy consumption for a given level of expenditure. Computer ownership is a key determinant to increase of social benefit use, as online application is the easiest and free method (compared to the postal alternative). Finally, spatial fixed effects $\eta_{\mathbf{c(i)}}$ are included in the model to capture unobserved regional differences, such as average temperature, which affect energy demand and household utility costs.

A potential reverse causality bias may arise between using its energy voucher and some explanatory variables. For example, receiving an energy voucher could lead households to reduce restrictions on electricity use. Indeed, similar results are obtained when the analysis is performed on the full sample (see Table 5 and the restricted sample of households in Table 6). For addressing the potential issue of omitted variable bias, several individual and dwelling characteristics are included as controls, using alternative proxies[10]. In

[10] Robustness checks were performed by alternatively controlling for total disposable income per CU, using three specifications: (i) log of total disposable income per CU, (ii) log of disposable income before social transfers except old-age and survivor benefits per CU, and (iii) log of disposable income before social transfers including old-age and survivor benefits per CU. For social benefit, alternative measures are: (i) procedure undertaken (completed or not): enrollment in an educational/training institution, (ii) procedure undertaken (completed or not): other application, (iii) administrative difficulties: procedure too difficult to understand, (iv) administrative difficulties: no internet or computer access, (v) procedures with difficulties: declaration of tax resources, (vi) procedures with difficulties: other, and (vii) perception during the procedure: not personally concerned. Same for control variables with number of rooms/ dwelling surface for instance. Across all specifications, the results remain statistically

addition, multi-collinearity is considered when there are high correlations between explanatory variables. Although income and education are positively correlated, their correlation is not high enough to exclude one of them

4.4 Double Robust Difference-in-Differences: Energy voucher effect

The principal goal of the empirical strategy is to identify the causal effect of the French energy voucher on households having used it. Has the energy voucher fulfilled its role of protecting French households from the energy crisis? A double robust difference-in-differences estimator proposed by Sant'Anna and Zhao (2020) is employed to identify the effect of interest. That combines propensity score weighting with outcome regression to provide consistent estimates of the average treatment effect on the treated (ATT), even if either the propensity score model or the outcome model is misspecified. Specifically, the following equation is estimated :

$$\hat{\tau}^{DR} = \frac{1}{N_T} \sum_{i \in T} \left[\left(Y_{i,post} - Y_{i,pre}\right) - \left(\hat{m}_0(1, \mathbf{X}_i) - \hat{m}_0(0, \mathbf{X}_i)\right) \right] \cdot \frac{T_i}{\hat{e}(\mathbf{X}_i)} \tag{2}$$

Formally, the DR-DID estimator identifies the effect of using the energy voucher by comparing treated and control households before and after the 2022 allocation, controlling for a rich set of covariates $\mathbf{X}_i$ (household and dwelling characteristics). Where $Y_{i,t}$ is the outcome vector for household i at time t (see Table 4), T_i indicates treatment status (1 if true positive, 0 otherwise), $\hat{e}(\mathbf{X}_i)$ is the estimated propensity score of treatment conditional on covariates, $\hat{m}_0(t, \mathbf{X}_i)$ is the predicted outcome from the control outcome regression model, and N_T is the number of treated households. This estimator is double robust, meaning that consistency of $\hat{\tau}^{DR}$ requires only that either the propensity score or the outcome regression model is correctly specified.

significant.

Variable	Definition
Total energy cost per m^2	Annual electricity and gas consumption per m^2
Total heating cost per m^2	Annual amount of energy and heating expenses per m^2
Total housing cost per m^2	Monthly total housing costs per m^2 including rent, mortgage interest payments on primary residence, utilities, electricity, water, gas, heating, and property tax
Total heating and water cost per m^2	Monthly amount of heating or domestic hot water expenses per m^2 for private use not included in the gas and electricity amounts declared above
Arrears on electricity bills	Inability to pay electricity, gas, water, or phone bills on time in the last 12 months due to financial problems
Ability to keep home adequately warm	Financial means to maintain the home at a comfortable temperature
Poverty indicator	Poverty indicator at the 60% threshold
Log total disposable income	Log of annual disposable income including revenues from employment or replacement income (retirement pensions and unemployment benefits), income from assets, transfers from other households,social benefits, and minimum social benefits, net of direct taxes
Perception of financial situation	Household perception of its current financial situation (very difficult, difficult, somewhat difficult, somewhat easy, easy, very easy)

Table 4: Dependent variables and their definitions

The baseline analysis focuses on the effect of energy voucher use on the living conditions of French households by comparing eligible groups. To capture the overall impact of the policy, results are presented for the full working sample, comparing true positives with the rest of the sample (false negatives, false positives, and true negatives). That is, the analysis estimates the effect of using the voucher versus not using it, regardless of eligibility status.

