



ProLight

D4.2: Survey analysis report

Publish Date 30-09-2023

D4.2

Authors: Michael Heidenreich (FHTW), Momir Tabakovic (FHTW),
Svitlana Alyokhina (FHTW), Daniel Bell (FHTW)



The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101079902.

Meeting Information

Project acronym	ProLight
Project full title	Progressive lighthouse districts serving as green district Gate towards Leadership in Sustainability
Call	CL4-2021-RESILIENCE-01-32: Social and affordable housing district demonstrator
Grant number	SEP-210789191
Project website	
Coordinator	Momir Tabakovic (FHTW)

Deliverable No.	D4.2
Deliverable nature	Report
Workpackage (WP)	WP4
Task	T4.2
Dissemination level ¹	Public
Due date	30-09-24
Number of pages	40
Keywords	Survey
Authors	FHTW
Contributors	ADEPORTO, BI, CluBE, EDP NEW, MATERIALIA, GLK, 4ER, PLANET IDEA, GAIA, TFI, UNIVAASA, EURAC, KOZANI, VOAS, ESCI
Due date of deliverable	30-09-24
Actual submission date	25-09-24

¹ PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)



Document history

V	Date	Beneficiary	Author
V1	23-08-24	FHTW	Michael Heidenreich
V2	16-09-24	FHTW	Momir Tabakovic, Daniel Bell
V3	24-09-24	FHTW	Svitlana Alyokhina, Daniel Bell

Summary

The survey responses indicate a growing awareness of sustainability among urban residents, especially in areas with active initiatives like the Social Affordable Housing Initiative. However, 20% of residents remain uncertain about their knowledge, highlighting the need for continued educational efforts. There is a clear demand for regular updates on project progress, particularly from those involved in refurbishment projects, to make informed and timely decisions.

In Gernika, the primary motivation for residents joining Renewable Energy Communities (RECs) is the financial benefit of reduced energy costs. This aligns with broader findings that cost savings are a key driver for participation in renewable energy initiatives. Although ProLight does not yet have direct energy-saving actions in the mobility sector, some RECs have introduced measures such as e-bikes and e-scooters to promote sustainable transportation.

Perceptions of energy efficiency vary by location. Residents in areas like Vienna, Matosinhos, and Gernika, where energy-saving measures are more advanced, report higher satisfaction with living quality and cost savings. In contrast, in Kozani, Vaasa, and Milan, where such measures are still in planning, energy efficiency is viewed as less critical. This suggests that tangible benefits increase the perceived importance of energy efficiency.

Finally, the analysis reveals that Renewable Energy Community (REC) approaches deliver quicker financial benefits compared to long-term investments in building efficiency measures. Overall, transparent communication and regular updates are essential for maintaining resident engagement and satisfaction, particularly in addressing financial incentives and energy savings.

Disclaimer

This publication reflects only the author's view. The Agency and the European Commission are not responsible for any use that may be made of the information it contains.



Table of Contents

Document history	3
Summary	3
Disclaimer	3
Table of Contents	4
1. Structure of the deliverable	5
2. Methodological approach	5
2.1. Common awareness aspects.....	5
2.2. Performed interviews.....	6
3. Survey results	6
3.1. Collated responses from the demo districts	6
3.2. SWOT analysis of surveys	30
Matosinhos (PT) & Kozani (GR)	32
Milan (IT) & Vaasa (FI)	35
Vienna (AT) & Gernika (ES).....	37
3.3. Consolidated synthesis.....	39
4. Conclusion	40



1. Structure of the deliverable

To enhance the acceptance, engagement, and sustained impact of investor interventions—and to improve the replicability of outcomes in demonstration (demo) districts—this task focuses on evaluating key dimensions related to the interventions. Specifically, T4.2 aims to assess the influence of direct exposure to large-scale demonstrations of clean technologies and sustainable energy solutions on the attitudes up to behaviors of the users involved. Our recent surveys of interrelated ProLight Tasks are strategically interconnected, each examining distinct yet complementary elements that contribute to the overarching goals of the project:

- **T2.2 (Framing the site ecosystems):** This survey captures the perspectives of local residents and the approaches of district leaders, particularly in relation to the expected technical implementations. It also explores the underlying motivations driving the project's development.
- **T2.4 (Benchmarking the planning and implementation processes):** This phase addresses the planning process, grounded in leading partly circular refurbishment practices. The findings will be consolidated into a publishable report, offering key insights to maximize the effectiveness and scalability of the demo district.
- **T4.2 (Socio-economic aspects of performed interventions):** This research phase evaluates how exposure to clean technology demonstrations impacts user attitudes and behaviors, providing a socio-economic lens on the interventions.

Together, these surveys form an integrated approach to understanding the technical, social, and economic dimensions that contribute to the success of sustainable urban developments. The insights gained will support the district's progress and guide future projects aiming for impactful, and scalable solutions.

2. Methodological approach

This section emphasizes the chosen analysis, methodological rigor, and strategic focus on stakeholder and user engagement in Affordable Social Housing initiative, which **sound** directly with involved academic, societal and institutional social actors.

2.1. Common awareness aspects

The successful implementation of sustainable demo district solutions is contingent upon a complex interplay of local natural, institutional, economic, cultural, and social factors. Insights from demand-side (management) and renewable energy projects underscore the importance of genuine stakeholder and social actor engagement, information dissemination, and education as relevant success factors. Among these, public and partly private awareness of emerging technologies—specifically their availability, development, benefits, potential, and associated incentives—has proven essential to the success of these initiatives.

In this context, ProLight will underline and prioritize empirical analysis, focusing on observing and evaluating citizen and con+prosumer behaviors under realistic conditions. The given case study



analysis aims to encompass a broad spectrum of sustainable demo district solutions, considering neighborhood, socio-economic, and technical dimensions.

2.2. Performed interviews

The district surveys will partly be conducted through personal, face-to-face interviews and partly via online inquiries. This method ensures an in-depth exploration of participants' responses, allowing for a more nuanced understanding of their perception. By personally and digitally administering each survey, the interviewers guarantee up to a certain extent that questions are fully understood and appropriately answered, while also tailoring the survey to the relevance of the respondent's experience by selectively omitting irrelevant questions in in-depth discussions among the T4.2 team. This tailor-made approach ensures a high level of data quality and comprehensiveness, providing critical insights for the broader project objectives.

3. Survey results

3.1. Collated responses from the demo districts

The given report intends to maximize the acceptance, responsiveness, and persistence of investor interventions and implications on building-users, and to enhance the replicability of outcomes in the demo districts, this task will assess the dimensions related to these interventions. T4.2 seeks to identify how direct exposure to major demonstrations of clean technologies and sustainable energy solutions influences the attitudes and behaviors of the involved users. As part of the T4.2 survey, we've gathered responses from **7 households in Vienna (AT)**, **10 dwellings in Gernika (ES)**, **5 interviews in Vaasa (FI)**, **1 selected household in Greece (GR)**, **12 households in Milan (IT)**, and **9 dwellings in Matosinhos (PT)**.

1. How much would you say you understand about sustainability?



Figure 3.1 Responses Received on Sustainability Knowledge



In our survey, over 80% of residents indicated they have at least a moderate understanding of sustainability, while the remaining 20% are uncertain about their knowledge on the subject.

Preliminary Results: The given responses highlighted a growing awareness and understanding of sustainability concepts among urban residents, particularly in areas where sustainability initiatives are actively promoted. However, the 20% of residents who are uncertain about their knowledge reflects the ongoing need for targeted educational efforts to ensure a more comprehensive understanding across the entire population such as the Social Affordable Housing Initiative². This alignment suggests that while progress has been made, there is still work to be done to fully engage all residents in sustainability efforts.

2. Do you think that climate change will be a problem for future generations, assuming no action is taken now?

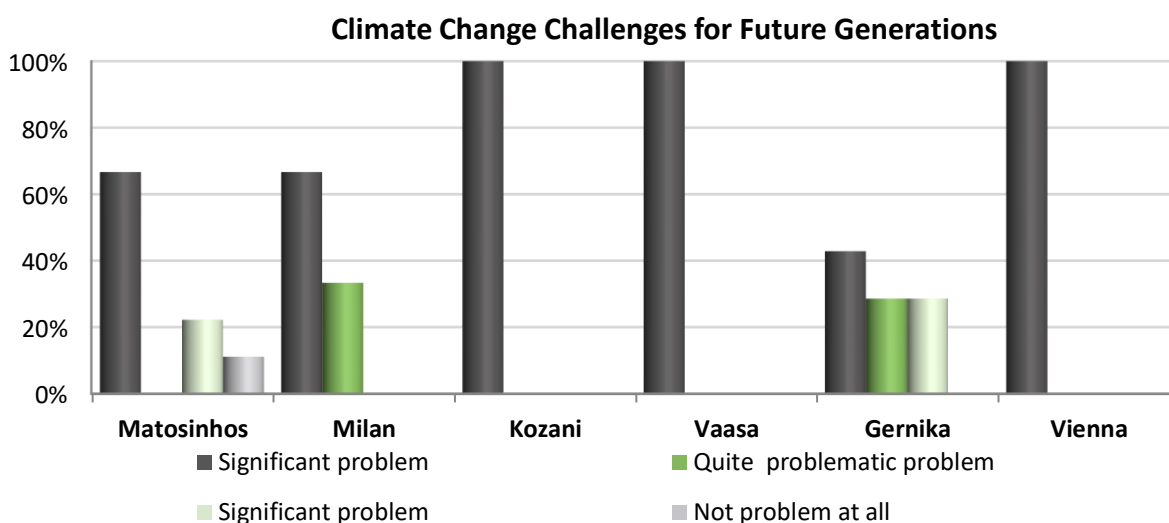


Figure 3.2 Responses on Climate Change Challenges for Future Generations if No Action is Taken Now

In response to our survey on the challenges of climate change for future generations, if no action is taken now, approximately 75% of residents in the demo districts and 85% in the renewable energy communities expressed significant concern. Only 2.3% in the demo districts and 5% in the renewable energy communities were uncertain about their stance.

Preliminary Results: There is a strong demand from community members and residents for regular updates on the Social Affordable Housing Initiative. These updates should provide more detailed information related to the survey's second inquiry, reflecting the community's interest in understanding and addressing the implications of climate change.

² Norris, M., & Byrne, M. (2017). Housing in Europe: Innovations in Social, Affordable and Co-operative Housing. This book examines the socio-economic impacts of different housing models across Europe, including the implications for social inclusion and community development.



3. Which of the following should take action to reduce carbon dioxide?

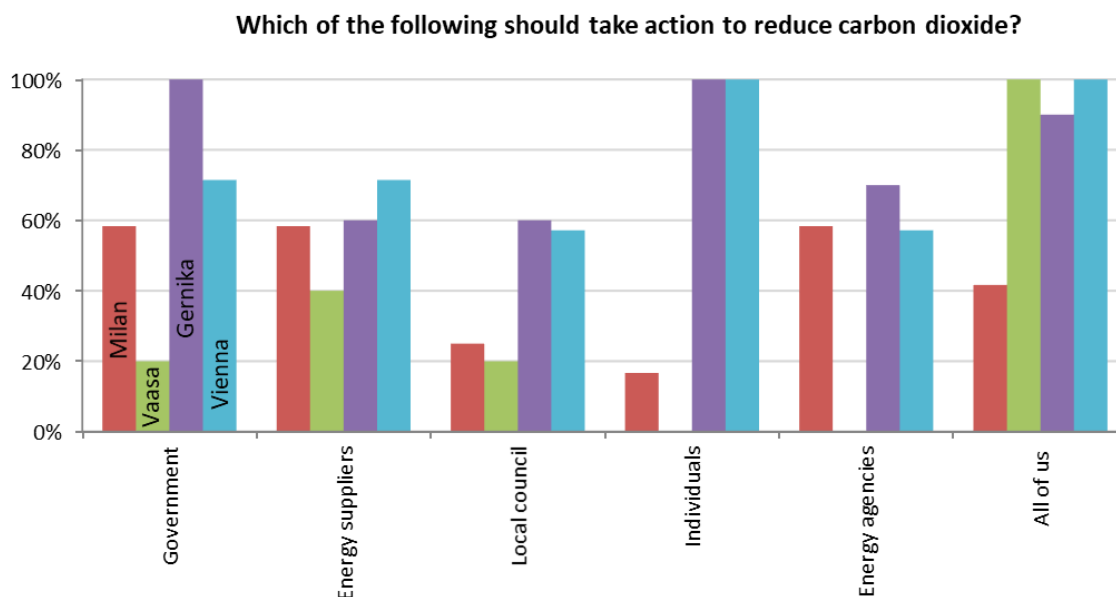


Figure 3.3 Responses on Which Societal Groups and Organizations Should Take Action to Reduce Carbon Dioxide

In our survey on which societal groups and organizations should take action to reduce carbon dioxide emissions, respondents highlighted a range of public and private entities, as detailed in figure 3.3.

