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Analysis of measures to enhance the energy efficiency of Italian buildings

Energy poverty in Italy

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Acronyms

EP	Energy poverty
ETP	Ecological Transition Plan
ISTAT	Italian National Statistics Institute
HH	Head of the household
PNIEC	National Energy and Climate Plan
SEN	National Energy Strategy
OIPE	Italian Observatory on Energy Poverty
ONPE	National Observatory of Energy Poverty

Executive summary

This policy brief includes an analysis of measures to enhance the energy efficiency of Italian buildings and an assessment of energy poverty (EP) in Italy.

A comprehensive analysis of recent measures aimed at improving the energy efficiency of Italian buildings is provided. The legislation, shaped by the revised Energy Performance of Buildings Directive (EPBD), aims for a 35% reduction in energy-related EU emissions from buildings, with specific attention to renovating the least efficient 15%. The first research output of this contribution is a cost-benefit analysis of the Italian 'Superbonus' incentive, revealing that while this measure contributes to emission reductions, its generous nature places a substantial burden on public finances: the break-even year extends beyond 2100 under certain scenarios. The second output estimates the expenses associated with advancing building efficiency in Lombardy and Piedmont: the potential costs of transitioning residential buildings to higher energy efficiency classes amount to a significant financial investment of 375.7 billion euros for both regions over a decade.The study argues that the financial burden of upgrading building efficiency cannot be solely shouldered by the private sector, necessitating government intervention. The existing subsidy is questioned based on its fiscal feasibility. The study suggests a need for a progressive subsidy scheme to ensure efficiency and address potentially regressive impacts.

The study on EP in Italy focuses on the difficulties faced by households in obtaining a basic set of energy goods and services, which involves the redirection of resources, in terms of expenditure or income, above the normal value (NES, 2017; NECP, 2019). After a general overview of the topic, the authors propose a measure for EP in Italy which objectively incorporates factors such as high energy costs, low expenditure, and hidden energy poverty. This approach, which follows the Low Income-High Cost principle adopted in the United Kingdom, differs from consensus-based measures, which rely on self-reported indicators. Focusing on 2021, the empirical research underscores a notable 20% increase in energy costs for Italian families, primarily driven by soaring gas and electricity prices. EP in Italy underwent a half-percent rise, affecting 2.2 million families (8.5% of Italian households). Geographical disparities emerge, with certain areas experiencing an increase in EP while others saw a decrease. Policy recommendations are provided focusing on the availability of data by rigorous measurement and analysis of the phenomenon, as well as a careful assessment of what actions can be promoted and developed to reduce the problem.

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1. Presentation and description of the research activity undertaken

1.1 Analysis of measures to enhance the energy efficiency of Italian buildings

This research empirically assesses the effectiveness of recent government incentives, notably the 'Superbonus', by weighing its economic costs against anticipated emission reductions; subsequently it provides an initial evaluation of the expenses associated with fostering building efficiency to further reduce emissions in line with European Union policies.

At the end of 2021, the European Commission adopted a major revision (recast) of the Energy Performance of Buildings Directive (EPBD, the so-called 'green buildings' directive), as part of the 'Fit-for-55' package. This directive is an important component of the package, as the building sector's contribution to Greenhouse Gas (GHG) emissions represents about 35% of energy-related EU emissions. It aims to accelerate building renovation, reduce GHG emissions and energy consumption and promote the uptake of renewable energy in buildings, by focusing on the worst performing 15% of EU buildings. Energy performance is measured by Energy Performance Certificates (EPCs), which attribute an energy efficiency label to buildings on a scale from G (the least efficient) to A (the most efficient) based on a building's overall energy consumption. According to the directive, all residential buildings should at least be in class E by 2030 and class D by 2033. The proposed revision of the directive is now being considered by the Council and the European Parliament.

As far as Italy is concerned, various steps were taken towards making the country's housing stock more energy-efficient ('Bonus casa' in 1998, 'Ecobonus' in 2007). In 2020, a substantial policy intervention ('Superbonus') was introduced to pursue the energy saving and greenhouse gas emissions reduction targets outlined in the 2019 Integrated National Energy and Climate Plan (PNIEC). The 'Superbonus' allowed for a 110% tax credit on energy efficiency renovations, provided that the building improved its energy performance by two classes.

1.2 Energy poverty in Italy

Energy Poverty (EP) can be defined as the difficulty for a household to purchase a minimum set of energy goods and services or access to energy services that involves a redirection of resources, in terms of expenditure or income, above the normal value (SEN, 2017; PNIEC, 2019).

According to Eurostat, the percentage of Europeans unable to keep their homes adequately warm was 8% in 2020, 6.9% in 2021 and increased to 9.3% in 2022, with Italy ranking 13th among the 37 countries in 2020, with a share of 8.3%, 11th in 2021 with 8.1% and 9th in 2022 with 8.8%.

Although in recent years the EP concept has been widely used in policy debates, there is still a lack of awareness regarding its definition, perception, and measurement, as required to effectively monitor mitigation policies. Moreover, the need to understand its different facets (causes and consequences) is crucial not only for central governments but also for local authorities. If, on the one hand, EP is significantly influenced by macroeconomic scenarios, political choices and policies, as the threshold for assigning the status of "energy poor" is mostly based on the dynamics of energy prices and income levels, on the other hand, EP is characterized by spatial heterogeneity, with consequences that need to be managed including at the local level, together with targeted actions (Gouveia et al. 2019, Creutzfeldt at al. 2020, Palma & Gouveia 2022).

