



Athens Urban Area

Roadmap III

Owner-occupied single-family houses in Athens Urban Area



Co-funded by
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Area characteristics

The Athens Urban Area, also known as “Athens - Piraeus Urban Complex”, forms the core and centre of Greater Athens and stretches across the Attica Basin over an area of 412 km², in Attica, the highest-populated region in Greece. In the new “Athens - Attica Regulatory Plan” (L. 4277/2014, Government Gazette Issue 156A, 01/08/2014), the Athens Urban Area is referred to as the “Athens - Piraeus Spatial Unit”. It consists of 40 municipalities, 35 of which are located within 4 regional units of the former Athens Prefecture (North Athens, West Athens, Central Athens, South Athens), and 5 municipalities are located within the regional unit of the former Piraeus Prefecture.

The climate of the Athens Urban Area is mild. The average annual temperature over the last 30 years (1991-2020) is 18.5°C (around 26-29°C in summer and 10°C in winter), the total annual precipitation is roughly 433 mm, and the average humidity is 61%. The average heating and cooling degree days are 1,030 and 580, respectively.

Population characteristics

With a population of over 3,000,000 people (approximately 1,000,000 households), the Athens Urban Area is the largest urban conglomeration in Greece, with a high population density. A worrisome finding of the last Population Census (2021) is that the population of the Attica Region, and consequently of the pilot area, is ageing. In line with this fact, the share of one-person households (34.8% in total) has increased by around 37% and that of two-person households (27.4% in total) by 4%. In comparison, three-person (18.7% in total), four-person (14.6% in total) and five or more-person (4.6% in total) households have decreased by 2.3%, 10.7% and 9.9%, respectively. In absolute terms, the GDP of the Athens Urban Area was 65.95 billion € in 2020, accounting for about 40% of the whole Greek economic output. Significant income inequalities are observed within the Athens Urban Area regions. Compared to Central Athens, which is the richest region in the study area, the GDP per capita in North Athens is around 82%, in South Athens and Piraeus about 59%, and in West Athens only 35%. The overall percentage of the population at risk of poverty is around 14%.

Based on REVERTER’s social survey, which focuses mainly on vulnerable households, 47.5% of the households are struggling to cope with their current income, 33.1% can make ends meet on their current income, and 10.5% live comfortably. Moreover, about 9% refused to answer this question. All households with a net income below €680 are struggling to make ends meet. About 75-80% of the households with an income between €680 and €1,250 say that they find it difficult to make ends meet. This percentage decreases to 50-60% for households with an income between €1,251 and €1,950 and further to about 30% for those with a net income between €1,951 and €2,500. Finally, households with a net income above €2,500 experience difficulties to a much lesser extent (10% or less).

Housing characteristics

Based on the 2011 Greek Housing Census, the total number of residences is around 1,662,500. About 62% of the houses were built before the implementation of thermal requirements and energy-related building codes (before 1980). The area with the oldest houses is Central Athens (around 75%

of the houses were built before 1981), followed by Piraeus region (about 62% of the houses were built before 1981). North Athens, on the other hand, shows the lowest percentage of old buildings (around 44.5%). West and South Athens lie in the middle, i.e., the pre-1981 houses make up 58.6% and 54.6%, respectively. Regarding the size, 12.4% of dwellings are less than 50 m², 39.3% between 50 and 79 m², 32.5% between 80 and 109 m², and the rest (i.e., 15.8%) are more than 110 m². According to the analysis of more than 797,000 Energy Performance of Buildings Certificates (EPBCs), about 62% of primary energy consumption is used for heating, 21.8% for domestic hot water (DHW), 16.2% for cooling and less than 0.01% for lighting. Moreover, only 0.02% of primary energy consumption is produced by RES. More than 71% of dwellings in the area of the pilot are classified in the three worst energy classes (E, F and G), about 25% in the middle energy classes (C & D), and only 4% in the highest energy classes (A+ to B).

Energy poverty status

According to REVERTER's social survey, the average cost of heating for main central heating systems with oil, firewood/pellet and LPG is around €580 (min=€80; max=€2,800). For those who use natural gas, the average cost per month is €115 (min=€8; max=€350) in winter and €24 (min=€8; max=€175) in summer, respectively. Finally, the average electricity cost per month is €123 (min=€8; max=€350) in winter and €102 (min=€8; max=€350) in summer, respectively. The average total energy cost per year is about €1,880 (min=€150; max=€7,900). The total annual energy and electricity costs are notably lower for houses constructed after 2012.

About 45% and 48% of surveyed households claim inability to keep their houses adequately warm in winter and cool in summer, respectively. These percentages exceed 60% in households with a monthly income of less than around €1,000. It should be noted that the inability to keep home adequately warm indicator is significantly higher than the national indicator (i.e., 18.7%) in 2022. Further, one-third of the households report condensation on windows and walls during winter. These percentages exceed 50% in households with a monthly income of less than about €700. Also, about one-fifth of the households (22.2%) report arrears on their energy bills and about 5% said that their electricity/gas supply was disconnected during the last 12 months. Finally, about one-third of the households (32.7%) report health issues related to inadequate heating and/or the presence of high moisture in the house. Again, low-income households appear more vulnerable to these problems. In addition, about 80% of the households have restricted the use of electricity, more than 75% the use of heating, and about 50% the use of DHW to be able to pay for energy use during the last 12 months. Moreover, more than half report cutbacks on food purchases, and 65% mention cutbacks on transportation. Not surprisingly, more 'inelastic' goods, such as medicines or expenses related to kid's education show smaller spending cuts, whereas less necessary goods (e.g., entertainment, shoes, etc.) show significantly higher spending cuts.