Preliminary Results: Community members and residents expressed a strong commitment to the belief that everyone is responsible for reducing their CO2 footprint. They emphasized the importance of implementing affordable measures to achieve this goal, reflecting a shared sense of responsibility and willingness to contribute to carbon reduction efforts.

4. How is your knowledge about “energy efficiency”?

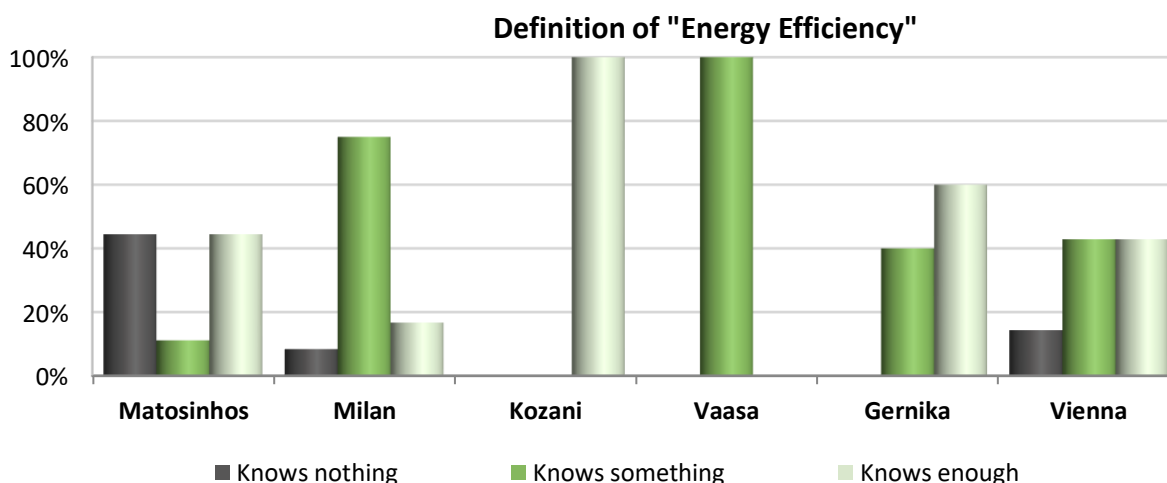


Figure 3.4 Responses Received on the Definition of "Energy Efficiency"

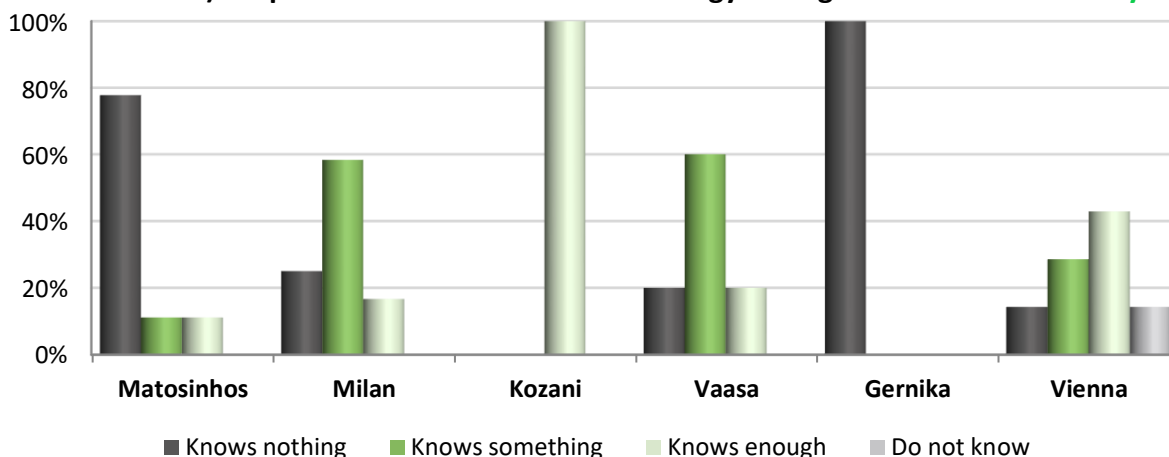
Survey responses regarding knowledge about "energy efficiency" show a clear correlation with the level of education and the amount of information received.



Preliminary Results: Community members and residents emphasized the relevance of this knowledge, particularly in relation to their involvement in refurbishment projects. They highlighted the importance of being well-informed to actively participate and make informed decisions in these initiatives.

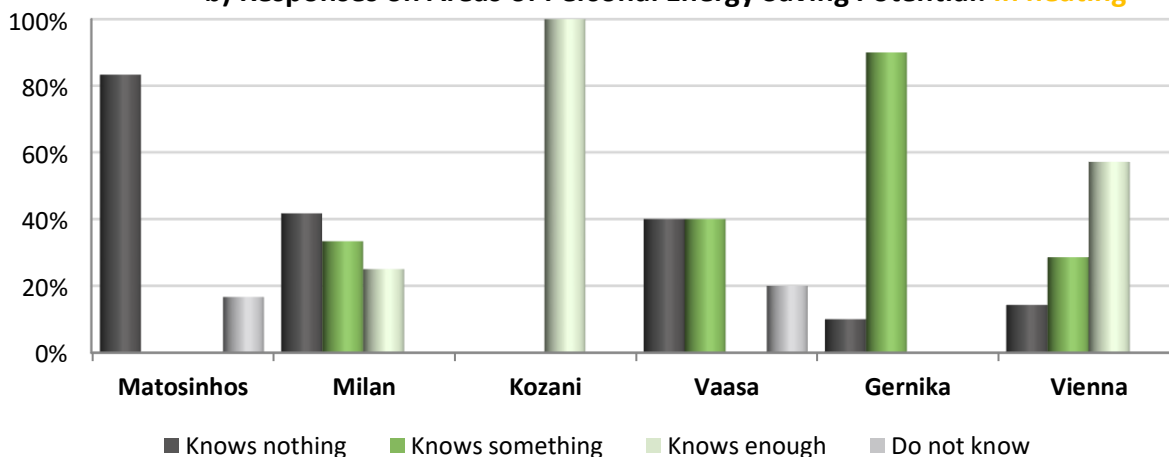
5. Do you think you have personal energy saving potential?

a) Responses on Areas of Personal Energy Saving Potential: **In electricity**



In our survey, around 72% of respondents believe their personal actions in electricity usage can positively influence the global warming problem, while 28% do not share this belief.

b) Responses on Areas of Personal Energy Saving Potential: **In heating**



Regarding heating, over 80% of respondents feel their actions can increase their energy-saving potential, with around 20% uncertain about their stance. These respondents are willing to change their behavior and feel they have sufficient knowledge to do so. However, the other half lacks the necessary knowledge on how to effectively make these changes.

Preliminary Results: For both electricity and heating, a significant motivation for joining Renewable Energy Communities (REC), such as the one in Gernika (see figure 3.5a), is the potential to reduce energy costs. Residents are particularly interested in becoming "shareholders of a PV system," highlighting a greater focus on cost savings rather than merely reducing electricity consumption, which



also applies to electric heating in Southern European countries. This underscores the importance of financial incentives in driving community participation in renewable energy initiatives.

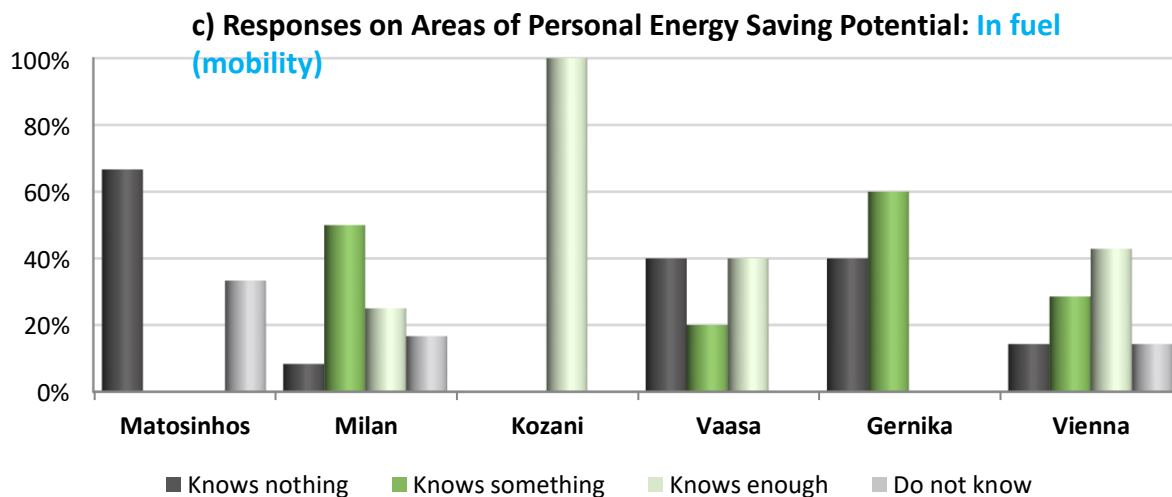


Figure 3.5a-c Responses Received on Areas (electricity a), heating b), and In fuel (mobility) c)) of Personal Energy Saving Potential

In the area of mobility, more than half of the respondents indicated that climate change is starting to directly impact their lives.

Preliminary Results: Currently, there are no specific ProLight demo actions directly aimed at maximizing savings in the mobility sector. Instead, the focus has been on raising awareness. For example, some Renewable Energy Communities (REC) have introduced initiatives such as supplying e-bikes or e-scooters. These measures highlight the potential for sustainable mobility options but do not yet encompass broader, direct actions to enhance energy savings in this area.



6. Which options do you think are linked with energy efficiency in buildings?

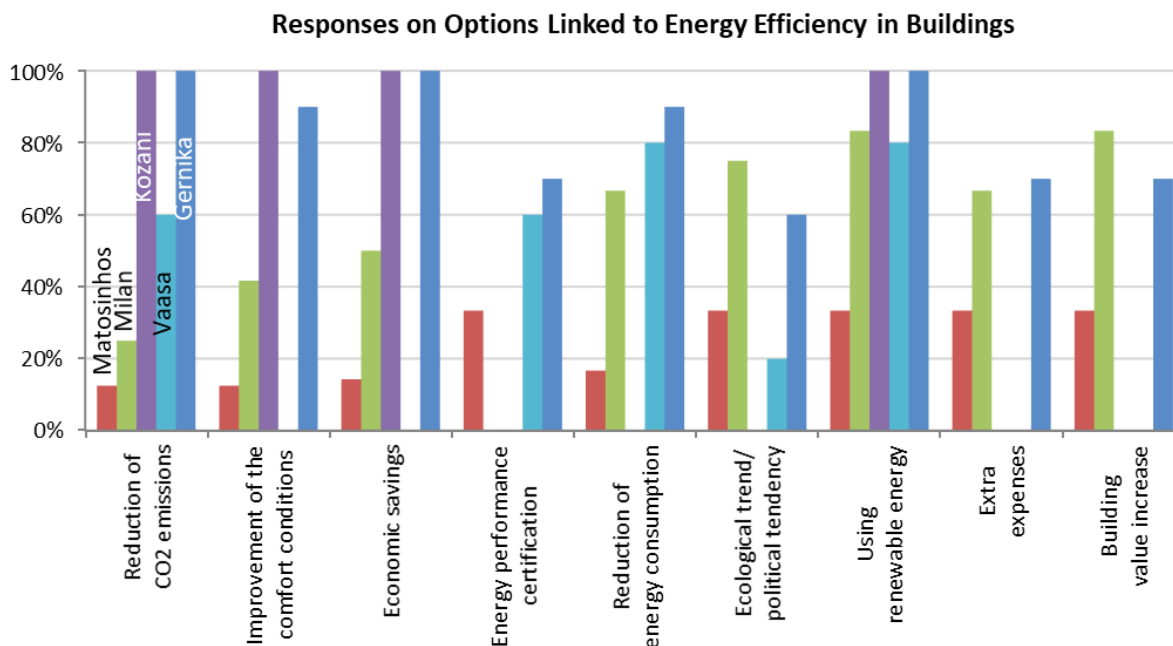


Figure 3.6 Responses Received on Options Linked to Energy Efficiency in Buildings

Responses on energy efficiency options in buildings reflect a growing awareness of their potential for savings, balanced against the quality and affordability of related services.