This research is dedicated to the assessment of EP in Italy up to the latest possible reference period, i.e. 2021. The approach proposed by Faiella and Lavecchia (2014, 2015, 2021) is adopted and discussion on the outcomes is carried out referring to the international literature. For the sake of this brief the numerical results of indicators at different territorial levels are presented along with some visualization tools.

2. Relationship with the existing literature on the topic

2.1 Analysis of measures to enhance the energy efficiency of Italian buildings

The literature on the topic is limited. The effectiveness of recent Italian government incentives has been analyzed by Alpino et al. (2022) based on the costs of the measure for 2021 and on the expected and estimated emission reductions, as published in the Italian National Recovery and Resilience Plan (NRRP). We extend the analysis on the total costs as of April 2023 and on the actual and certified emission reductions as published by ENEA. Amenta and Stagnaro (2021) compare the different incentives in place in European countries and show that the Italian framework is far more generous than that of any other country, even before the introduction of the 'Superbonus'.

On advancing building efficiency, there are essentially three strands in the literature. The first focuses on the technical aspects of Energy Performance Certificates (EPCs) (Khayatian et al., 2016, Gouveia and Palma, 2019, Streicher et al., 2018). The second strand provides a descriptive analysis of national building stocks (see Daskalaki et al., 2013 on Greece, Gangolells et al., 2016 on Spain and Hjortling et al., 2017 on Sweden). The third and final category describes the determinants of EPCs (see Otsuka and Goto, 2015, Otsuka, 2018 ,Trotta, 2018 and Dolsak 2023).

2.2 Energy poverty in Italy

The concept of EP was first formally mentioned at the EU level in Directive 2009/72/EC. The 2020 Recommendation (EU) 2020/1563 reports that there was no standard European definition of EP, so each Member State had to define its own criteria to assess the number of households in EP in their National Energy and Climate Plan (PNIEC). At that time, Italy already included this analysis in the PNIEC (2019), referring to the pre-existing indicator used in the National Energy Strategy (NES) in 2017, based on the measure proposed by Faiella and Lavecchia (2014, 2015) and estimated yearly by the Italian Observatory on Energy Poverty (OIPE). The Italian EP indicator builds on the existing literature (EPEE, 2006; and Miniaci et al. 2008, 2014; Kessides, 2009, among

others), and follows the Low Income High Cost (LIHC) approach designed for the United Kingdom by Hills (2011, 2012).
Accordingly, the EP indicator refers to the concept of energy vulnerability as the condition in which "access to energy services means forgoing other resources (in terms of expenditure or income) to an abnormal extent". Specifically, the Italian indicator, identifying whether a household is "energy poor", is characterized by three main blocks:

a. high energy costs: incidence of energy expenditure more than twice the annual average
b. low expenditure: when household energy expenditure is subtracted from total expenditure and it spends less than the threshold for the country's official measure of relative poverty (which varies according to the number of person equivalents)
c. hidden energy poverty: zero heating expenditure and equivalent expenditure below the median value

Compared to "consensus-based" EP measures, widely used due to the availability of data sources (EU-SILC survey data), the above EP indicator represents an advancement in terms of objective measurement. Indeed, "consensus-based" EP measures can lead to biased pictures as they are based on data collected by asking questions about the perceived adequacy of the home temperature, leading to confusion in terms of objective needs and individual preferences. In addition, questions in the EU-SILC survey may be too vague to elicit conscientious and effective feedback.

3. Research output

3.1 Analysis of measures to enhance the energy efficiency of Italian buildings

3.1.1. Cost-benefit Analysis of the Superbonus

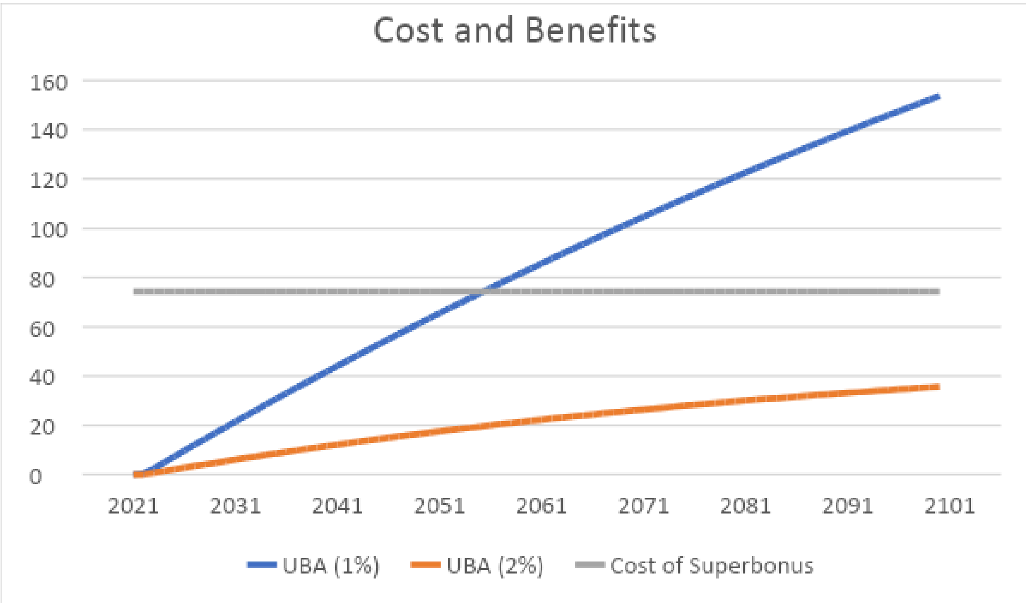
The 'Superbonus' provided a 110% tax credit on energy efficiency renovations. Total investments eligible for the 110% tax credit, as of 30 April, 2023, amounts to 74.6 billion euros, corresponding to a government liability of 82.6 billion euros. Given the significant burden of this fiscal measure on public finances, careful assessment is needed not only of the short-term macroeconomic effects on the Italian economy but also of any positive effects in terms of energy efficiency and emission reduction. A detailed assessment is particularly difficult to make because of the limited availability of granular micro-data. However, an aggregate cost-benefit analysis of the measure can be carried out using official data published by the Italian Energy Agency (ENEA) in its annual report on tax credits.