Energy poverty levels are lower in households that live in apartments compared to those that live in detached or semi-detached houses. In addition, all indicators examined show that EP levels are lower in small apartment buildings. Finally, EP is directly linked to the year of construction of the households' residence and therefore to their energy performance.

Willingness to participate in energy retrofit actions

About one-third of the households have installed energy-efficient windows and doors and solar water heaters, one-fifth have insulated their houses' walls, floors, and ceiling and bought energy-efficient appliances, and more than 10% have replaced their heating/cooling systems. Replacement of old lamps with energy-saving ones is, by far, the most popular energy-saving measure (implemented by about 62% of the households), most probably because it is a relatively cheap measure with a short payback period. On the other hand, the least popular measure is the installation of photovoltaics on the roof for electricity production (only 2% of the households have installed PV panels and more than 37% claim that they are not thinking about this measure at all). Another critical finding is that only 5-10% of the households are willing to invest in energy-saving measures with high upfront costs in the next 5 years and will do so without state support.

So far, about one-tenth of the households have participated in subsidy programmes. Those who have not participated in subsidy schemes and have not renovated their homes were asked to state if they would be willing to pay for renovation and how much money they could give every month to repay the project. About 80% of the sample would be willing to contribute, 12% said that they couldn't give anything due to financial inability, 1.6% stated that they are not interested in investing in energy efficiency and 7.1% concealed their intention and did not answer the question. Of those who agreed to pay, about 30% would be willing to give up to €60 per month, 33.5% would pay between €60 and €100 per month, 20% would pay between €100 and €200, and about 10% over €200.

Renovations triggered by REVERTER

REVERTER is expected to contribute to the renovation of owner-occupied apartments in multi-family buildings in the period of five years after the completion of the project (2026-2030) through the establishment and operation of the physical and digital one-stop shops, visits to homes of energy-poor households by REVERTER Ambassadors who will inform them about energy renovation issues and the awareness-raising and training activities to reinforce the existing level of knowledge of the energy poor households. According to the initial estimates described in Section 3 “Impact calculation table” of D1.4 “Extract of the project data from the LIFE KPI webtool”, approximately 15,700 households in the Athens Urban Area will be reached through information campaigns, home visits and social engagement events. Of these households, it is estimated that around 1,800 will visit the physical and digital one-stop shops and around 15%, i.e. 275 households, will express interest in upgrading their home in the next 5 years. The distribution of these households across the three REVERTER roadmaps was carried out proportionally, taking into account the number of houses and energy-poor households in each category (tenants in single-family and multi-family residential buildings, apartment owners in multi-family residential buildings and single-family residential building owners).

The contribution of the REVERTER project regarding the renovation of owner-occupied single-family houses is summarised in Table 1, while the allocation of the total investments to public and private investments triggered by the REVERTER project is presented in Table 2. It should be noted that the foreseen investments are expected after the completion of the REVERTER project in 2026.

Table 1. Contribution of the REVERTER project to the implementation of the specific roadmap for owner-occupied single-family houses in the period 2025-2030.

Impacts	Energy-poor households - Owner-occupied single-family houses
Number of newly renovated buildings	28
Resulted cumulative final energy savings (GWh)	0.83
Resulted cumulative primary energy savings (GWh)	1.03
Resulted cumulative CO ₂ reduction (ktn CO ₂)	0.22
Resulted employment impacts (person-years)	19.65
Resulted cumulative multiple benefits (million €)	0.03
Required new investments (million €)	1.27

Table 2. Allocation of the total investments to public and private investments triggered by the REVERTER project (million €) in the period 2025-2030.

Period	Roadmap	Energy-poor households	Share	Public funds	Private (own) funds	Total
2025-2030	Energy-poor households - Owner-occupied apartments in multi-family buildings (MFB)	Category I	20%	0.13	0.13	0.25
		Category II	30%	0.29	0.10	0.38
		Category III	50%	0.57	0.06	0.63
		Total	100%	0.98	0.29	1.27

The REVERTER project

The REVERTER stands for Deep REnovation roadmaps to decrease households VulnERability to Energy poveRty. The REVERTER project is funded under the LIFE Programme with under the Grant Agreement No 101076277.

9 Roadmaps

The roadmaps are tailor-made to the characteristics of the building stock, the characteristics of the vulnerable households and the climate conditions, to cover a sufficiently cohesive group of cases that will allow for a larger-scale rollout and replication of the proposed actions for the effective analysis and tackling of the problem. The roadmaps will target the worst-performing homes first (“worst first” principle), will cope with split-incentive dilemmas and will address market, information and behavioural failures through the creation of “one-stop shops” (OSS) in 4 countries as defaults for the enrolment of vulnerable households in subsidised energy efficiency improvement programmes for buildings.