Preliminary Results: Interviewees recognize that energy efficiency is crucial for mitigating global warming. The importance of various enabling options is illustrated in figure 3.6, highlighting the community's understanding of how these measures contribute to overall environmental goals.

7. In your opinion, at the current quality of living, how important is energy efficiency?

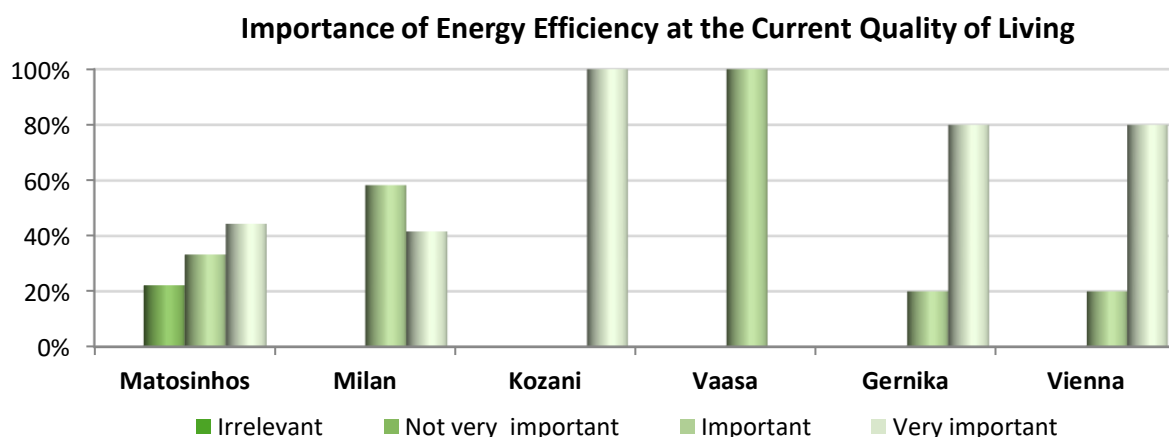


Figure 3.7 Responses on the Importance of Energy Efficiency at the Current Quality of Living

In response to the question, "At the current quality of living, how important is energy efficiency?" approximately 50% of residents in the demo districts and 35% in the renewable energy communities



expressed that they find it irrelevant or not important. However, the perceived importance of energy efficiency tends to increase as implementation progresses.

Preliminary Results: The analysis indicates that a high percentage of respondents who consider energy efficiency irrelevant or not important are in areas where implementation is still in the planning phase. For instance, in Vaasa and Milan, where measures are not yet fully implemented, the perceived importance is low. Conversely, in Vienna and Gernika, where implementation is further along, residents report a certain degree of satisfaction with the current quality of living and energy cost savings. This suggests that the perception of energy efficiency's importance grows as tangible benefits from implemented measures become evident.

8. What is the main reason that drives you to save energy?

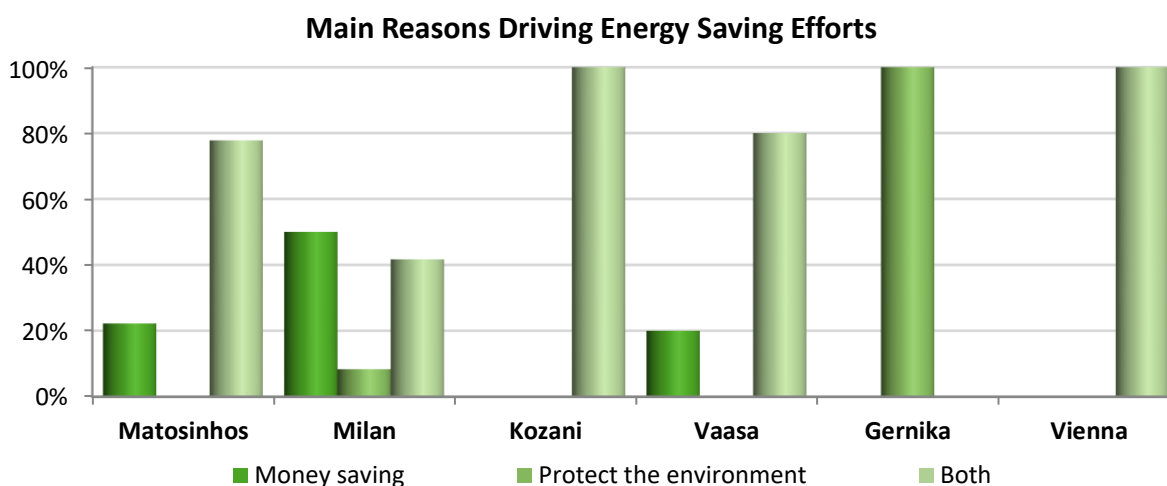


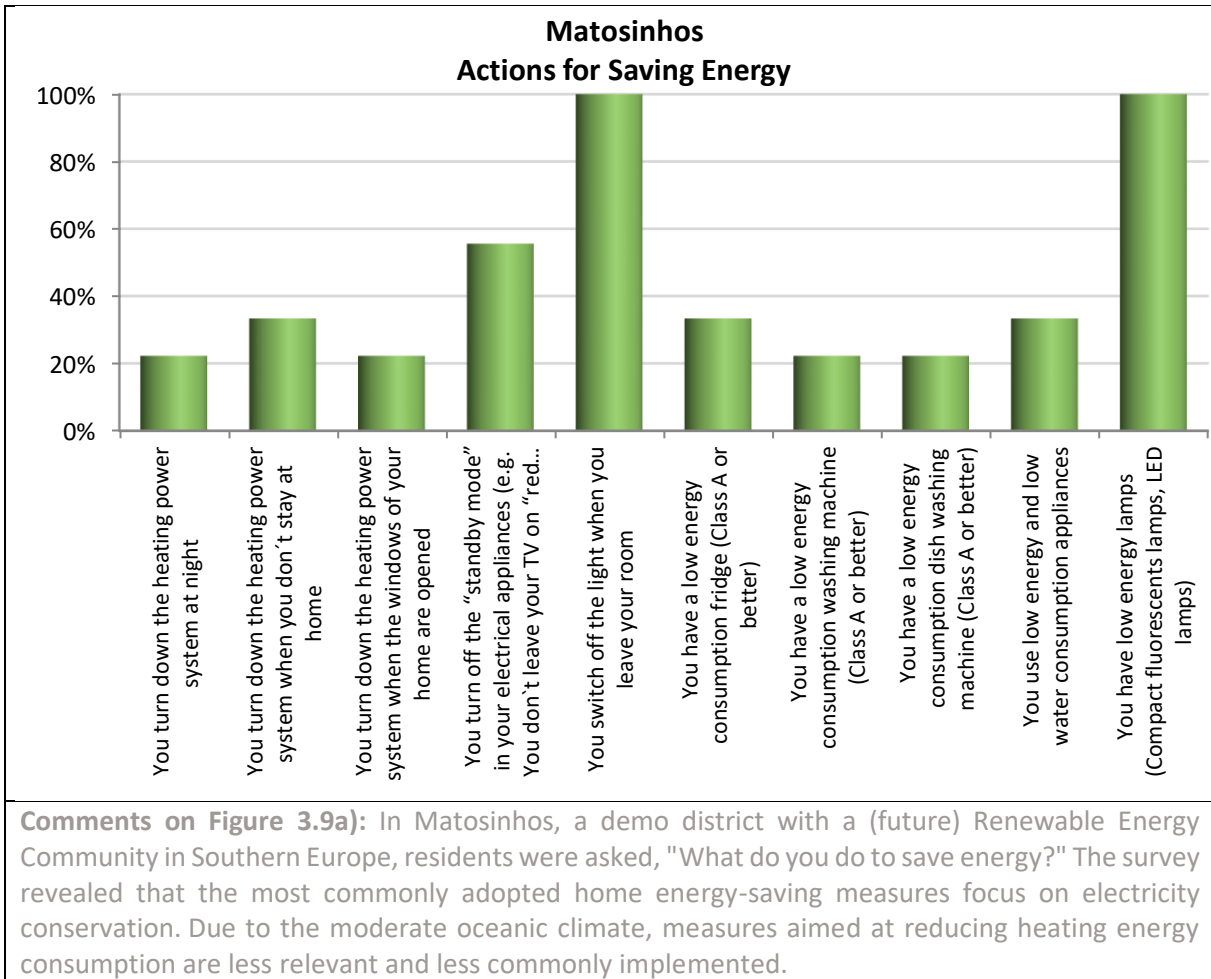
Figure 3.8 Responses on the Main Reasons Driving Energy Saving Efforts

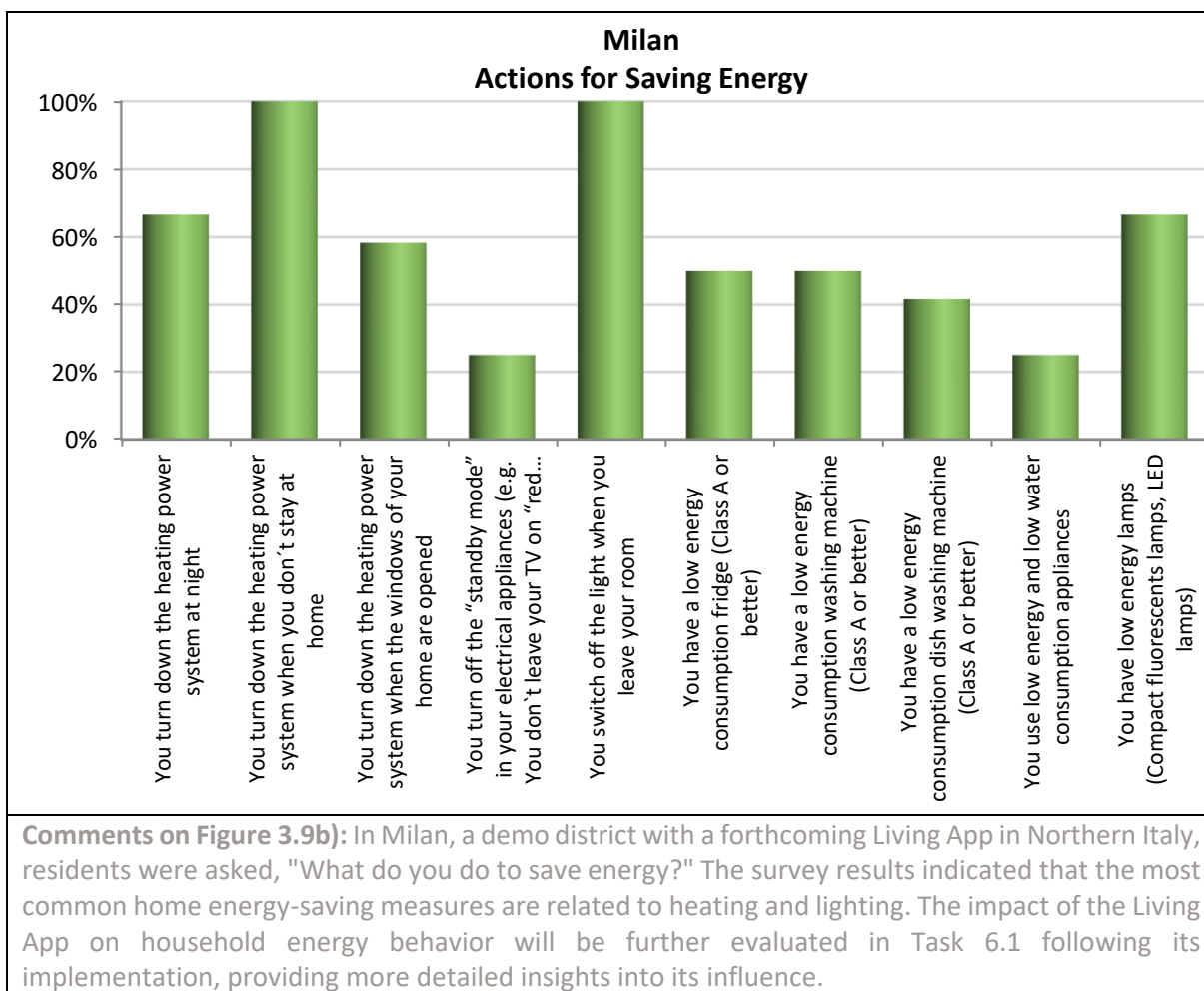
In response to the question, "What is the main reason that drives you to save energy?", approximately 61.4% of residents in the demo districts and 90% in the renewable energy communities cited money savings and environmental protection as their primary motivation. The notable 30% difference between these groups can be attributed to the differing life cycle cost (LCC) models and the pay-off timelines for interventions.