A cost-benefit analysis evaluates the net value of an investment by comparing the Present Discounted Value (PDV) of its cost to the PDV of its long-term benefits. In the context of the 'Superbonus', the costs are defined by government liabilities stemming from eligible investments. Our primary focus on benefits pertains to the social benefits, i.e., reduced emissions—specifically, the emissions eliminated by the investments.

For eligible investments in 2021, amounting to 15.2 billion euros, ENEA certifies annual energy savings in non-renewable primary energy equal to 2,293.81 GWh/year (equivalent to about 200 Kilo Tonnes of Oil Equivalent, Ktoe). According to conversion factors provided by ENEA, these energy savings correspond to 688.9 kton of CO2 not emitted into the atmosphere each year. To convert abated emissions into monetary terms, we apply the Social Cost of Carbon (SCC), which represents the economic damage resulting from CO2 emissions. There are several estimates of the actual SCC depending, among other things, on the discount rate used to discount future economic damages. The lower the discount rate, the greater the value today of future economic damages and thus the greater the related SCC. Here, we present two estimates using the two SCCs published by the German Environmental Agency (UBA). The first estimate is an SCC of 197 euros per ton of CO2 in 2021, calculated assuming a relatively high discount rate (2%). The second estimate assumes a lower discount rate (1%) and leads to an SCC of 682€/ton of CO2 in 2021.

The results of the analysis are shown in Figure 1. The horizontal line indicates the costs of the measure reported by ENEA as of 30 April, 2023 (82.6 billion euros) discounted to 2021 (74.3 billion euros), assuming that the government liabilities for 2021, 2022, and 2023 are spread over a period of, respectively, 5, 10, and 4 years. The two rising lines represent the PDV of the cumulative monetary benefits as a function of time, depending on the discount rate and SCC used. The intersection of the horizontal line with each of the two lines indicates the break-even year, i.e., how many years of future benefits are needed to repay the costs incurred by the investment. With the lowest discount rate (1%), the break-even year of the funding is 2055, while at the highest rate (2%) the break-even year is not reached until after 2100. This result shows that the benefits of the 'Superbonus' do not seem to justify the extremely generous tax incentives.

Figure 1: Cost-benefit analysis of the 'Superbonus'



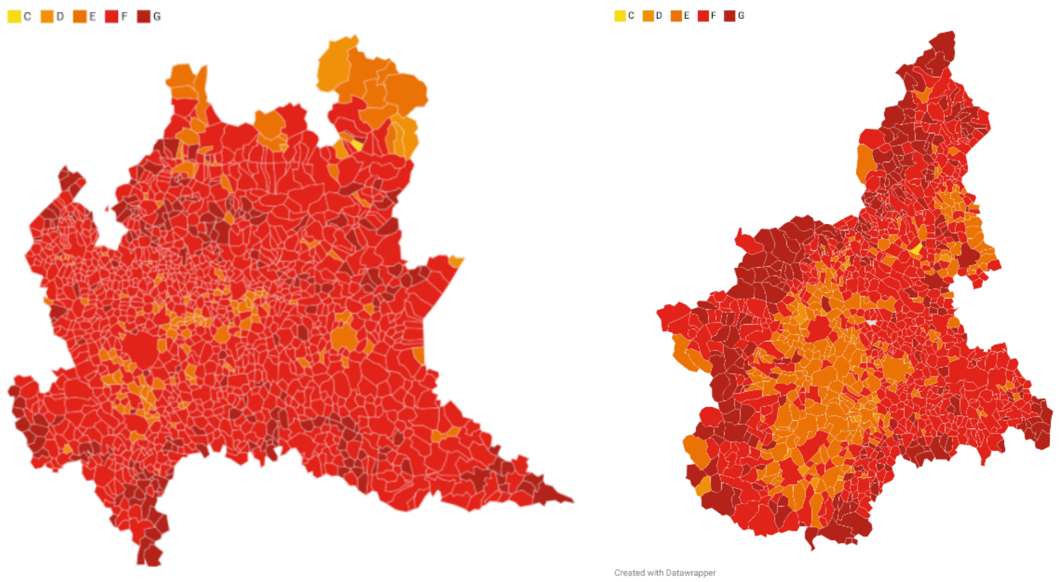
In conclusion, comparing the estimated annual cumulative energy savings for the 2021-2023 period (1.05 Mtoe) with the 2030 target for the residential sector defined in the 2023 PNIEC (4.8 Mtoe), the investments incentivized by the 'Superbonus' have contributed about 22% to achieving the target. However, the result is a substantial government liability. Moreover, a recent study by the Parliamentary Budget Office (UPB) shows that both the 'Ecobonus' and 'Superbonus' are essentially regressive measures and therefore unsuitable for mitigating energy poverty. However, the 2023 Budget Law extends the measure throughout the year 2023, with the 110% tax credit for energy efficiency interventions on social housing ('case popolari'). This measure has the potential to mitigate energy poverty conditions for households in this type of building.

