Statistical description of the 4 living labs

CITIZENS4PED

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1. Introduction

This document provides a set of contextual data aimed to better understand the four Living Labs (two in Brussels, one in Bari and one in Vienna) studied in this research. The data presented relate to the size of each neighbourhood studied, the type of population living there, the socio-economic context, the age of the buildings, the prices of the different types of energy and the climatic conditions of each of the four sites. These descriptive statistics make it possible to compare the different sites and to situate each site in relation to the average situation of the city in which it is located.

Below we briefly outline how the selected descriptive variables can influence energy consumption and production, as well as the incentives and potential challenges related to energy that residents of a neighbourhood may face.

• The area of the district, the number of households, and the population give an indication of the size of the studied neighbourhood.

• The income of residents and the employment rate indicate whether a district is deprived, average, or affluent. In affluent neighbourhoods, residents can invest in their homes to reduce their energy consumption and/or increase local energy production. It is more difficult for deprived neighbourhoods.

• In districts whit a high proportion of tenants and/or social housing tenants, residents are less likely to invest financially in their homes to reduce energy consumption or increase energy production because they have little incentive to do so. In addition, policies aimed at renovating buildings and increasing local energy production are often targeted at owner-occupiers. These neighbourhoods may therefore be more easily mobilized towards becoming PEDs. However, the disadvantage of prioritizing the easiest neighbourhoods for transformation is that fewer resources may be available for neighbourhoods with higher proportions of tenants, potentially hindering their transition.

• Electric vehicles can absorb excess energy production during peaks in solar panel production. If the proportion of households with one or more cars is high, some of these cars may be electric and could help to balance electricity supply and demand in the district.

• The age of the population is a variable that influences energy consumption and its timing. Children under 18 spend a lot of time at school. Older people spend more time at home than younger people. Older people also often live in homes that are too large for their household size (after the children have left home). Furthermore, smaller households often consume more energy per person than larger households due to economies of scale within the household but also because they often have older and less efficient appliances.

• Rent prices for social housing provide an indication of the daily difficulties faced by the inhabitants of these dwellings. The higher the rent for their dwelling, the more difficulty they will have in paying their energy bills, especially if the dwellings are of poor quality and inadequately insulated.

• The period of construction of the dwellings (buildings) provides an indication of the quality of their insulation. From the late 1970s onwards, a gradual improvement in the energy performance of dwellings and buildings in general can be expected.

• Comparing the prices of different energies between the 3 cities gives a better understanding of the importance of energy in household budgets. The price of different energies influences energy consumption but also acts as an incentive or a barrier to technological changes: if gas is cheap and electricity relatively expensive, it will be more difficult to switch away from gas for heating (and vice versa). However, a high price of electricity can also act as an incentive for owner-occupiers to install solar panels. Where there are cheaper gas and electricity tariffs for low-income households, we also provide this preferential rate.

• Better-educated households are often easier to mobilize around environmental issues, but they are also often high-income households that consume more energy than poorer households.

• Heating and cooling degree days indicate the extent to which residents need to heat and cool their homes. Heating is often done with gas and cooling with electricity. The climate therefore also has an impact on the type of energy used.

2. Brussels

Indicators	Year	Caserne Ixelles	La Roue	Brussels-Capital Region	Source
Area (m²)	2024	86 787	206 849	162 423 680	Statbel
Number of households	2021	200	782	559 260	IBSA
Population	2021	326	2 215	1 219 970	IBSA
Income (average per capita income after tax, €)	2019	10 376	10 452	11 738	IBSA
Employment rate	2020	54 %	51 %	52 %	IBSA
Number of social housing units	2021	0	238	40 232	IBSA
Share of tenants	2011	42 %	74 %	62 %	Census 2011
Share of households with one car or more	2019	27 %	62 %	52 %	IBSA
Share of population aged 0-17	2021	15 %	26 %	23 %	IBSA
Share of population aged 65 and over	2021	6 %	13 %	13 %	IBSA
Average private household size	2021	1,63	2,75	2,16	IBSA
Average age of inhabitants	2021	33,15	37,49	37,65	IBSA
Average rent for social housing	2021	348 €	317 €	328 €	SLRB (Table
Dwelling units built before 1919		71	101	184 265	Census 2011
Dwelling units built between 1919 and 1945		63	636	116 411	Census 2011
Dwelling units built between 1946 and 1960		10	46	77 374	Census 2011
Dwelling units built between 1961 and 1970		20	20	75 791	Census 2011
Dwelling units built between 1971 and 1980		0	6	61 549	Census 2011
Dwelling units built between 1981 and 1990		0	0	16 357	Census 2011
Dwelling units built between 1991 and 2000		0	59	25 186	Census 2011
Dwelling units built between 2001 and 2011		0	5	23 732	Census 2011
Total number of dwelling units	2011	164	873	580 665	Census 2011
Gas price (per kWh)	2023-S2			0,1	Eurostat
Electricity price (per kWh)	2023-S2			0,41	Eurostat
Heating oil price (1500 l/year)	26/11/2			1361	https://www.
Tertiary education	2011	40 %	17 %	36 %	Census 2011
Heating degree days	2019-2023			2311,15	Eurostat (nrg_chddr2_a
Cooling degree days	2019-2023			29,56	Eurostat (nrg_chddr2_a

