ENERGY POVERTY IN THE RURAL CONTEXT

POLICY BRIEF

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Energy poverty in the rural context

Romania is characterized by a variety of instances of energy poverty. Whereas national analyses display important regional differences in these manifestations and in the availability of programmes of redress (Jiglau, Sinea, & Murafa, 2017), there are important contrasts in the residential sector between the urban and the rural localities, each displaying specific challenges. This policy brief is aimed at displaying a number of energy poverty challenges characteristic of the rural context in Romania.

Low-quality single-family households in the rural area

In Romania there are 8 mil. residential spaces corresponding to 7,2 households. Residential buildings amount to 90% of the total national building capacity. 31% of total are multifamily buildings, whereas 50% are single family houses (PNRR, 2021). Romania is rural to a large extent. 47,5% of the residential spaces (71% of the single-family households) are locate in the rural area. The highest structural challenge in the rural area consists of single-family households (European Commission, 2021). 95% of the buildings are individual houses. The rest consists of administrative buildings and multifamily buildings, which are highly uncommon and are mostly former workers colonies situated in the proximity of industrial sites or mines. The rate of vacancy at the level of residential buildings in Romania is 16% of the total and the rural area is particularly affected by this phenomenon (Ministry of Energy, 2018). This is considered to be an important factor of space degradation. One of the most important reasons behind space vacancy is migration. In the rural space there are two types of migration at work: the external exodus and a rural-urban migration, especially at the level of the young population. Besides vacancy, another general phenomenon present in the residential sector is overcrowding. The majority of households live in small living spaces compared to the majority of EU member states. 63% of living spaces are smaller than 50sqm. Despite larger living area for individual houses - 73sqm (Guvernul României, 2020) - up to 1/4th of them is under 50sqm.

From a structural perspective, 50% of the houses are made of building bricks, whereas the remaining half are made of wood and plaster – approx. 20%. This latter feature is disproportionately present in rural housing facilities as they have very specific renovation needs. Soil-based materials conserve humidity and heighten the risk of an unhealthy living space.

Generally speaking, structural characteristics, their location and the fuel employed may determine a variety of energy needs and a corresponding climate footprint. Using data retrieved from the national buildings' census, CSD has classified 80% of the national building stock in 23 different categories based on a number of structural features. The heating needs of these of these households have been established and their effort to reach a steady inside temperature of 21 degrees Celsius. This temperature is provided for in the national regulations on building standards. The model computed enabled the identification of those households who may be rendered most vulnerable in the process. While furnishing us a list of useful information, the model does not account for behavioral practices inside the building – actual technology employed, the quality of the resource used (the quality of wood) and consumption manners, which may result in features such as under- or overconsumption. In Romania partial

and temporary room heating is common practice in more than 50% of the households (Ministry of Energy, 2016). Heating below standards at times, or over-heating are much employed coping practices, whereas hidden energy poverty (resulting from underconsumption) is as high as 11,7% (Center of the Study of Democracy, 2021). Furthermore, the model only captures heating needs. Cooling needs during the hot season are not included.

Despite the shortcomings, the model allowed us to formulate a number of conclusions with regard to single family houses: Generally, private houses have been recorded to face the highest potential energy effort to reach a steady 21 degrees, as anywhere between 255 and 900 kWh/sqm/year are needed in order to secure acceptable living conditions. This effort lies much above the European real average sqm consumption in the residential area, which is 180kWh/sqm and the national average of 300 kWh/sqm, as shown in European Commission data (European Commission). Other reports point out the difference in inefficiency between single family houses and multifamily buildings referring to the fact that single family houses build before 1994 are 83% less inefficient as compared to multi-apartment buildings, Whereas the difference goes down to 12% for houses built after 2014. Romania has an aging building stock with only 6% of its residential buildings built after 2000, whereas half of it is older than 1970 with little investment afterwards (Fiocompass, ERDF, 2020). Whereas national strategies aim at reducing the annual consumption of refurbished multifamily buildings to 100 kWh/sqm (ANRE, 2018), there are no plans yet with regard to single family houses and no evaluation of the effective refurbishment effort needed. However, in order to cause real change, these interventions need to take into account heating needs.

From a standard heating need perspective, the highest energy consumption effort potential is associated with single family brick buildings built in the 1960s, 50 sqm, with 2 rooms using wood to heat as they may have to consume anywhere between 520 and 900 kWh/sqm/year to reach an acceptable indoor temperature. Given the volatility of the wood market, these households may be exposed to outrageous prices especially during the high season and may have to reduce their consumption drastically in order to stick to budgets. An earlier CSD report showed that wood heating may surpass electricity costs for some families during the high season (Jiglau, Sinea, & Murafa, 2017). These very specific group of vulnerable buildings identified above represent over 5% of the total household population considered in the study. More generally speaking, brick houses seem to be an important problematic category, irrespective of their primary energy source being gas or wood. Their needed consumption seems to potentially surpass 700 kWh/sqm/year easily in order to secure a decent living environment, which may indicate a high need for investment in refurbishment and finding alternative heating solution.