3.1.2 Advancing building efficiency in two Italian regions

This section provides an initial evaluation of the expenses associated with advancing building efficiency to further reduce emissions in line with European Union policies. To perform the analysis, we consult the only publicly available data on Italian EPCs, relating to two Northern Italian regions: Lombardy and Piedmont. We consider only residential buildings: our dataset includes 1,182,616 observations for Lombardy over the period 2015-2022 and 474,935 observations for Piedmont over the period 2015-2023. The samples represent respectively 21.1% and 17.0% of total residential units in Lombardy and Piedmont (based on 2021 Census data). In Lombardy (Figure 2a), the large majority of municipalities has an average EPC in class F (75.7%), followed by class G (14.5%). In Piedmont (Figure 2b), the most abundant class is F (52.9%), followed by class E (25.3%); class G, the lowest, represents 20.3% of all municipalities. The higher proportion than in Lombardy may reflect an older dwelling stock in the region.

Figure 2 - Average energy performance class by municipality

(a) Lombardy (b) Piedmont



We estimate the overall cost of switching from classes G/F to E and then from class E to at least class D for the whole housing stock of Lombardy and Piedmont. We consider the estimated median cost to switch from classes G/F to class E and calculate the potential overall cost of bringing Lombardy and Piedmont housing stock into class E (first column of Table 1): 126.5 billion euros for Lombardy and 56.5 billion euros for Piedmont. We then assign the median cost of switching from class E to at least class D to the total updated number of E-class housing units in the two regions (3,690,447 in

Lombardy and 1,805,487 in Piedmont, respectively), which results in the estimated potential overall cost shown in the second column of Table 1. Overall, we estimate the final cost of bringing the whole building stock of the analyzed regions first to class E and then to at least class D to be 255.2 billion euros for Lombardy and 120.5 billion euros for Piedmont, a total of 375.7 billion euros (see Table 1, third column).

Table 1. Estimated cost (billions of €)

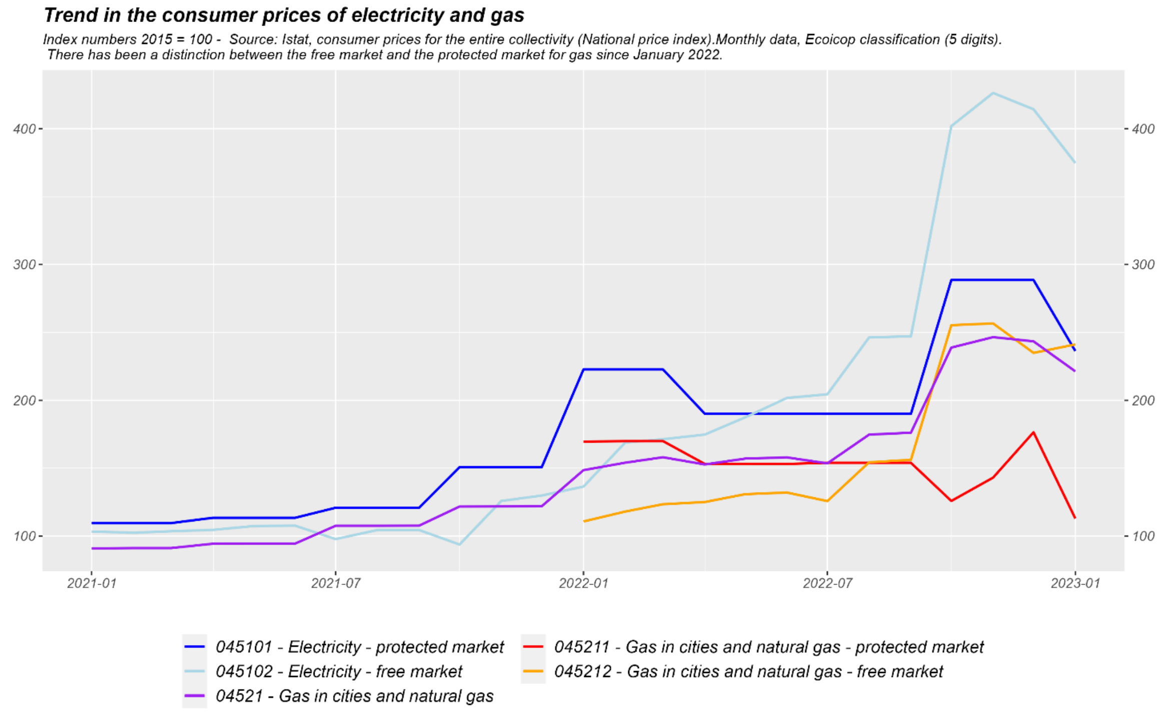
	From classes G and F to class E	From class E to at least class D	Total
Lombardy	126.5	128.7	255.2
Piedmont	56.5	64.0	120.5
Total	183.0	192.7	375.7

Source: Authors' processing of EPC data.