This section examines the evolution of household outcomes since 2021, prior to the European energy crisis. On average, the FN group reports a better financial situation, with higher log of disposable income, greater ability to keep their homes warm, and a more favorable perception of their financial situation. With the onset of the energy crisis, households in both groups report increased difficulties, reflected in higher total energy and heating expenditures. More households also report challenges in keeping their homes adequately warm and paying electricity bills. However, this decline in living conditions does not translate into changes in the poverty indicator. For most economic and energy indicators, pre-treatment trends are very similar between groups, supporting the parallel trends assumption required for causal identification. Post-treatment trends remain largely parallel, except for total heating cost per m^2 and total heating and water cost per m^2, where the FN group's averages converge toward the TP group. Graphical analysis suggests that, even accounting for covariates in a double robust framework, the energy voucher does not appear to generate substantial improvements in household outcomes. The convergence of FN averages toward TP levels reflects increasing energy costs for the FN group, which appears unrelated to voucher use. A significant effect of the Energy Voucher Policy would manifest as reduced energy costs or improved ability to pay electricity bills after 2022, which is not observed.

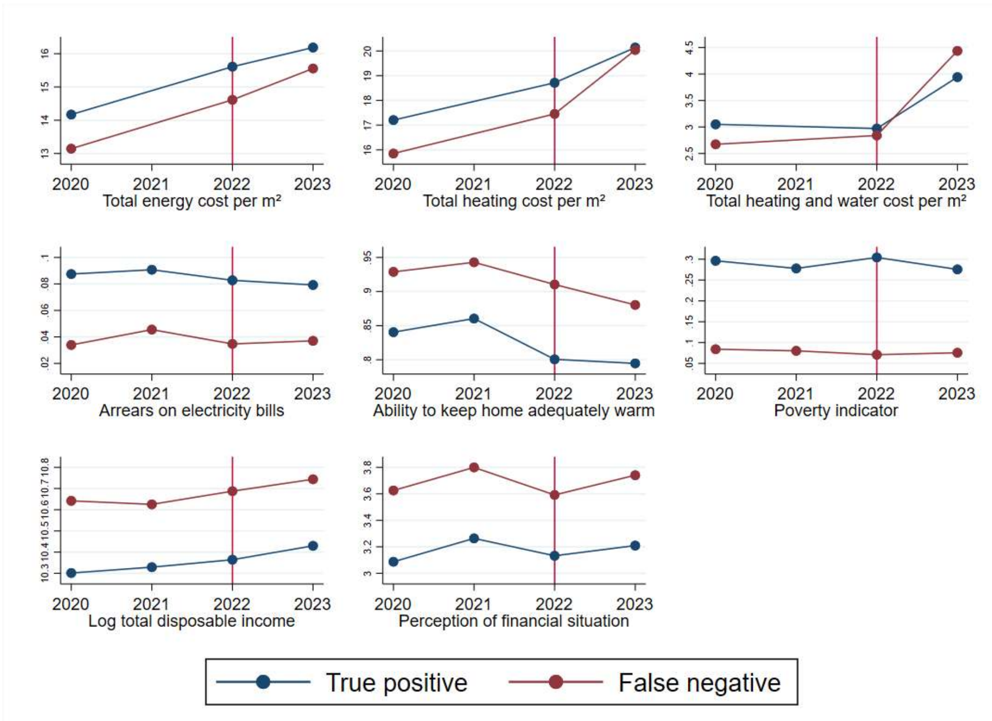

Figure 5: Trends in economic and energy indicators by group (TP vs. FN), 2020–2023

5 Descriptive results

5.1 Factors of non-take-up

Table 5 presents results explaining factors that increases the probability of using energy voucher among eligible households. Column (4) reports the main results, controlling for individual and dwelling characteristics, such as family structure or tenure status, while also capturing for spatial fixed effects through region of residence.

The amount of the energy voucher received is positively associated with households use of their payment. A 1-unit increase in the log of the energy voucher amount — which corresponds to multiplying the original amount by approximately 2.7 — increases the probability of using the voucher by about 9.3 percentage points.