With regard to pollution, brick houses using gas boilers are particularly problematic as their annual carbon footprint, provided the heating effort needed to reach 21 degrees would be deployed, would be anywhere between 53 and 160 kgCo2/sqm/year, with 56 sqm houses with 2 rooms being particularly problematic (91-160 kgCo2/sqm/year). This category represents 1.19 % of the housing population considered in the simulation.

Two discussions need take place at this point: one concerns structural regulations and investment measures and programs, whereas the other refers to the need to change energy consumption behaviors and heating technologies.

First, Romania is paramount for its high degree of private property with 94,7% degree of private ownership (PNRR, 2021). This feature has a number of implications in terms of the

quality of the building stock, and energy poverty more specifically. Private property tenure involves a higher maintenance burden on the owner, and therefore higher investment liability, either in own funds, bank loans or capacity to access public grants with or without individual contribution. It should be noted that in 2019 Romania classified as the country with the lowest median equivalized disposable income in the EU, despite increases, and the Member State with the fourth highest income inequality (with a Gini coefficient of 34.8% (Eurostat, 2022). Moreover, rural-urban disparities in terms of income are high with earnings 35% lower in the countryside as compared to towns (INS, 2020). This does not only mean that the investment capacity of rural households is low but also that bank solvability is (especially compared to urban households) reduced and the ability to access green mortgages or other private financial instruments is limited. Bank loans are more accessible to higher income groups who are able to provide better guarantees in terms of income and property. Rural property values are generally lower than those in the cities, which decreases the capacity of rural families to access bank loans.

In terms of building refurbishments, it should be noted that despite a higher concentration of single-family households in the countryside, and more structural and socio-demographic challenges associated, renovations have been performed disproportionately in the urban sector (8% as opposed to 3% in the country side). It is unclear whether these interventions have been performed on private or public sums, or a combination of the two. However, most of them have run on financing schemes that involved 60% national sources and 40% individual or local administration sources either separately or in a combination of the two. With respect to these mechanisms, one of the conclusions of previous field studies should be noted here, namely the limited capacity of local administration to attract funding and administer renovation programs or implement innovative solutions that would help households improve their energy efficiency (Jiglau, Sinea, & Murafa, 2017). Based on a national legislation from 2011 (Ivanov, 2011), some urban administrations have launched façade reconditioning programs which have had different degrees of success (Sfârlea, 2018). In the rural context these have been generally absent. National programs targeting single family houses have been marginal and mainly dedicated to higher income families, and even so, they have been slow to deliver. Programs like Casa Verde Clasic (The classic green house programme), only aimed to install PVs on individual houses. 30.000 individual houses have been targeted, but no structural intervention was involved. Casa Verde Plus (The green house plus) (Ziare.Com, 2018) was designed to be an upgrade for the previous program and also include efficiency works by financing building insulations. Casa eficienta energetic (The energy efficient house) was aimed exclusively at financing energy efficiency works on private houses. 60% of investment (up to 15.000 EUR) involving insulation, heating system improvement, and window and door improvement would be supported from the grant. These programs have faltered out of various reasons, such as the lack of funds (Casa Verde Plus), slow bureaucracy (Casa verde) (Digi24, 2020) or low institutional capacity despite high public interest in the program (Casa eficienta energetic) (Alba24, 2021). Green mortgages, another financial instrument well promoted by authorities and administered by private banks, have been accessible solely to real-estate investors and solvable families (Romania Green Buildings Council). The national resilience plan will implement a scenario where multifamily buildings will be mainly targeted and completely refurbished by 2026, whereas for individual houses the two latter programs will be activated to be accessed by beneficiaries (PNRR, 2021)

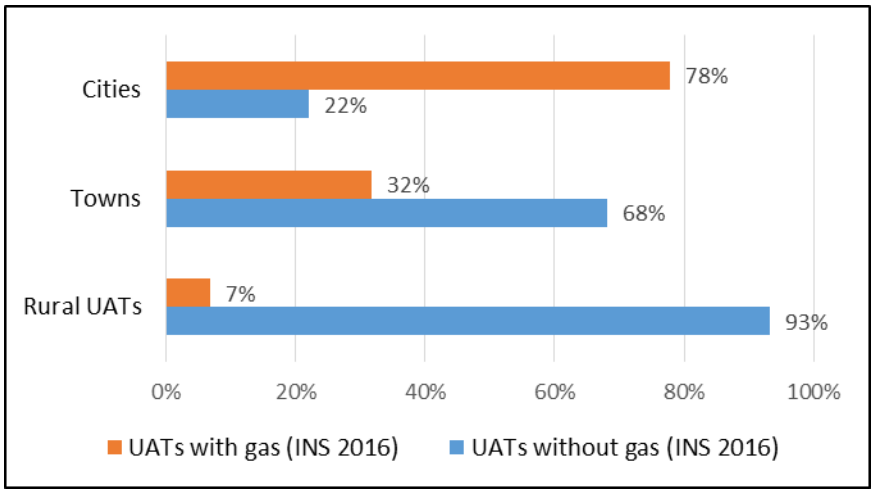
Another challenge that results from the high degree of private property combined with low institutional capacity at the level of local public administrations is the low implementation rate of national construction regulations and for that matter the low capacity of local administrations to produce and enforce local construction norms. This weakness has been regarded by many experts interviewed as an explanation for the low implementation of EU standards on the ground and can be found at the intersection of the low institutional adaptability, the reluctance coming from real estate developers to reduce profit margins by investing more in quality, and the objections coming from the population at large due to low investment capacity. Moreover, the low institutional capacity at the local level and the high private property mentality can also be associated with a high degree of free-riding and construction work performed without authorization. There is not statistics of the percentage of unauthorized construction work performed on private houses, however the practice is highly recognized and media accounts of hazards resulting from such behavior are at the ordinary. The newly issued NRRP (European Commission, 2021) points out the need to develop construction related expertise at the local level and especially in the rural area in order to provide for better implementation and construction overview.