3.2 Energy poverty in Italy in 2021: measurement, visualization and assessment

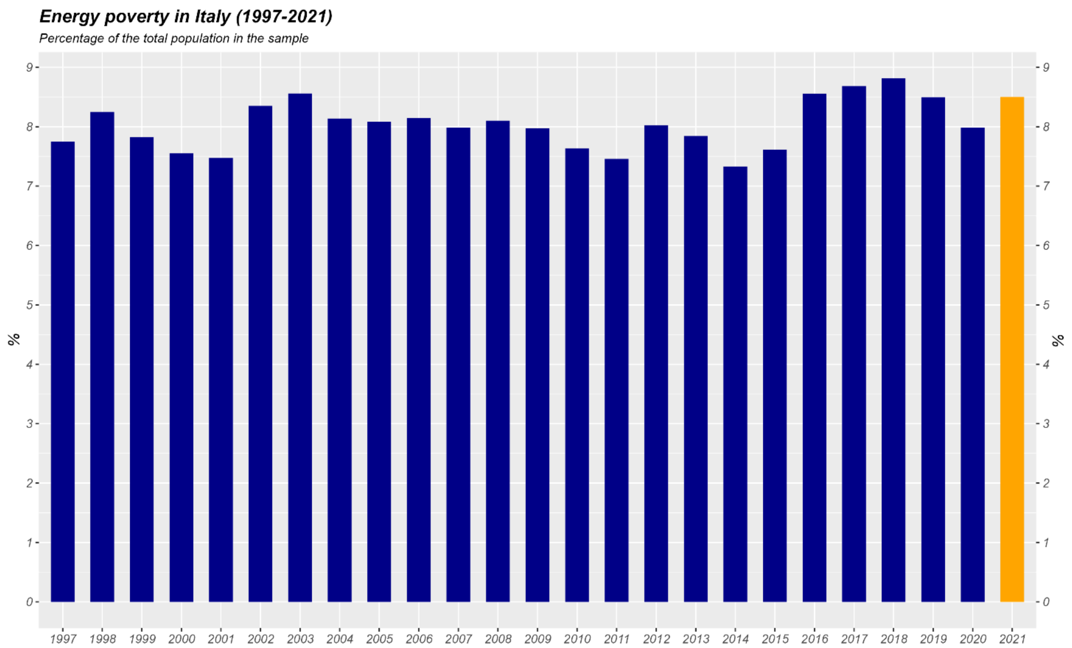
In 2021, energy costs for Italian families increased by 20% on the previous year, mainly due to the sharp rise in the prices of gas and electricity starting from the second quarter of the year. At the end of 2021, the final price of electricity paid on average by households increased by 35% compared to 2020. This variation shows a significant difference when referred to households in regulated (i.e. "protected") or in liberalized (i.e. "free") markets: the former group recorded a +44% average increase, and the latter a +26% average increase. In the same period, the price of gas rose on average by 41%, with a larger increase for households in the free markets (Figure 3).

Figure 3



In 2022, the prices of electricity and gas again rose sharply, more than doubling during the year. This significant increase in prices (and related expenses) led to a half percent increase in EP in Italy. According to this parameter, at the end of 2021, 2.2 million families were in EP, up 125 thousand on 2020; in percentage terms, this was 8.5% of Italian families, an increase that completely offset the decrease recorded in 2020 (Figure 4).