The association is ever stronger for households that received the energy voucher in 2021, who have a 27.4 percentage-point higher probability of using it in 2022 than otherwise similar households that did not report it in 2021, all else equal. This corresponds to an odds ratio of 4.1 (i.e., about 310% higher odds). However, the log of total disposable income per consumption unit has a negative effect: a 1-unit increase decreases the probability of using the voucher by 26 percentage points, which corresponds to an odds ratio of 0.34 (around 66% lower odds). Familiarity with social benefits application procedures also may contribute to a higher probability of energy voucher use, by approximately 10 percentage points. These four factors are statistically significant and substantially influence household decisions. The results are robust to control variables, fixed effects, and functional form (see column (5) with probit model coefficient, almost identical). Hence, two main effects appear to emerge:

- **Income effect**: poorer households tend to use the energy voucher more, while the odds of use decrease with higher income. Additionally, the probability of use increases with the voucher amount, which is itself correlated with household income ;
- **Cognitive load effect**: familiarity with administrative procedures strongly facilitates the use of public support, either though habit (having received previous vouchers) or though prior exposure to other administrative processes.

	Eligible households sample				
	(1)	(2)	(3)	(4)	(5)
	No controls	**Ind. controls**	**Dwell. controls**	**All**	**Probit**
Log amount of energy voucher	0.103***	0.093***	0.102***	0.093***	0.096***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Having received the 2021 voucher	0.321***	0.302***	0.284***	0.274***	0.272***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log total disposable income per CU	-0.284***	-0.234***	-0.296***	-0.260***	-0.245***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Application for social benefits	0.102***	0.100***	0.103***	0.102***	0.101***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Individual controls	No	Yes	No	Yes	Yes
Dwelling controls	No	No	Yes	Yes	Yes
Spatial FE	No	No	Yes	Yes	Yes
N	4 198	4 166	3 817	3 787	3 787
Pseudo-R^2	0.208	0.223	0.235	0.247	0.246
Log-likelihood	-2252.781	-2193.668	-1982.718	-1937.002	-1938.654

Notes. Standard errors in parentheses are clustered by region (climate zone). Coefficients for controls are shown in Appendix Table. * / ** / *** represent significance at the 0.10 / 0.05 / 0.01 levels, respectively.

Table 5: Factors influencing the use of energy voucher

Table 6 presents results for a split sample between poorer eligible households (those with a reference tax income per CU below 8 700 euros — half of the eligibility threshold) and wealthier households (between 8 700 euros and 17 400 euros). The purpose of this table is too highlights differences in behavior according to income group, as mechanisms appear to differ. First, the log of the energy voucher amount is not longer significant for the poorer group, while it remains significant for the wealthier households of the sample. Doubling the voucher value for households at the lower end of the distribution has no significant effect on their probability of use, whereas it nearly increases probability of use by 10.4 percentage points for wealthier households (rise odds of use by 89%). Both groups are associated with a negative effect of disposable income: a 1-unit increase in log income per consumption unit reduces the probability by 18.6 percentage points for poorer households and by 37.4 percentage points for wealthier households. A similar relationship appears for familiarity with administrative procedures, with poorer households being more sensitive. Prior experience with social benefits significantly increases the likelihood of using the energy voucher. For poorer households, having previously applied for benefits raises the probability of use by 10.2 percentage points and multiplies the odds of use by 5, whereas for wealthier households, it raises the probability by 9.1 percentage points and multiplies the odds by 1.7, relative to households with no prior applications, holding all other variables constant.

	No control		**All controls**	
	Severe poor	**Moderate poor**	**Severe poor**	**Moderate poor**
	(1)	(2)	(3)	(4)
Log total disposable income per CU	-0.231***	-0.352***	-0.186***	-0.374***
	(0.03)	(0.03)	(0.03)	(0.04)
Log amount of energy voucher	0.054	0.109***	0.080	0.104***
	(0.06)	(0.02)	(0.06)	(0.02)
Having received the 2021 voucher	0.354***	0.255***	0.295***	0.247***
	(0.02)	(0.04)	(0.03)	(0.04)
Application for social benefits	0.091***	0.108***	0.102***	0.091**
	(0.03)	(0.03)	(0.03)	(0.03)
Individual controls	No	No	Yes	Yes
Dwelling controls	No	No	Yes	Yes
Spatial FE	No	No	Yes	Yes
N	1 711	2 487	1 527	2 260
Pseudo-R^2	0.186	0.111	0.232	0.163
Log-likelihood	-933.560	-1310.374	-782.037	-1124.696

Notes. Standard errors in parentheses are clustered by region (climate zone). Coefficients for controls are shown in Appendix Table. * / ** / *** represent significance at the 0.10 / 0.05 / 0.01 levels, respectively.