3. Bari

Indicators	Year	Target area	San Paolo	Bari	Source
Area (m²)	2024	200 000	9 130 000	116 400 000	
Number of households	2021	783	11 116	137 958	ISTAT, 2021
Population	2021	2 184	30 916	314 511	ISTAT, 2021
Income (average per capita income after tax, €)	2023				Ministry of
Employment rate	2021	37,6%	48,3%	53,1%	ISTAT, 2021
Number of social housing units	2023	752	3413	7 962	https://www.a
Share of tenants	2011	92 %	42,3%	24,4%	ISTAT, 2011
Share of households with one car or more					
Share of population aged 0-17	2021	15 %	20,2%	16,4%	ISTAT, 2021
Share of population aged 65 and over	2021	28 %	21 %	25,3%	ISTAT, 2021
Average private household size	2021	2,7	2,8	2,3	ISTAT, 2021
Average age of inhabitants	2021	47	42	45	ISTAT, 2021
Average rent for social housing	2023	100 €	100 €	97 €	https://www.a
Buildings built before 1919		2	76	2 892	ISTAT, 2011
Buildings built between 1919 and 1945		0	1	4 400	ISTAT, 2011
Buildings built between 1946 and 1960		1	57	4 064	ISTAT, 2011
Buildings built between 1961 and 1970		0	2	5 281	ISTAT, 2011
Buildings built between 1971 and 1980		24	297	3 753	ISTAT, 2011
Buildings built between 1981 and 1990		0	164	1 540	ISTAT, 2011
Buildings built between 1991 and 2000		0	18	849	ISTAT, 2011
Buildings built between 2001 and 2011		0	1	473	ISTAT, 2011
Total number of buildings	2011	29	755	28 041	ISTAT, 2011
Gas price (per kWh)	2023-S2			0,13	Eurostat
Electricity price (per kWh)	2023-S2			0,36	Eurostat
Heating oil price (1500 l/year)	26/11/24			2131	Chetariffa.it
Tertiary education	2021	3,3%	5,5%	21,6%	ISTAT, 2021
Heating degree days	2019-2023			1428,42	Eurostat (nrg_chddr2_a
Cooling degree days	2019-2023			371,95	Eurostat (nrg_chddr2_a

4. Vienna

Indicators	Year	Kahlenber-gerdorf	Döbling (district)	Vienna	Source
Area (m²)		2 260 100	25 000 0		
Number of households					
Population	2023	540	75 517	1 982 097	Statistisches
Income (average per capita income after tax, €)	2021		29 903	24 992	
Employment rate	2021		91 %	88 %	Statistisches
Share of public housing	2024		25 %	24 %	Döbling in
Share of tenants	2022		71 %	79 %	Döbling & Wien
Share of households with one car or more					
Share of population aged 0-14	2022		13 %	14 %	Wien in Zahlen
Share of population aged 65 and over	2022		21 %	16 %	Wien in Zahlen
Average private household size	2022		2	2	Wien in Zahlen
Average age of inhabitants	2022		44	41	Wien in Zahlen
Average rent for social housing					
Buildings built before 1919			1627	31 831	Döbling in
Buildings built between 1919 and 1944			1277	23 841	Döbling in
Buildings built between 1945 and 1980			3588	54 328	Döbling in
Buildings built between 1981 and 2021			2527	65 760	Döbling in
Total number of buildings	2021		9019	175 760	Döbling in
Gas price (per kwh)	2023-S2			0,15	Eurostat
Electricity price (per kwh)	2023-S2			0,31	Eurostat
Heating oil price (1500 l/year)	26/11/24			1693	HeizOel24
Tertiary education	2021		42 %	29 %	Döbling in
Heating degree days	2019-2023			2286,72	Eurostat (nrg_chddr2_a)
Cooling degree days	2019-2023			177,36	Eurostat (nrg_chddr2_a)

5. Indicator description

Indicators	Objective	Target area
Area (m²)		
Number of households		
Population		
Income (average per capita income after tax, €)	Assess the socio-economic level of a neighbourhood	
Employment rate	Share of people more likely to spend their day away from home	Share of the employed population in the working age population
Number of social housing units		
Share of tenants	Share of households with fewer incentives and less financial resources to renovate their home	Rented houses /(rented homes + houses occupied by the owner)
Share of households with one car or more	Share of households using a private car (mobility question)	
Share of population aged 0-17	Share of people more likely to spend their day away from home	
Share of population aged 65 and over	Share of people more likely to spend their day at home	
Average private household size	The larger the household, the more energy it will use (all other things being equal)	Exclude collective dwellings (religious communities, rest homes, orphanages, student or worker housing, hospitals and prisons)
Average age of inhabitants	Provides an indication of household structure. For example, older households are less likely to renovate their homes.	
Average rent for social housing	Housing costs for social housing recipients (municipal average)	
Dwelling units built before 1919	Housing quality indicator	
Dwelling units built between 1919 and 1945	Housing quality indicator	
Dwelling units built between 1946 and 1960	Housing quality indicator	
Dwelling units built between 1961 and 1970	Housing quality indicator	
Dwelling units built between 1971 and 1980	Housing quality indicator	
Dwelling units built between 1981 and 1990	Housing quality indicator	
Dwelling units built between 1991 and 2000	Housing quality indicator	
Dwelling units built between 2001 and 2011	Housing quality indicator	

Total number of dwelling units	Total	
Gas price (per kWh)	Comparison of energy price between cities	Gas prices for household consumers, second semester 2023, consumption from 20GJ to 199GJ
Electricity price (per kWh)	Comparison of energy price between cities	Electricity prices for household consumers, second semester 2023, consumption from 1000kwh to 2499kwh
Heating oil price (1500 l/year)	Comparison of energy price between cities	Price for the supply of 1500 litres of heating oil
Tertiary education	The more educated a population is, the more energy it consumes but the more it can be mobilized around environmental issues	Because of the difficulty of comparing education systems across countries, we look at the share of tertiary education (educational level following the completion of secondary education) in the total population aged 18+
Heating degree days		Average heating degree days 2019-2023
Cooling degree days		Average cooling degree days 2019-2023

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