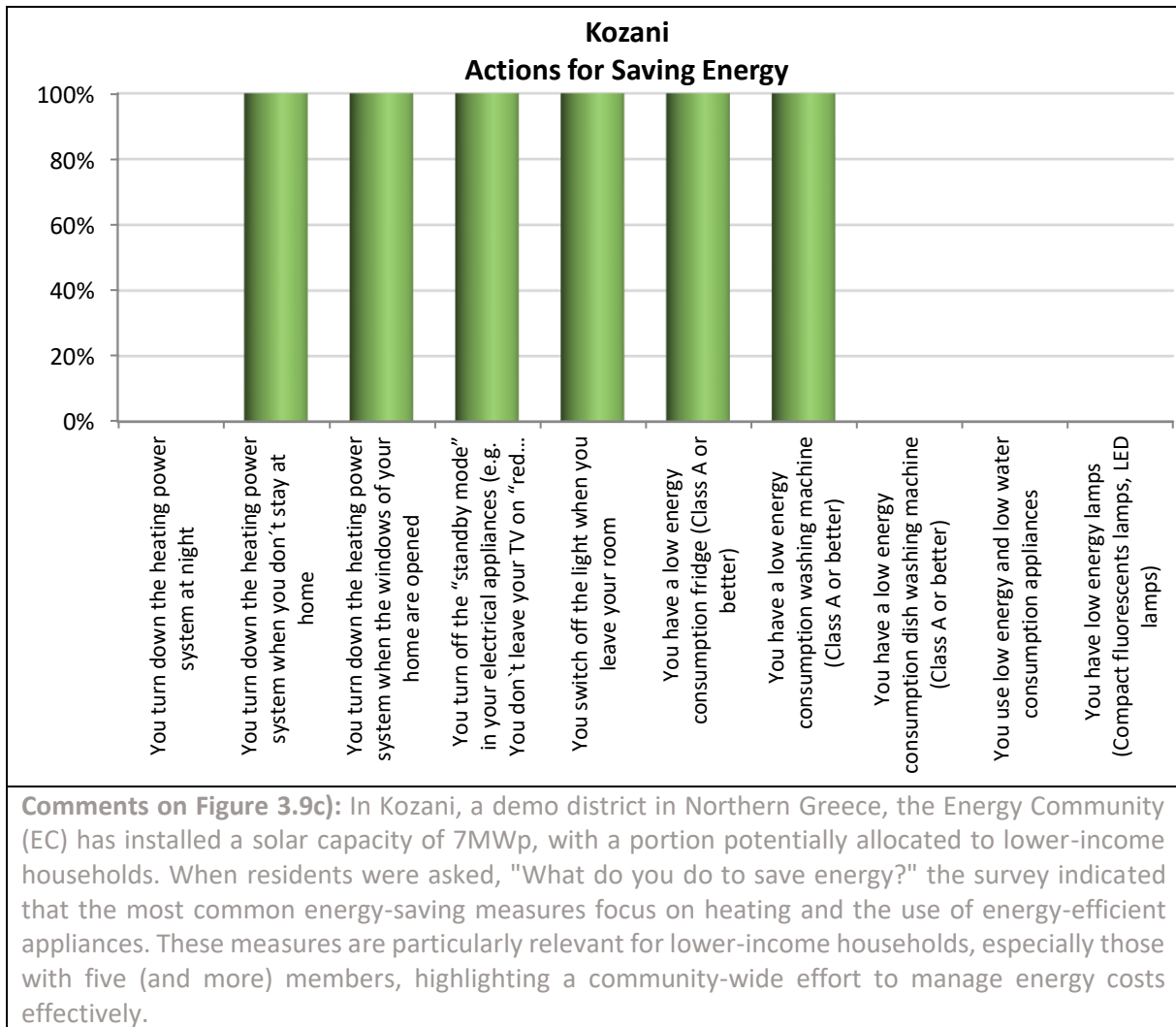
Preliminary Results: Considering LCC models and intervention pay-offs, it is evident that approaches in renewable energy communities (REC) offer more immediate cost savings. In contrast, investments in building efficiency measures in demo districts tend to provide benefits over the long term. This difference explains the varying levels of motivation among residents in these areas, with REC residents seeing quicker financial benefits.

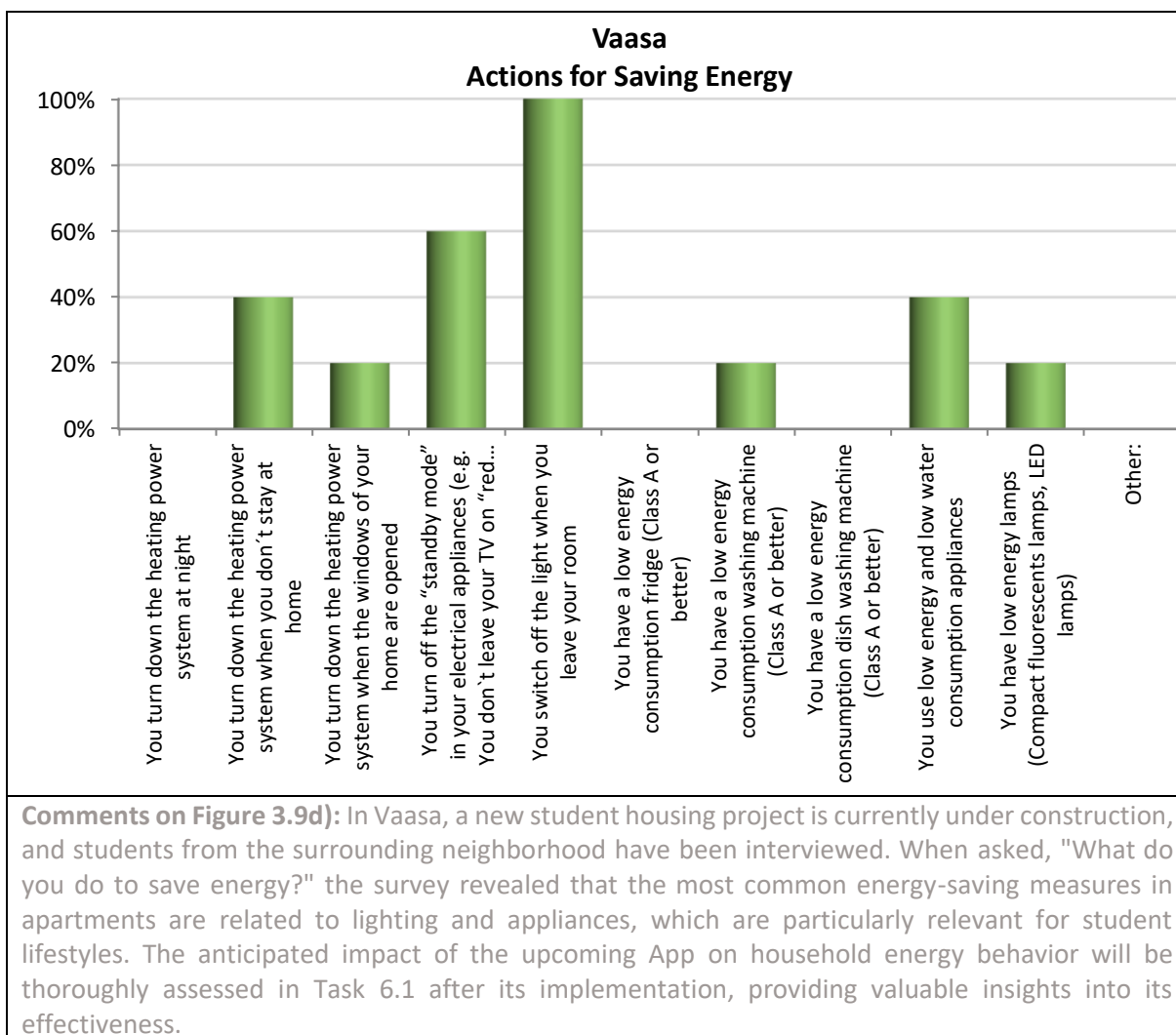


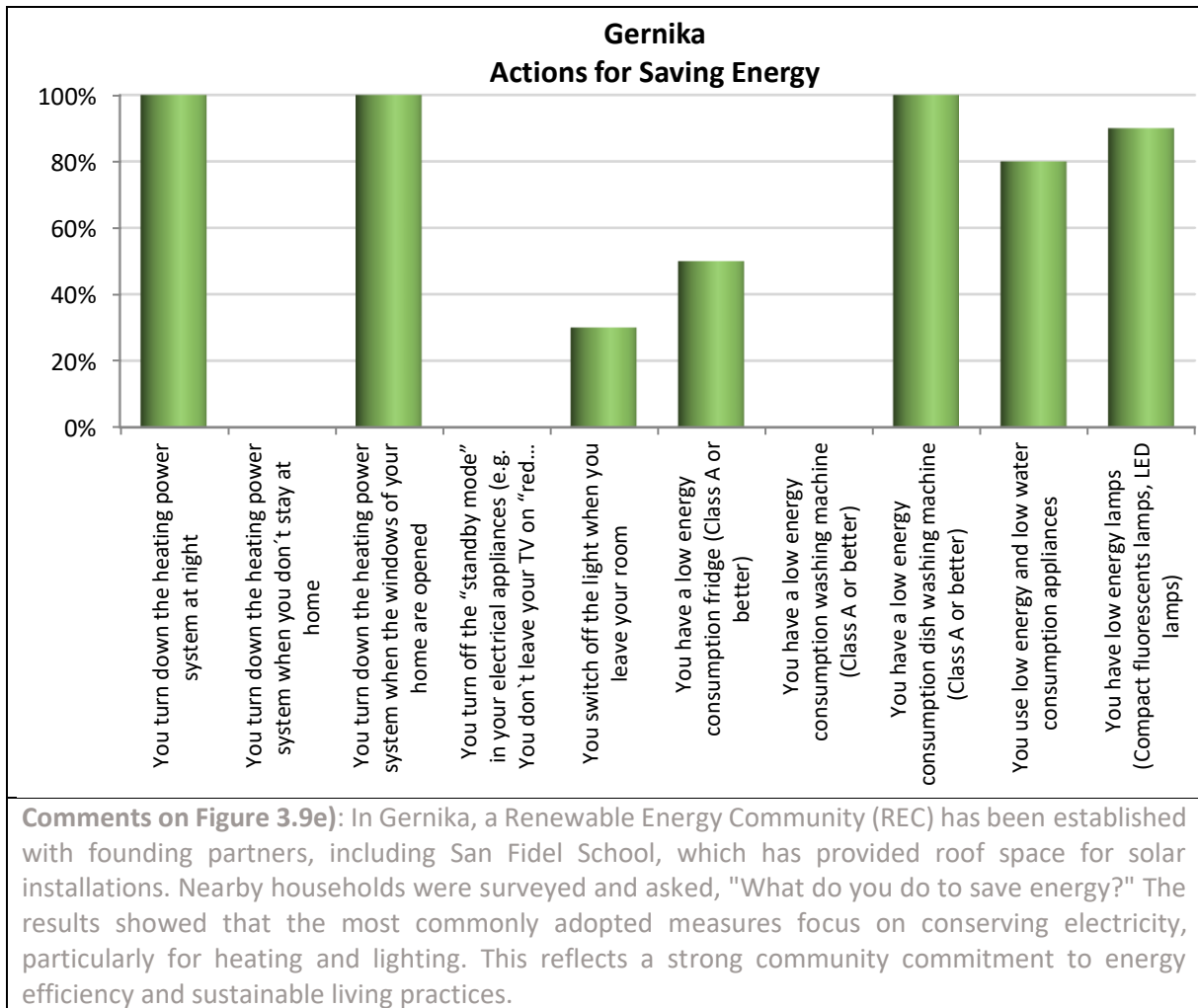
9. What do you do to save energy? Mark all that apply.