Table 6: Factors influencing the use of energy voucher per income group

The results across income groups appear to confirm hypotheses outlined above. The cognitive load effect is much more stronger for low-income households, while the amount of the subsidy remains a secondary factor in their decision-making. The opposite mechanism can be observed for households near the eligibility threshold, for whom the value of the energy voucher is an essential determinant and administrative burdens are less influential. However, it is important to keep in mind that the full sample of eligible households consists of the poorest 20% of French households, which explains why administrative burdens still affect both groups. Overall, these results highlight how the relative importance of the income effect and the cognitive load effect changes with household income.

5.2 Effect of the Energy Voucher Policy

The baseline difference-in-difference model seeks to estimate the effect of the 2022 Energy Voucher Policy on those that used their voucher, compared to households who did not used their financial aid. Table 7 presents the effect of the voucher on nine outcome variables: (1) total energy cost per m^2, (2) total heating cost per m^2, (3) total housing cost per m^2, (4) total housing and water cost per m^2, (5) arrears on electricity bills, (6) poverty indicator, (7) log of total disposable income, and (9) perception of financial situation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total energy cost per m^2	-0.734							
	(1.350)							
Total heating cost per m^2		0.084						
		(0.704)						
Total housing cost per m^2			0.084					
			(0.704)					
Total heating and water cost per m^2				-0.762				
				(0.961)				
Arrears on electricity bills					0.031			
					(0.044)			
Poverty indicator						-0.004		
						(0.044)		
Log total disposable income							-0.011	
							(0.033)	
Perception of financial situation								-0.048
								(0.103)
Observations	7807	7446	7446	7783	8298	8303	8297	8280

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Difference-in-differences: baseline results

The interaction coefficient β is not significant across all specifications. The estimates suggest that using the energy voucher does not reduce energy and housing cost, and resolve arrears, or improve households' perceived financial situation. The energy voucher shows no measurable effects on households that used it. Both energy-related and individual characteristic outcomes are insignificantly influenced by the voucher.

6 Discussion/ policy analysis

6.1 Non-take-up

The first part of the analysis focuses on the determinants of non-take-up. Table 5 highlights the importance of the income effect and the cognitive load effect in household decision-making, comparing those who received the energy voucher and used it with those who received it but did not use it. Indeed, poorer households are more likely to undertake the application for social benefits or to use the financial support for which they are eligible. In addition, a higher voucher amount increases the incentive to use it. Both mechanisms illustrate the income effect : individuals in need are more willing to devote time to understand or to apply administrative procedures because each additional euro has greater value. The incentive is reinforced when the value of the financial support is larger. However, this mechanism is not linear as households face administrative burdens. Understanding procedures and terminology, setting aside time, or simply knowing how to use a computer represent real obstacles that can outweigh the value of the aid itself. Households are therefore confronted with a trade-off: weighing the effort required against the potential financial gain — a form of transaction cost. Table 5 illustrates this mechanism clearly, showing that households familiar with social benefit applications are 10 percentage points more likely to use the energy voucher.

Among beneficiary households, the importance of each factor varies by income group. Indeed, Table 6 presents the results of equation 1 for two income groups : eligible households with income below 8 700 euros per consumption unit (poor group) and eligible households between 8 700 and 17 400 (higher low-income group). Household behavior appears to be influenced by different factors depending on whether they are very poor or relatively better-off within the eligibility range. The results support this hypothesis, highlighting a weaker income effect — and in some cases non-existent (e.g., the value of the aid) — among the poorer group, while administrative burdens are much lower for wealthier households. These findings underscore the need for public policy to account for both income constraints and cognitive barriers, ensuring that programs are not only accessible but also effectively used by their intended beneficiaries. Policymakers seeking to design effective residential energy policies and promote social welfare should account for differences across household income groups (Charlier and Kahouli, 2019). Stricter rules regarding program participation, such as multiplying eligibility criteria to improve allocation, can enhance targeting accuracy and potentially raise participation rates. However, these rules often exclude the most disadvantaged individuals the transfers are intended to support. Because households are highly sensitive to participation costs, even small changes in program rules can have disproportionately large effects on take-up (Currie and Gahvari, 2008).

6.2 Effect of Energy Voucher Policy

The difference-in-differences results estimate the effect of the energy voucher for household that used it compared to those that did not. The purpose of the Energy Voucher Policy is to help low- and middle-income households to pay their energy bills. Therefore, beneficiary households would therefore be expected to experience improvements in the share of income spent on energy, their ability to pay bills on time, their overall financial situation, or their financial perception. Unfortunately, none of these factors are statistically significant, indicating that users of the energy voucher are no better off than non-users. These findings raise questions about the effectiveness of the policy.