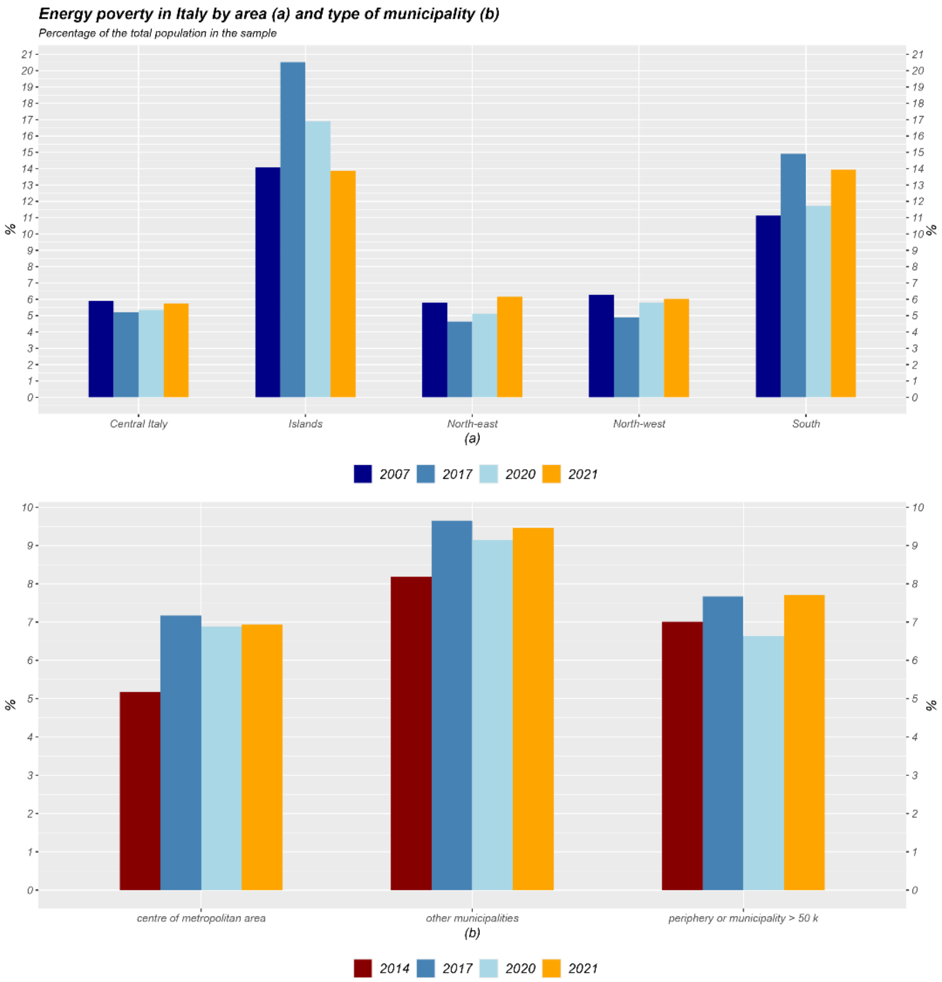
Figure 4



In relation to geographical areas, there was a considerable reduction in the percentage of households in EP in the islands, partly due to the comparatively mild winter compared to the past 30 years; however, the percentage increased in the other macro-areas, particularly in the south and north-east of Italy (Figure 5.a). EP mainly affects households living in small municipalities (i.e. those with fewer than 50 thousand inhabitants) and suburban areas, where EP is indeed increasing. In large cities, EP was substantially unchanged (Figure 5.b).

At the regional level, EP in 2021 ranged from 4.6% in the Marche to 16.7% in Calabria (Figure 6 and Table 2).

Figure 5



The region with the largest increase on 2020 was Puglia (+5.5%), followed by Molise (+4.3%). After a particularly mild winter, the islands recorded the sharpest decrease (Sicily: -3.5; Sardinia: -1.8%).