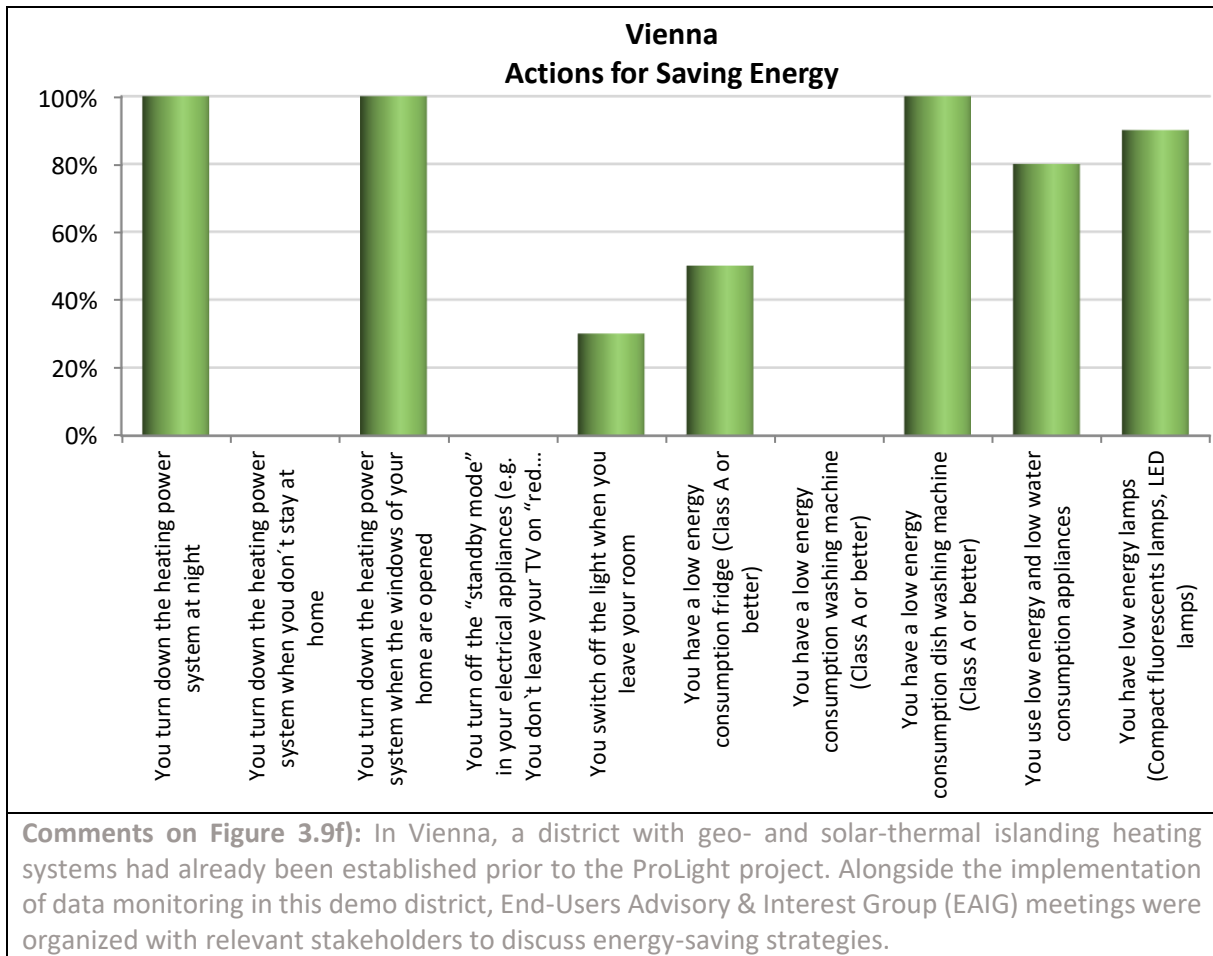


Figure 3.9a) to f) Responses on Actions for Saving Energy: Mark All That Apply

10. In regard to renewable energy, that is energy from the sun, wind, wood or other energy crops, what is your overall opinion of renewable energy?

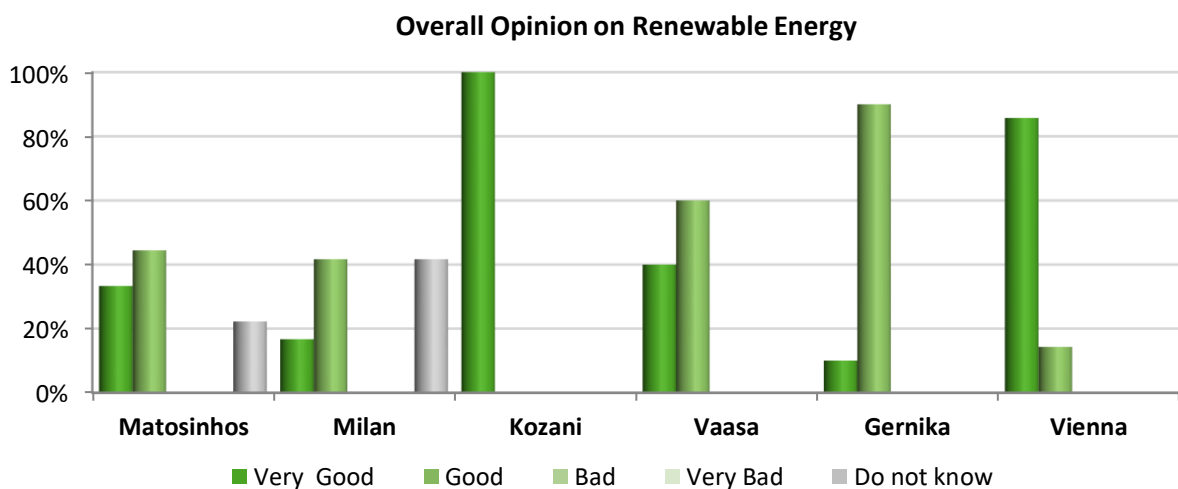


Figure 3.10 Responses on Overall Opinion on Renewable Energy

Across the six Demo Districts, 52.3% of residents expressed a very favorable view of renewable energy, with an additional 43.2% holding a positive opinion. Only 4.5% were uncertain about their stance. Among respondents from three Renewable Energy Communities, 25% have a very favorable view of renewable energy, 65% have a positive opinion, and 10% are uncertain. These **preliminary results** indicate that over 90% of respondents across both groups support renewable energy sources (RES). The variations in responses likely reflect differences in individual motivation and awareness levels.

11. What you accept to pay more for using renewable energy rather than conventional energy?

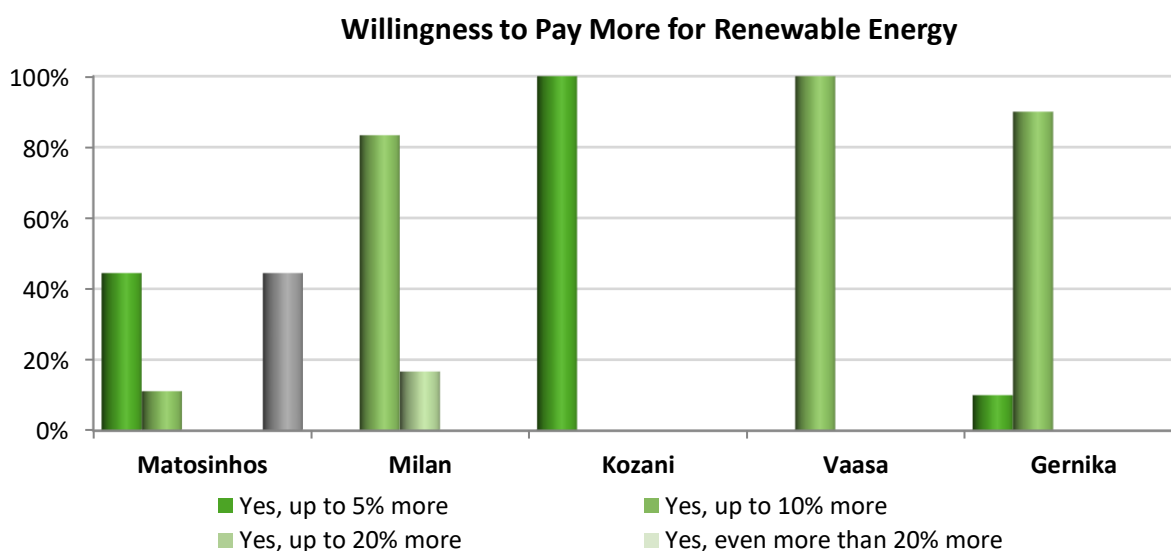


Figure 3.11 Responses on Willingness to Pay More for Renewable Energy

More than 80% of those interviewed expressed a very favorable view of paying a premium for renewable energy. Furthermore, over 40% indicated they would be willing to pay up to 10% more for green energy. However, green-pricing programs have uncovered a notable discrepancy between respondents' stated willingness to pay (WTP) and their actual payment behavior.

Preliminary results: A separate survey under T2.2 revealed that 40% of cases face difficulties with energy bills, surpassing the 10% energy poverty threshold. This highlights that a significant motivation for joining Renewable Energy Communities (REC) is the potential to reduce energy costs.



12. Do you think your personal activities may influence the global warming problem in a positive way?

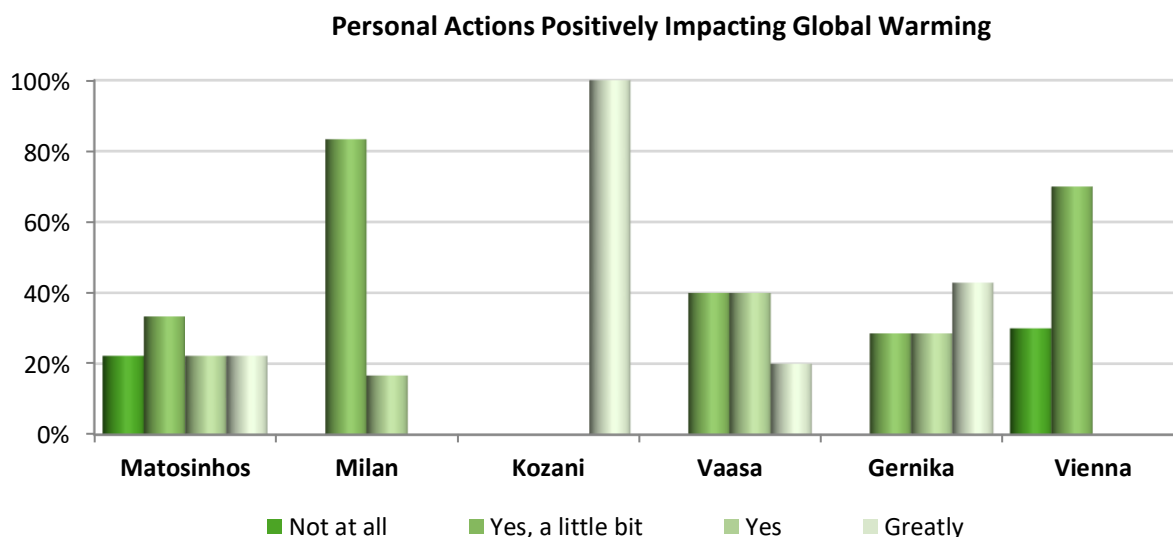


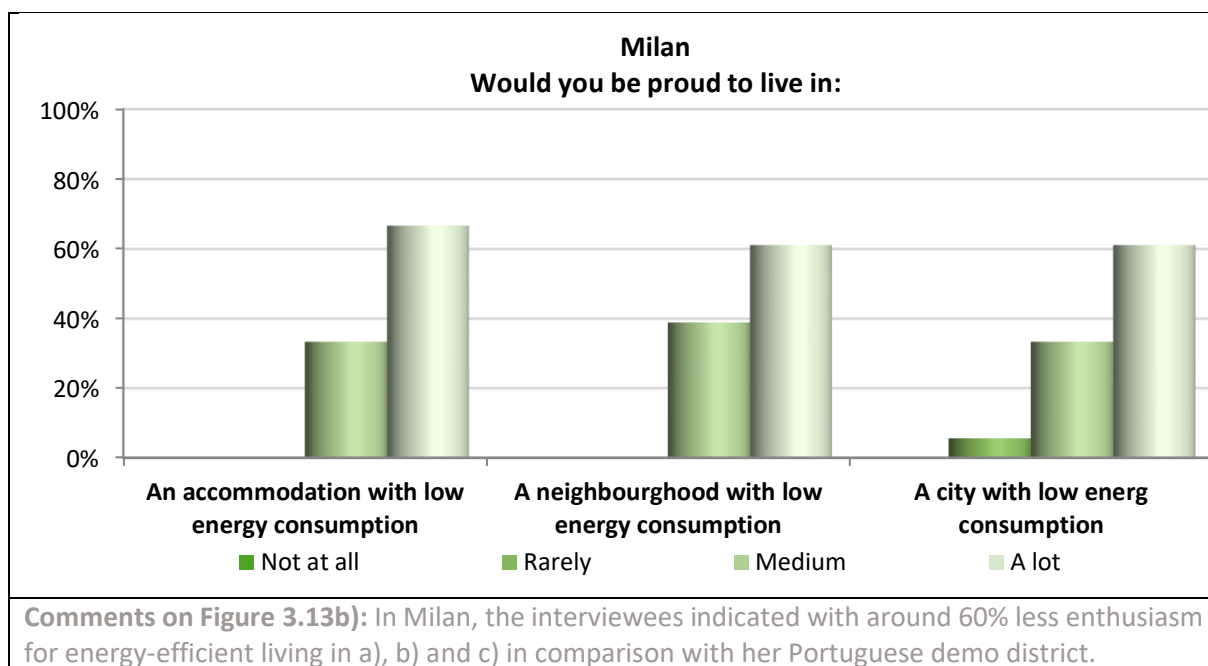
Figure 3.12 Responses on Personal Actions Positively Impacting Global Warming