Access to diversified and sustainable sources of energy

Nearly 80% of the rural population use wood for heating, in obsolete and inefficient stoves with low heating power and energy efficiency, with highly air polluting emissions and toxic effects on human health and the environment. Besides environmental and health effects, wood burning gives rise also to accessibility issues. Generally speaking, in terms of price, wood is the cheapest heating fuel available but at only a short distance from gas. Moreover, there is high illicit consumption associated with wood heating. This may produce contrasting effects: the lower costs effect possible on one hand, can be compensated by the uncertain costs effect on the other. The wood market is highly volatile and with large price variations from one region to another and between seasons. This may lead, at times, to prices that are considerably higher than those of gas (George Jiglau, 2018). With regard to price compensations available for these households, despite the fact that by far the largest part of heating aid available is allocated for wood, (Jiglau, Sinea, & Murafa, 2017) individual payments can be up to five times lower than for gas or electricity. They do not cover by any standard the wood needs of a household during the cold season. Recent legal changes have ceased this disparity between fuels. Despite a better satisfaction of the equitability standard, heating payments can only be a transitional measure and can by no means sustain the sustainability ambitions in place.

It should be noted that for most wood-consuming households this is the only heating resource available. No alternatives are in sight (Jiglau, Sinea, & Murafa, 2017). Access to the gas network, for instance, is particularly limitative for rural localities. As displayed below gas usually reaches high density urban and suburban areas, whereas rural administrative unites can access this alternative to a low degree.

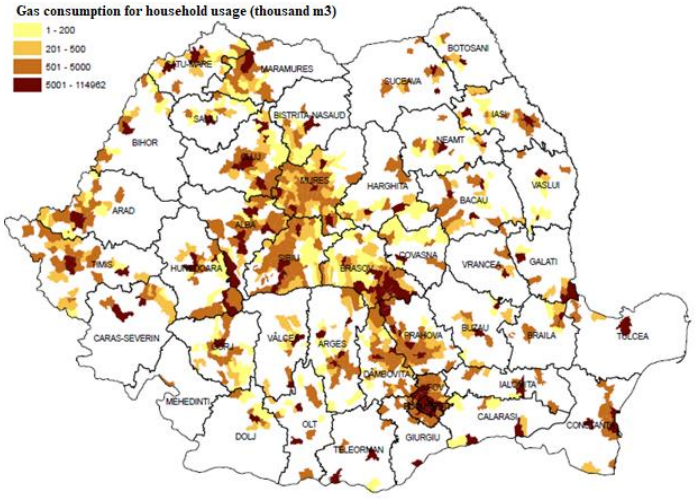
Figure 1. Percentage of UATs connected to gas



Source: (INS)

The map displayed below presents visually the areas which are uncovered by gas alternatives and households are bound to wood-based heating. Legislative initiatives aimed at the facilitating the spread of gas connection to households have faltered due to limited capacity on the side of the distribution companies.

Figure 2. Gas consumption for household usage



Source: (George Jiglau, 2018)

Heating on electricity is limited. Nation-wide only 1% of the population heats on electricity due to its high intensity for heating and the limitative technology prices. It is usually either extreme poor households that revert to electric heaters or richer households that can afford heat pumps or similar technology. The spread of renewable technology is also particularly limited at this

level with very minor initiatives supported either through public grants or through the activity of NGOs.

Based on national analysis, wood will continue to be part of the residential heating mix until 2030, thus having a major role in the energy transition process (European Commission, 2016). According to the same data, a growing number of wood-burning dwellings are expected to shift to natural gas. More than certainly, this phenomenon will be particularly prevalent in urban areas due to infrastructural limitations. It will be considerably slower in rural areas, where it will need additional support schemes. Despite the fact that NRRP enlarges the efficiency measures that can qualify for financial support, including, inter alia, also the change of heating systems, they are mainly dedicated to multifamily buildings, whereas allocations for technology switches are only made for private enterprises. Single family households remain in the sphere of the national programs in places, their implementation depending on funding, institutional capacity, individual contribution, etc., elements which have so far faltered their success (PNRR, 2021) ((European Commission, 2021).

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