Figure 6

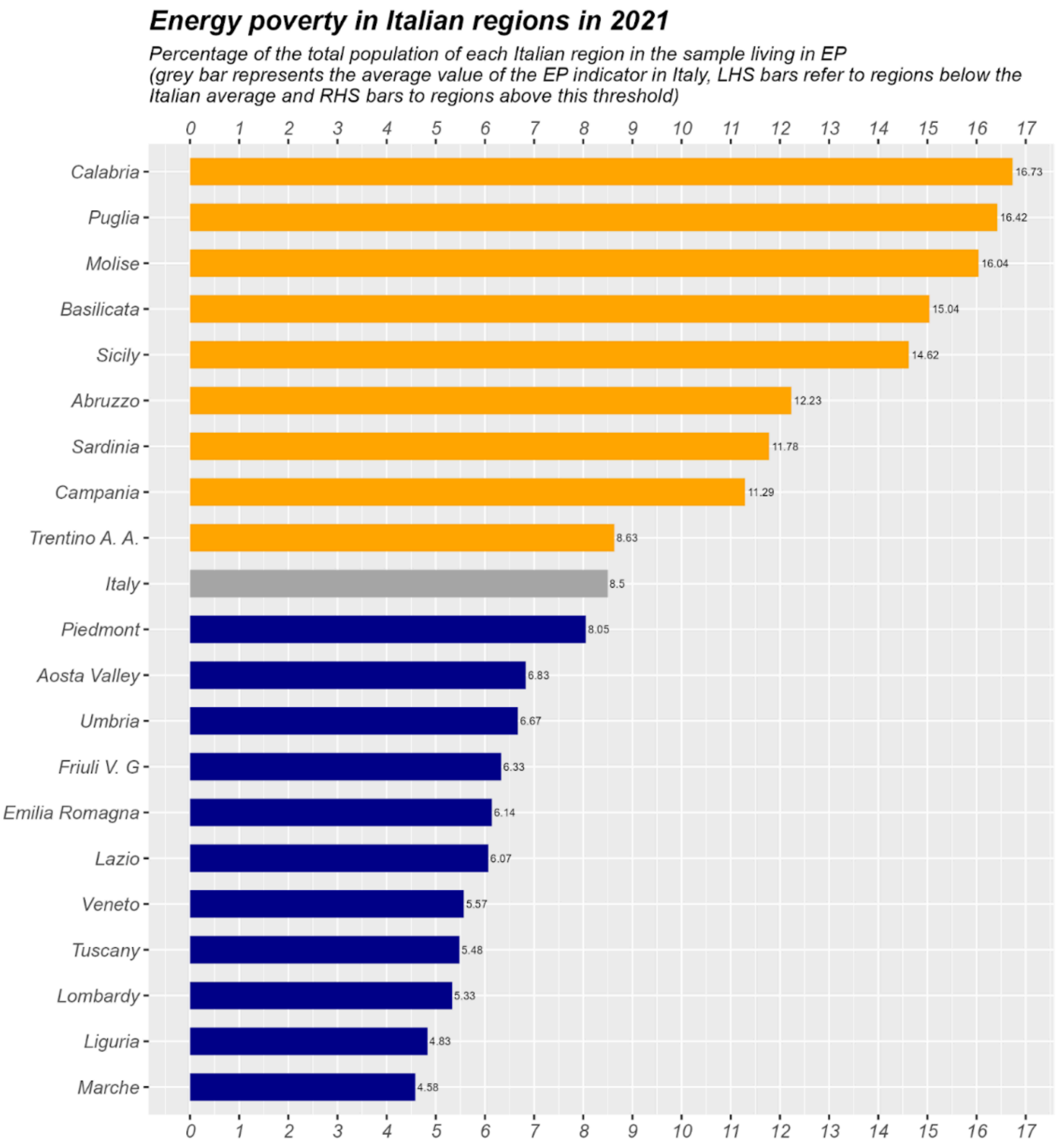

Energy poverty in Italian regions in 2021
Percentage of the total population of each Italian region in the sample living in EP
(grey bar represents the average value of the EP indicator in Italy, LHS bars refer to regions below the Italian average and RHS bars to regions above this threshold)
Calabria 16.73
Puglia 16.42
Molise 16.04
Basilicata 15.04
Sicily 14.62
Abruzzo 12.23
Sardinia 11.78
Campania 11.29
Trentino A. A. 8.63
Italy 8.5
Piedmont 8.05
Aosta Valley 6.83
Umbria 6.67
Friuli V. G 6.33
Emilia Romagna 6.14
Lazio 6.07
Veneto 5.57
Tuscany 5.48
Lombardy 5.33
Liguria 4.83
Marche 4.58
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Table 2. Energy poverty by region in 2021

	averag e	***standard error***	***95% interval***	***% variation on 2020***
01 Piedmont	8,1	0,9	[6,5-9,6]	2,0
02 Aosta Valley	6,8	1,4	[4,1-9,5]	-0,5
03 Lombardy	5,3	0,5	[4,5-6,2]	-0,5
04 Trentino A. A.	8,6	1,4	[6,3-11]	1,8
05 Veneto	5,6	0,8	[4,3-6,8]	1,0
06 Friuli V. G	6,3	1	[4,3-8,3]	0,5
07 Liguria	4,8	0,8	[3,1-6,5]	0,0
08 Emilia Romagna	6,1	1,1	[4,9-7,4]	1,0
09 Tuscany	5,5	0,7	[4,2-6,7]	0,0
10 Umbria	6,7	1,6	[3,9-9,4]	0,1
11 Marche	4,6	0,8	[2,9-6,2]	-0,1
12 Lazio	6,1	1	[5-7,2]	0,9
13 Abruzzo	12,2	1,8	[8,8-15,7]	2,1
14 Molise	16,0	3,3	[9,5-22,6]	4,3
15 Campania	11,3	1,4	[9,2-13,4]	0,5
16 Puglia	16,4	2,6	[13,8-19]	5,5
17 Basilicata	15,0	3,4	[8,4-21,7]	-1,3
18 Calabria	16,7	3,3	[11,4-22,1]	1,1
19 Sicily	14,6	1,8	[11,7-17,5]	-3,5
20 Sardinia	11,8	2,4	[8,1-15,4]	-1,8
Italy	**8,5**	**0,3**	**[8-9]**	**0,5**

4. Policy implications

4.1 Analysis of measures to enhance the energy efficiency of Italian buildings

The estimated total cost to move all Lombardy and Piedmont residential dwellings from class G/F to at least class D is 375.7 billion euros, i.e., approximately 70% of Gross Domestic Product (GDP) for the two regions and 19% of Italy's GDP. The size of this figure means that the financial burden of the EPBD cannot be borne by the private sector alone but requires some degree of government intervention.

The main instrument that most European Governments, including Italy since the late 1990s, have used to stimulate investment in the energy efficiency of buildings is tax credit, which allows households to write off a share of the investment from their tax liabilities. The presence of a subsidy, in the form of a tax credit, is justified by the fact that GHG emissions are a negative externality. By incentivizing households to invest in improving the energy efficiency of their dwellings, less energy is consumed in the aggregate, resulting in lower emission levels. Since households do not take this into account in their objective functioning, the subsidy is desirable from a theoretical standpoint. More questionable instead is the size of the subsidy: there are at least two reasons why the current size is probably too high.

The first reason is related to costs and financial feasibility. Let us assume that the upgrade we analyzed in the previous section is carried out in the current incentive framework. This framework, named 'Ecobonus', provides a tax credit ranging from 50% to 75%, depending on the type of retrofit and residential unit involved, to be spread over ten tax years. For the sake of simplicity, we assume that an average of 65%: upgrading for all the buildings in Lombardy and Piedmont to at least class D would cost the Italian government 244.2 billion euros, i.e., approximately 45% of GDP in the two regions. Suppose we extend this share to the whole of the remaining regions, unrealistic though this may be, since Lombardy and Piedmont are hardly representative regions. This means that the Italian Government should spend, on average, 2.37% of Italian GDP in tax credits every year until 2042 only to comply with the EPBD. Since the suspension of EU fiscal rules ends in 2024 and the current level of Italian public debt is extremely high, this policy seems unfeasible and unsustainable.