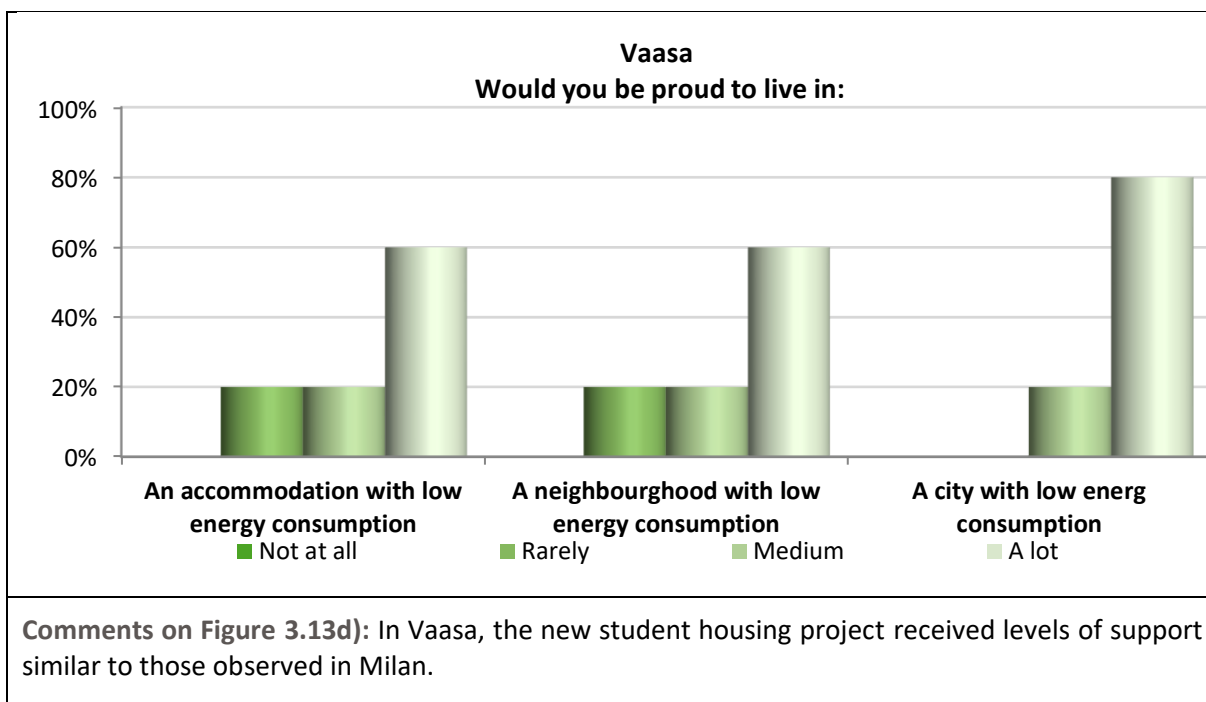
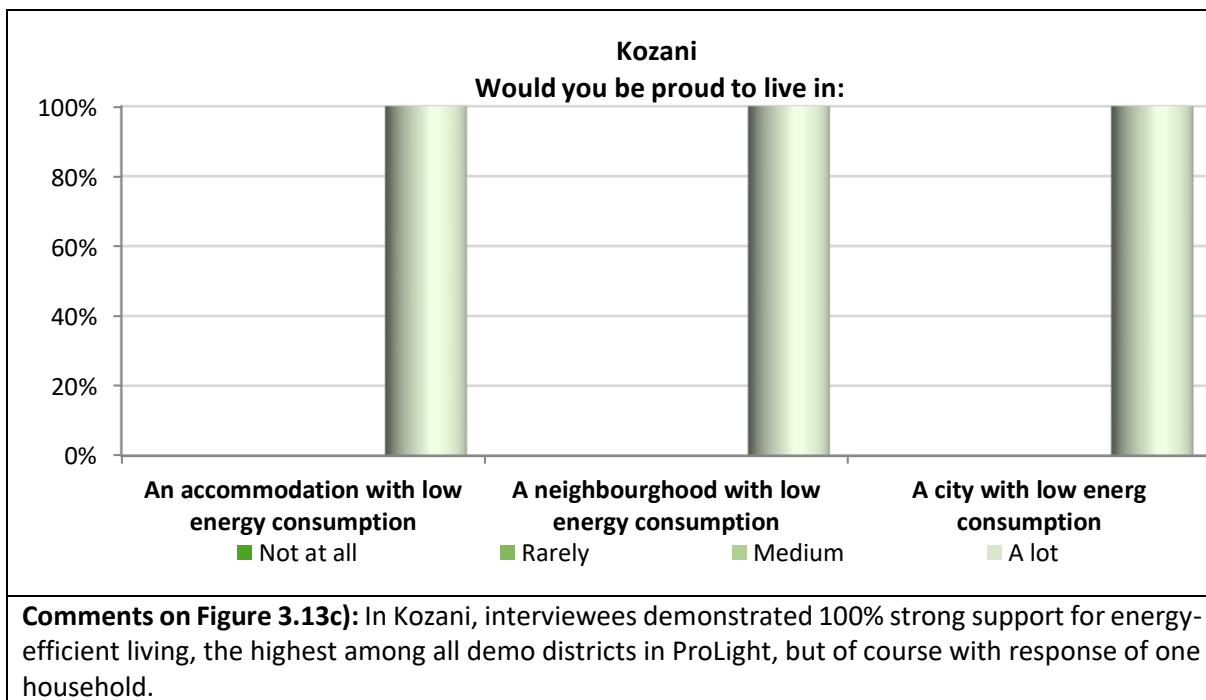
Our inquiry asked, "Can Personal Actions Positively Impact Global Warming?" The results indicate that approximately 34% of residents in the demo districts and 25% in the renewable energy communities believe their actions have a medium to significant impact. However, the majority perceive personal actions as having little to no relevance in combating global warming.

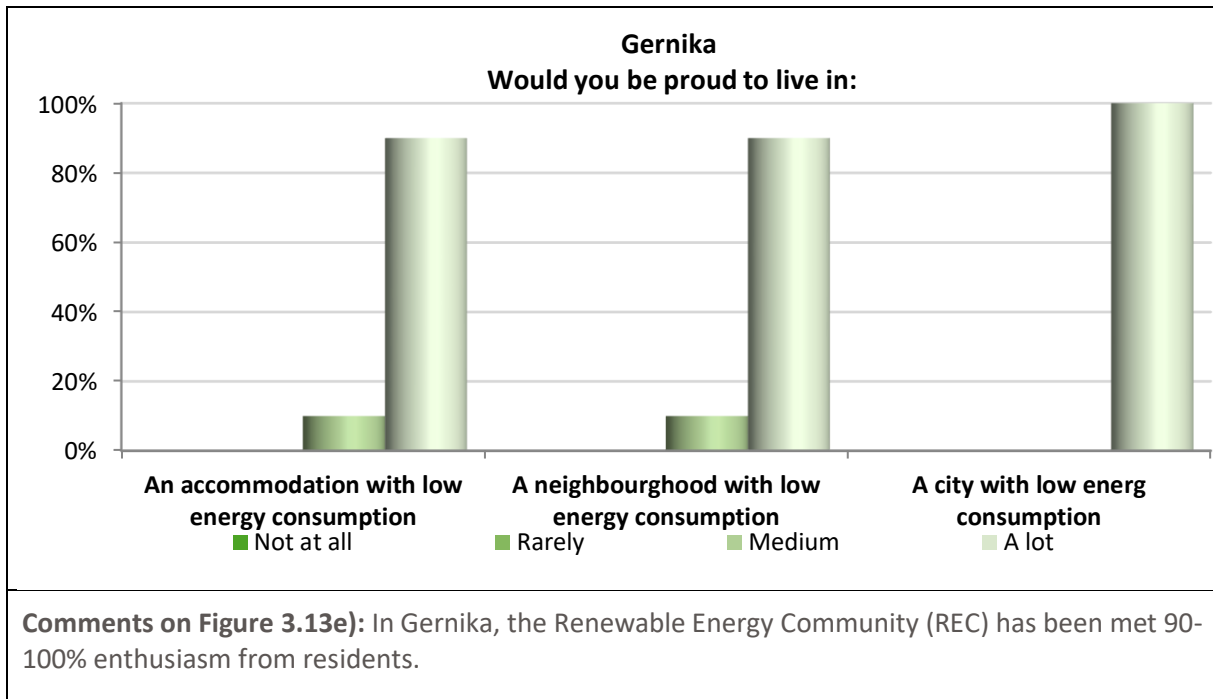
Preliminary findings also reveal a strong demand from community members for regular updates on the Social Affordable Housing Initiative and associated personal actions. The analysis suggests that increased awareness measures could enhance understanding of how individual actions affect personal CO2 footprints.



13. Would you be proud to live in a) An accommodation with low energy consumption, b) A neighborhood with low energy consumption







Comments on Figure 3.13f): In Vienna, the degree of enthusiasm has not been inquired.

Figure 3.13a-f: Responses on Personal Preferences of living in an accommodation or/and in a demo district or city

14. Do you live or work in a pilot district area (ProLight Preferential Refurbishment Area)?

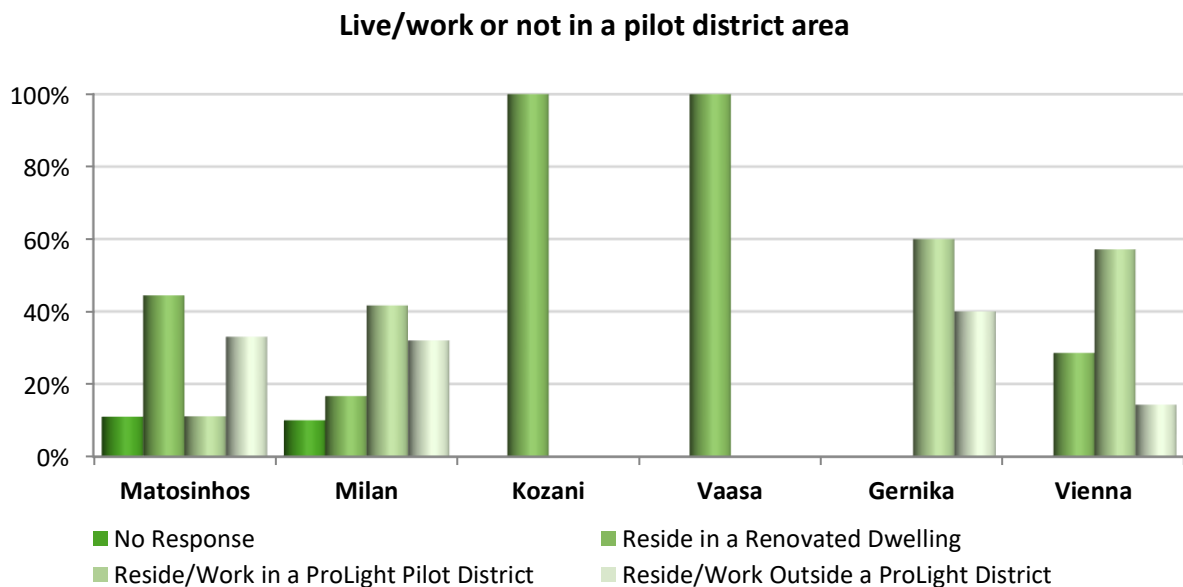


Figure 3.14 Responses on Living/Working or not in ProLight Demo Districts



Our inquiry asked about residents' and workers' perspectives on living or working in ProLight Demo Districts. The significance of different factors influencing these choices is shown in Figure 3.14.

Preliminary results underscore the community's awareness of their role within the Social Affordable Housing Initiative.