Based on the results and existing literature, several hypotheses can be drawn. First, the energy voucher value is too low to have a meaningful impact on economic or energy poverty. A payment averaging 149 euros per year cannot provide durable protection against rising energy prices. In 2022, households spent an average of 1 744 euros on energy for their homes — including 1 039 euros on electricity, 379 euros on natural gas, 210 euros on petroleum products, 62 euros on wood, and 53 euros on district heating — equivalent to an average monthly expenditure of 145.33 euros[11]). Thus, the energy voucher covers only about one month of energy costs. It would be interesting to compare the French Energy Voucher Policy with the Spanish scheme, which differs both in eligibility criteria and in payment value. Moreover, beyond the weak amount of the voucher, targeting based only on income criteria — that is widely criticized in the literature — may also reduce effectiveness. It is likely that some beneficiaries do not actually need this social benefit, explaining a relative small share of non-take-up. Finally, even though the policy has been designed to be simple as possible, the poorest households are still facing administrative burdens that prevent them to access the aid, despite being the group most in need.

Beyond the higher share of income devoted to energy expenditures among low-income households, a central issue lies in the quality of their dwellings. While financial support can help vulnerable households to pay high energy bills, it does not resolve the landlord-tenant dilemma. Since landlords do not bear their tenants' utility costs, they have little incentive to invest in energy-efficient renovations, thereby reinforcing the burden of energy expenditures on poor households. Several studies recommend targeted government support for renovation programs, which could substantially reduce energy costs, particularly for low-income households (Kröger et al., 2023; Chaton, 2025).

[11] French Ministry for the Ecological Transition, Department for Data and Statistical Studies (SDES), "Dépenses en énergie," in Chiffres clés de l'énergie – Édition 2024 (2024). Available at: https://www.statistiques.developpement-durable.gouv.fr, last accessed September 2, 2025.

7 Conclusion

This paper assesses the effectiveness of the 2022 Energy Voucher Policy in France, a means-tested transfer allocated to the 20% poorest French households to help pay their energy bills. Despite efforts to design an accessible eligibility and allocation process, this paper finds that 34% of eligible households in the representative EU-SILC sample did not use their voucher. The results confirm two main hypotheses regarding non-take-up: an income effect generating transaction costs, and a cognitive load effect. The income effect operates through both the allowance value — higher amounts increase the incentive to use it — and the financial situation of eligible households. Although allocation is automated, usage depends on household behavior: higher-income eligible households have less incentive to complete the administrative process, while poorer households value each additional euro more. The first logit model shows that wealthier eligible households are more sensitive to the voucher's value than poorer ones. Beyond financial considerations, administrative burdens play a critical role, particularly for the poorest households. The logit results indicate that prior experience with social benefit applications, or with the voucher itself, significantly increases the probability of take-up. The importance of this mechanism decreases as income rises.

The fact that some eligible households do not use their automatic allowance provides a natural setting for applying a difference-in-differences approach to evaluate the effect of the energy voucher on treated households — i.e., those who actually used it. Comparing nine outcomes related to economic and energy conditions between true positives and false negatives, the results suggest that voucher use had no effect on the targeted dimensions. The evolution of both groups remains essentially parallel before and after the voucher's introduction.

The absence of significant policy effects can be explained by several factors. First, the average voucher amount covers only about one month of the average French household's energy bill. Since the voucher is sent only once a year, its impact on bill payment capacity or indoor heating is very limited. Second, low-income households continue to face administrative barriers that are not fully addressed. For example, although allocation procedures are relatively simple, the French Court of Audit has highlighted the poor readability of official beneficiary documents, underscoring improvements to be made. Finally, the policy design reflects a political choice to distribute limited support to as many households as possible, whereas a more restricted and better-targeted allocation would likely be more effective.

The French Energy Voucher Policy has failed to achieve its objectives since its introduction in 2018. A full redesign should be considered to make it more effective — through more precise targeting and higher payment amounts. This failure raises questions about the optimal forms of public assistance for low-income households, particularly in the context of the energy crisis. The key issue may not simply be the ability to pay energy bills, but rather why energy bills are disproportionately high for poorer households. The analysis highlights structural inequalities in living conditions between higher-income households (often owners) and lower-income households (more frequently renters). Policies addressing these inequalities, such as financing renovation works for tenants or prohibiting the rental of dwellings with excessive energy expenditures, should be considered.

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