The second reason why the size of the current subsidy framework is probably too high is related to the benefits of the measure and the relative size of social versus private benefits from the incentivized investments in energy efficiency. Private benefits lie in the monetary savings that each household achieves because it consumes less energy, while social benefits, as explained above, come from the reduction in harmful GHG emissions. Looking at the break-even years declared by technicians in our samples of EPCs, we see that the median break-even point is as early as 10 years. Although a thorough analysis of the benefits of the recommendations is outside the scope of this Policy Brief and is left for future research, this result seems to suggest that the private benefits more than outweigh the social benefits, making it difficult to believe that a tax credit rate higher than 50% is efficient. Therefore, a question arises: if such investments are so attractive in terms of private savings from energy consumption, why are these subsidies not more widely exploited?

UPB (2023) showed that, by combining fiscal data with data on access to tax credits, the measures are regressive, with half of the amount of written-off tax liabilities pertaining to the richest 10% of the Italian population. Hence, the answer seems to lie in the fact that not all households are able to access the tax credit. On the one hand, households in the lowest part of income distribution are more likely to face liquidity constraints and to be unable to pay the whole amount of the investment in advance. On the other hand, even if they can, a low-income household may not have the fiscal capacity to make the most out of the tax credit. The 'Superbonus' provided for two alternative ways to access the tax credit: one allowed the credit to be sold on a secondary market ('cessione del credito'), and the other or discounted the amount of the tax credit on the invoice for the renovation works ('sconto in fattura'); in the latter case, the firm doing the work applied for the tax credit. These are effective ways to enable the poorest households to access the subsidies.

To conclude, the revised EPBD is likely to create an important challenge to the Italian economy in terms of the private and/or public resources needed to upgrade the energy efficiency of most of the Italian residential building stock. Government subsidies, in the form of tax credits, are needed to incentivize and accelerate the rate of national building renovation. The size of these subsidies, however, should be reduced, otherwise the budget cost will become unsustainable and because the private advantages of these measures seem to outweigh the social benefits. However, the existence of financial constraints may make the policy regressive, and adjustments may be needed. Indeed, one could imagine a variable rate for the tax credit, as introduced by the French Government, in which the tax credit rate decreases with the income of the household, ranging from 90% to 40%. To investigate the optimal size and shape of the public subsidy, we plan to further investigate and quantify the private benefits of the recommended interventions in our dataset, but this is left to future research.

4.2 Energy poverty in Italy

The latest available measurement of Italian EP (2021) shows an increase in the phenomenon, driven by the drastic increase in the national prices of electricity and gas from the second half of 2021: this has moved discussions on EP from the sphere of specialists to public debate. The widespread recognition of the issue has highlighted the need for a structured national policy framework to address EP. In this new perspective, the preconditions are, on the one hand, the availability of data for rigorous measurement and analysis of the phenomenon; and on the other, careful assessments of what actions can be taken and developed to reduce the problem.

The Italian government has implemented several policy measures to address EP in recent years; however, they need to be better targeted, avoiding the adoption of instruments such as tax cuts, while prioritizing direct support to vulnerable consumers, promoting awareness-raising campaigns for efficient energy consumption, supporting better energy education as well as flexibility in switching from one energy provider to another (IEA, 2023). These recommendations cannot be validated without a consensus on what exactly EP is and who the "energy poor" are in the country. This task has been institutionally assigned to the National Energy Poverty Observatory (ONPE), established in March 2022 to coordinate measurement and actions to be implemented by different institutional actors. In addition, ONPE will design a national strategy to combat energy poverty (NECP, 2023).

The EP indicator for Italy defined by Faiella and Lavecchia (2014, 2015, 2021) and estimated by OIPE, as presented in this brief, is an initial attempt at the national level to address the existing challenges. Data availability plays a pivotal role: most current EP assessments and analysis for Italy are based on data available in the ISTAT repository. However, Colabella et al. (2023) note that data on electricity and natural gas consumption for all Italian households and businesses are archived through the Sistema Informativo Integrato (SII) managed by Acquirente Unico, a public company, but access is currently not possible. A similar issue arises in relation to databases collecting information contained in Energy Performance Certificates (EPC) for buildings. In Italy, these data are collected by Italian Regional Authorities, but only a few, such as Lombardy, allow open access to this information. Analyses at the national and regional level based on these data are provided by ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development, which is the institution that manages the national platform SIAPE (Energy Performance Certificate Information System), in which all the information contained in the EPCs issued in Italy is conveyed. At the time of writing, it is not possible to access this database, even for research purposes. Allowing access, combined with the matching of household consumption data with information in the national property register could significantly improve the assessment of EP.

Regarding the analysis of current policies in Italy to fight EP, more data are needed for the evaluation of Social Electricity and Gas Bonuses. The latter have undeergone significant changes in terms of eligibility in recent years.

Under the current rules, vulnerable households with an ISEE slightly higher than the threshold -even by a few euros - are not eligible. Moreover, households with district heating are excluded from the gas bonus. In the case of utilities with central heating, the available data do not allow to know whether households resident in public housing have benefited from the bonus. Data from new surveys and existing data from the national regulator, local authorities and the Italian Statistics Office are needed and should be collated to study the effect of these bonuses, and possible improvements to their implementation. This is one goal of the project in Spoke 6 on energy poverty researchers are currently working on.

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