15. What expectations do you have for the ProLight project?

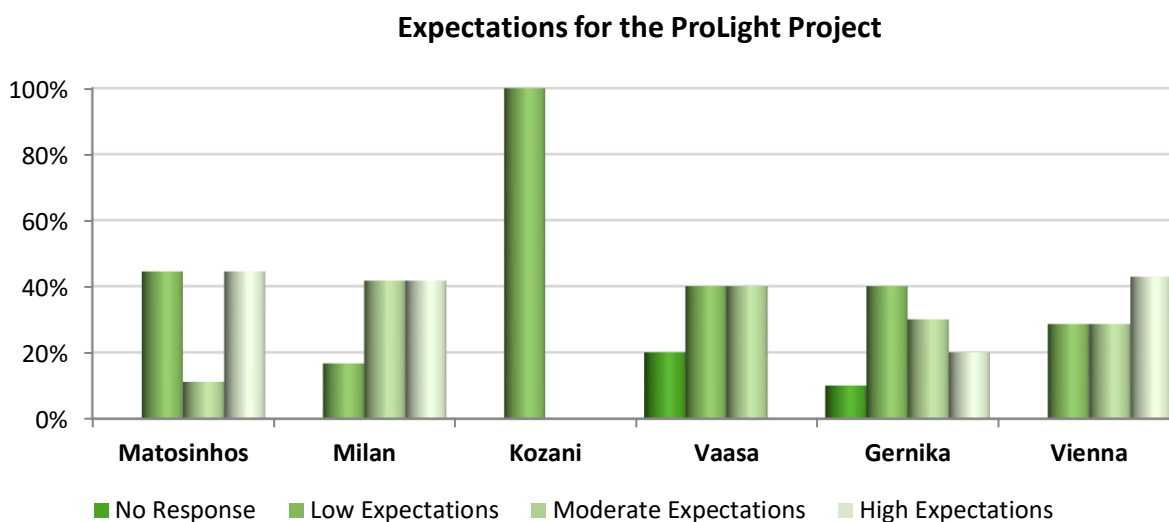


Figure 3.15 Responses on Expectations for the ProLight Project

Preliminary results show that around 35.1% to 37.8% of residents in the demo districts, and 45% to 35% in the renewable energy communities, believe their actions can meet moderate to high expectations.



16. How is the degree of satisfaction about the done measures?

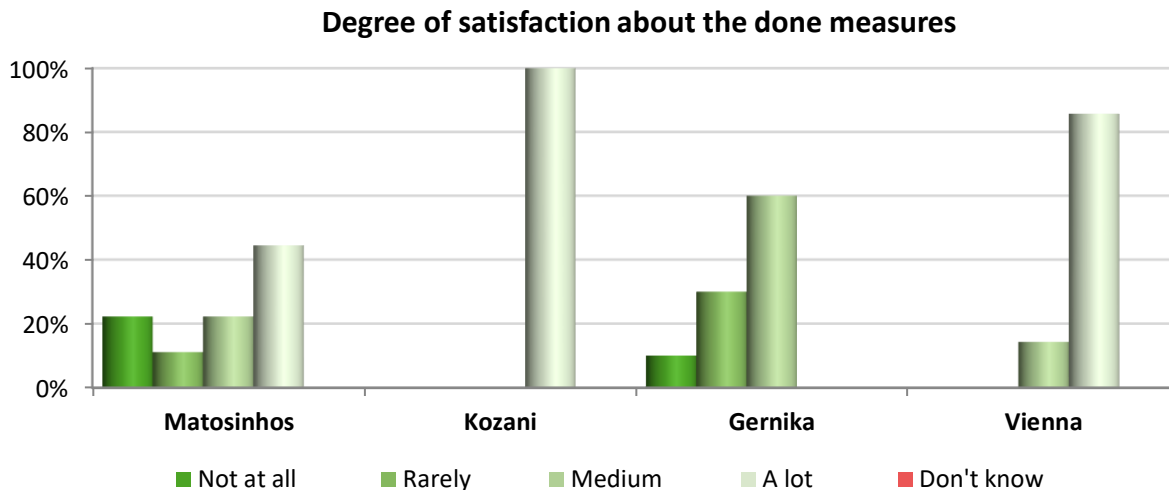


Figure 3.16 Responses on degree of satisfaction about the done measures

Please note that two demo districts are not applicable as the digital services of the ProLight project will commence at a later date. In the remaining demo districts and renewable energy communities, over two-thirds of respondents reported a medium to high level of satisfaction with the project. However, satisfaction levels tend to be lower when interventions have been more recent.

Preliminary results: The data suggests a correlation between satisfaction and the amount of information provided to community members and residents. There is a clear request from these groups for regular updates on the progress of the project, indicating the importance of transparent and consistent communication. Community members & residents request regular updates on project progress.

18. What is the size of your home/flat?

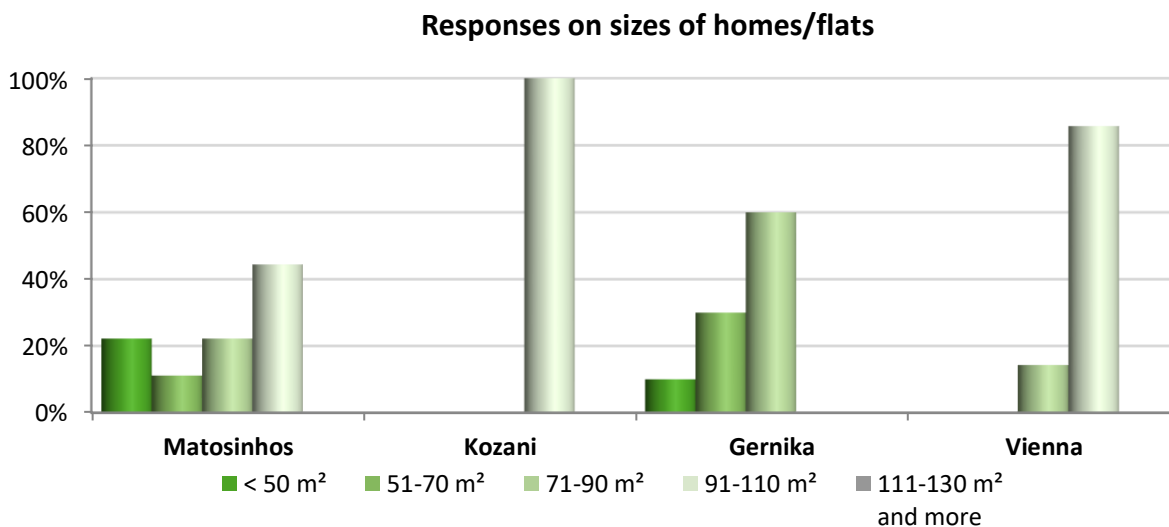


Figure 3.18 Responses on sizes of homes/flats

Figure 3.18 outlines the range of home and flat sizes, spanning from smaller units of 50m² to larger spaces exceeding 130m². Please note that data from Milan (IT) and Vaasa (FI) are not applicable in this context.

19. How long have you been living in your home/flat?

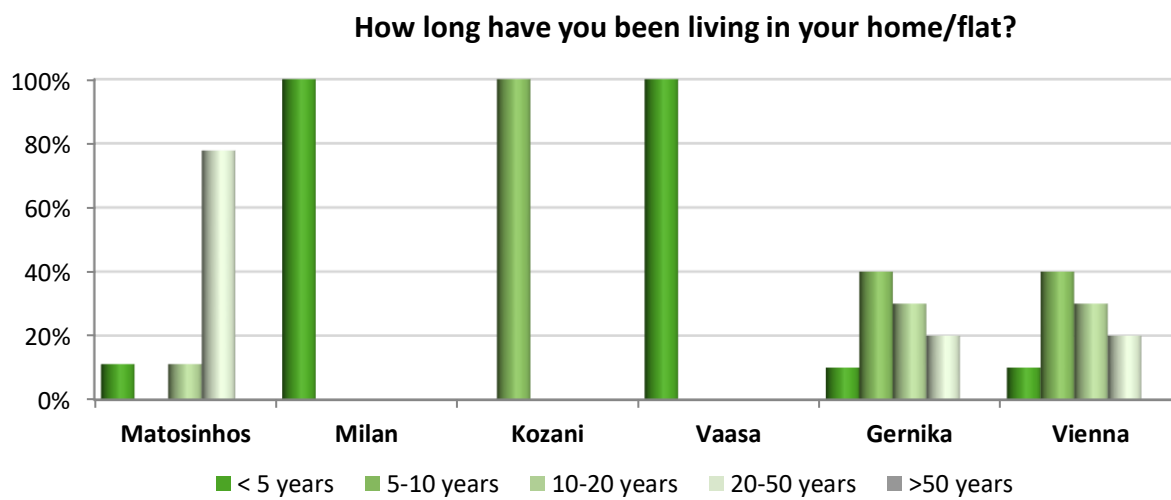


Figure 3.19 Responses on How Long Have You Been Living in Your Home/Apartment

Figure 3.19 details the duration of residency in homes or apartments, showing that approximately 69% of residents have lived in their current homes for less than 10 years, around 14% for 10 to 20 years, and up to 27% for more than 20 years.



20. Occupancy of the dwelling disaggregated by age groups

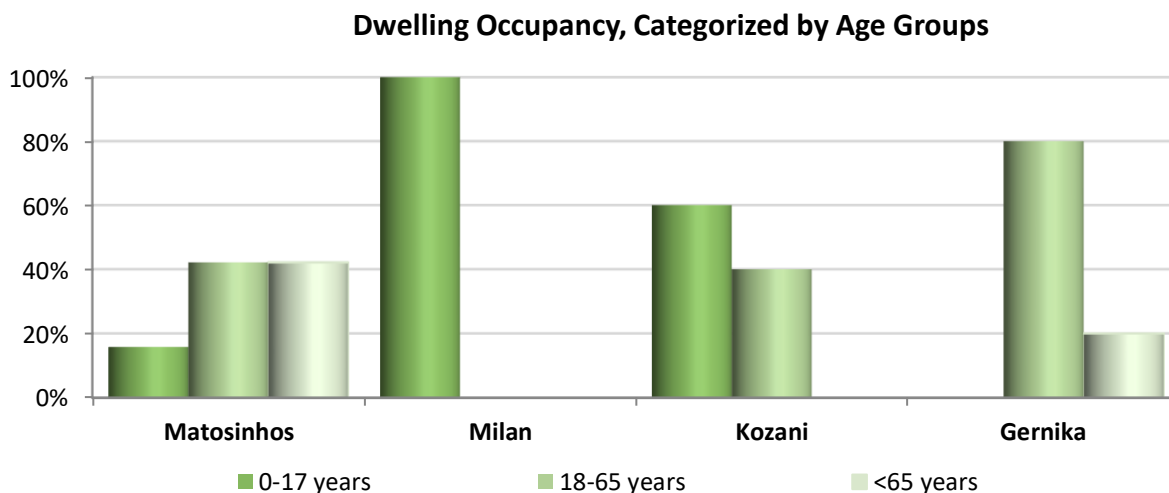


Figure 3.20: Responses on Dwelling Occupancy, Categorized by Age Groups

Figure 3.20 outlines dwelling occupancy categorized by age groups, with approximately 20% of occupants under 17 years old, around 51% between 18 to 65 years, and about 29% over 65 years. Please note that data from Vaasa (FI), due to new construction, and from Vienna are not applicable in this context.

21. Average indoor temperature approx. in your home

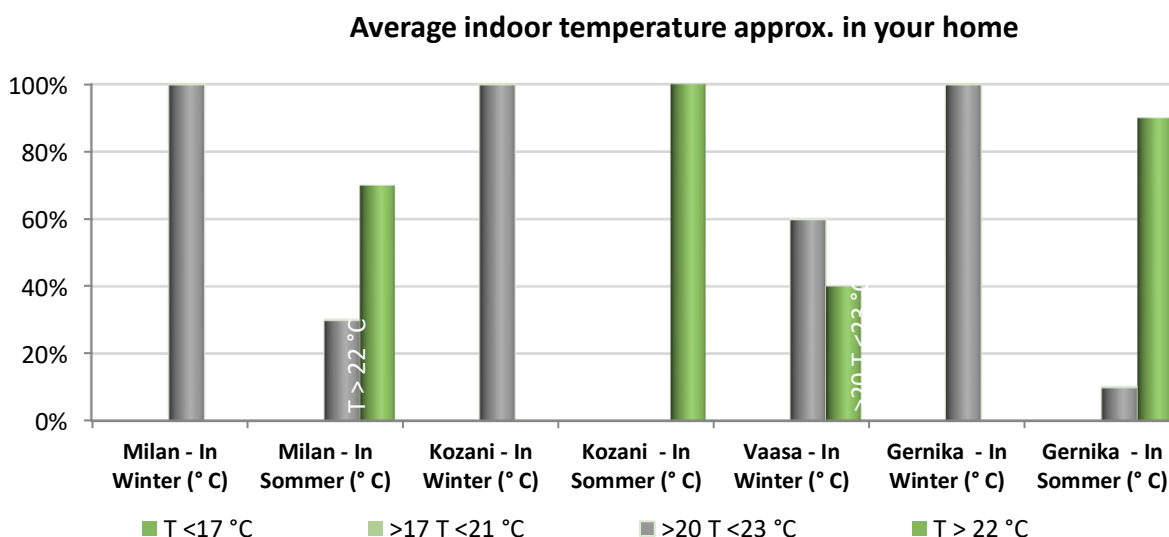


Figure 3.21 Responses on Average indoor temperature

Figure 3.21 details responses on average indoor temperatures, showing that approximately 92% of respondents maintain temperatures below 23°C in winter, while around 76% report temperatures



exceeding 23°C. Please note that summer data from Vaasa (FI) and data from Matosinhos (PT) and Vienna (AT) are not applicable in this context.

22. Do you know how much you spend on energy at home?

Responses to the question "Do you know how much you spend on energy at home?" are included in Deliverable D2.2, which contains the D2.2 - Master plan incl. the demo design frameworks.

23.1-Does it matter how your electricity is generated? .2-Does it matter how your heat is generated?

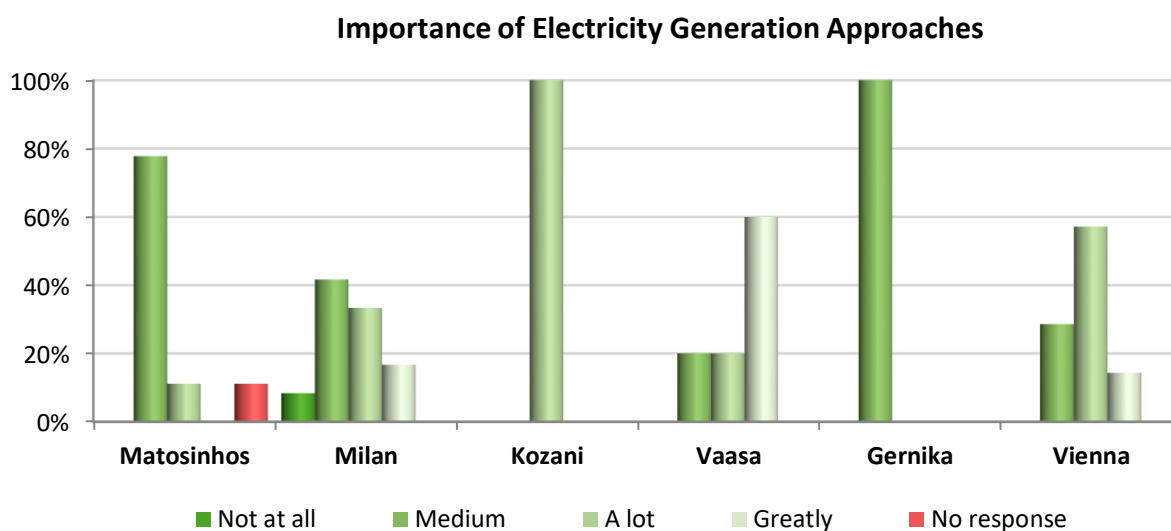


Figure 33.23.1 Responses on the Importance of Electricity Generation Approaches

In our demo districts, over 60% of respondents, and in our renewable energy communities (RECs), about 90%, expressed little to moderate concern about how electricity is generated.

Preliminary results: This limited interest in the technology itself is understandable, given that REC customers are more focused on the business model and their role as shareholders in local PV systems. For REC participants, being active partners in the energy trading process and enjoying cooperative membership are the primary benefits they value most.

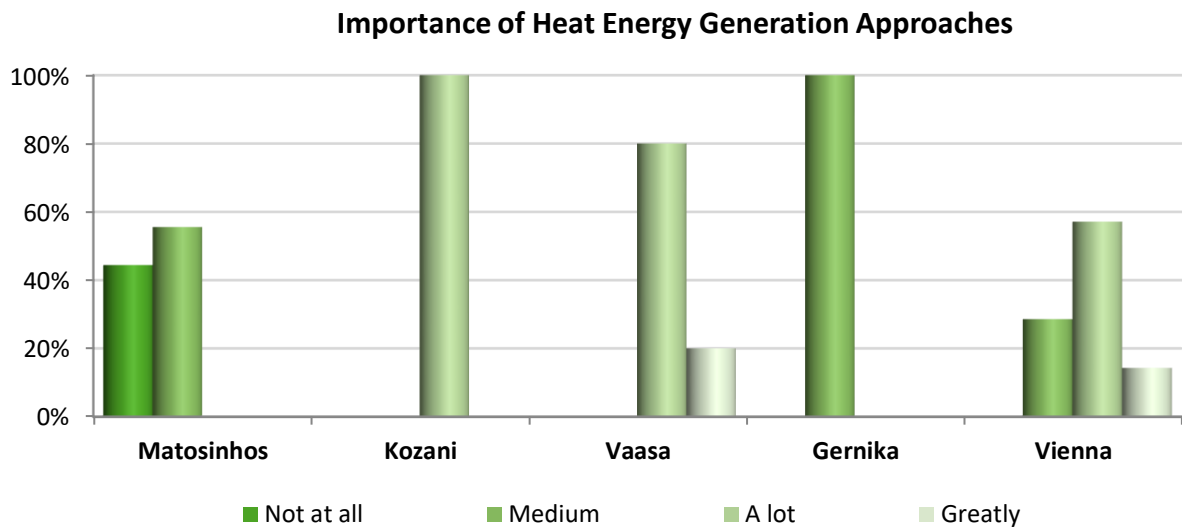


Figure 3.23.2 Responses on the Importance of Heat Energy Generation Approaches

In our demo districts, about 60% of respondents, and in our renewable energy communities (RECs), approximately 95%, expressed little to moderate concern about how heat energy is generated.

Preliminary results: This minimal interest in the specific technology used is understandable. REC customers often benefit from locally installed PV systems that supply solar electricity, which is commonly used for heating in southern Europe. Additionally, residents in Vaasa (FI) and Vienna (AT) show similar indifference, as district heating is generally well-regarded regardless of its energy sources.

24. Would you be willing to invest in retrofitting your building?

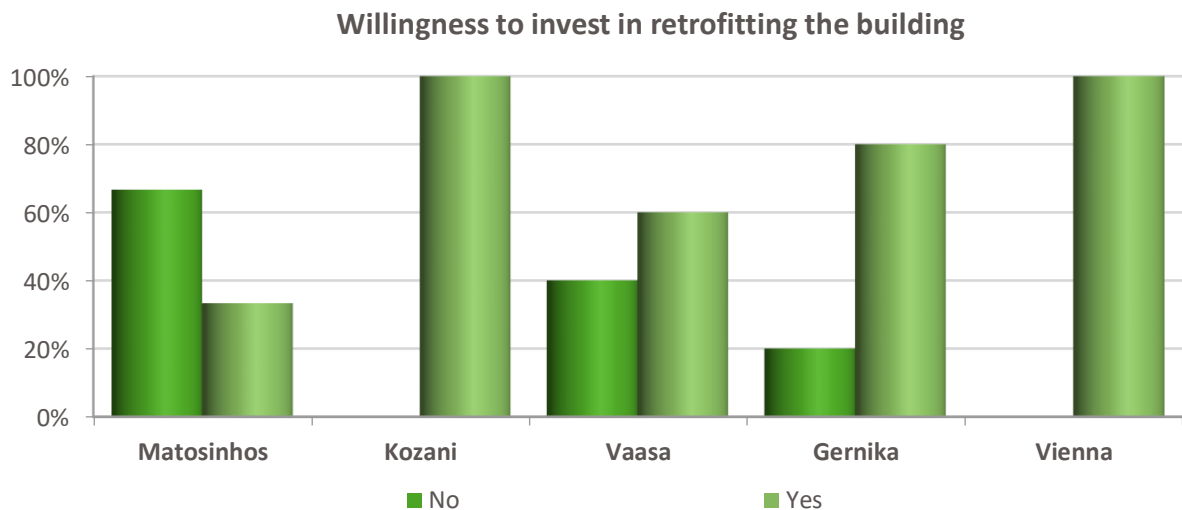


Figure 3.24 Responses on Willingness to Invest in Building Retrofitting



The results indicate that approximately 69% of residents in the demo districts and 60% in the renewable energy communities would be willing to invest in refurbishing their buildings.

25. Which improvements would you include in your building?

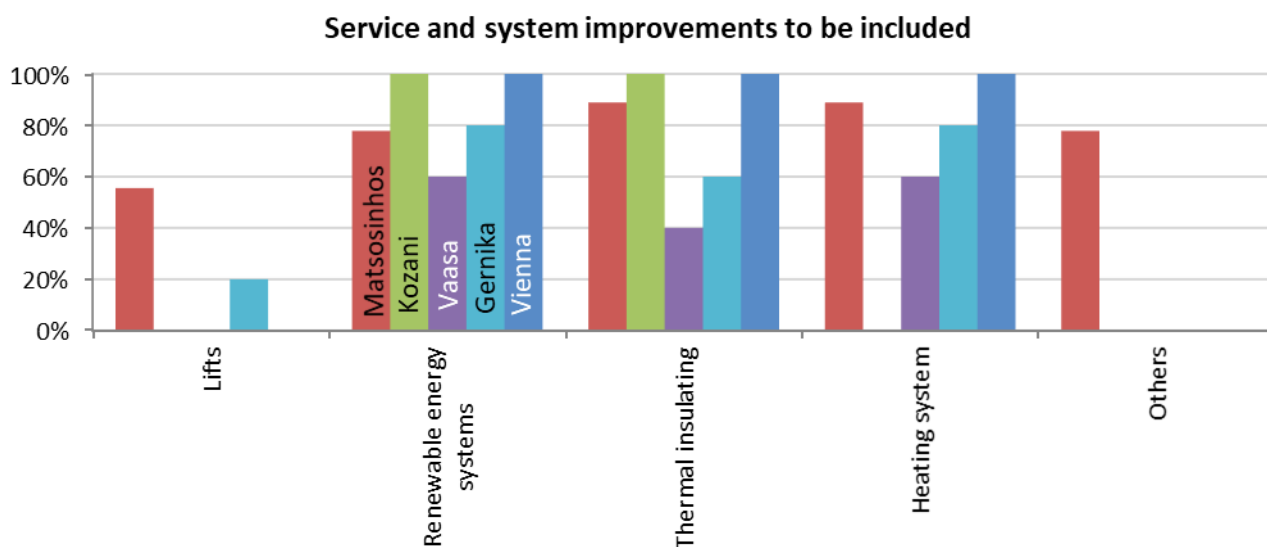


Figure 3.25 Responses on Resident Priorities for Building Improvements

Responses on energy efficiency options in buildings highlight an increasing awareness of the need for service and system enhancements, while also considering the balance between quality and affordability.

3.2. SWOT analysis of surveys

In line with part B of the Grant Agreement, "T4.2 intends to identify the consequences of the direct exposure to major demonstrations of clean technologies & sustainable energy solutions on the attitudes & behavior of involved users." Initially, a section on the consequences of these implementation exposures was planned. However, since D3.3 (Three Annual Implementation Reports) already provides detailed plans covering all aspects of the demonstration actions in the six demo districts—planning, design, implementation, operation, and maintenance—and T5.3 addresses user attitudes, motivations, and challenges through its Persona Templates, the T4.2 team has decided to enhance the related reports with a SWOT analysis given hereafter.

The research background of the given report aims to assess how direct exposure to major clean technology and sustainable energy demonstrations influences user attitudes and behaviors across the demo district twins. The demo district twins are connected by a common goal: to explore how clean technology and sustainable energy solutions can be scaled and adapted to diverse urban contexts. Despite geographic, cultural, and social differences, these districts face similar challenges, such as the need to raise energy literacy, engage communities, and overcome logistical hurdles. The following aspects have been considered in the three SWOT analysis types below:



- **Shared Stakeholder Engagement:** Across districts like Matosinhos (PT) and Kozani (GR), local stakeholders such as municipal bodies and housing cooperatives are crucial partners. These organizations play a central role in facilitating engagement, helping to translate technical solutions into locally relevant actions. Similar dynamics occur in Milan (IT) and Vaasa (FI), where community cooperatives or educational programs help bridge gaps between technical knowledge and citizen participation.
- **Community Attitudes and Energy Literacy:** Each district grapples with varying levels of energy awareness and literacy. In Vienna (AT) and Gernika (ES), efforts to directly interact with residents through door-to-door surveys reveal the need to tailor communication strategies to local contexts. This mirrors challenges in other demo districts, where increasing energy literacy is key to fostering long-term engagement.
- **Technological Adaptation and User Feedback:** The feedback gathered from one demo district informs the implementation in its twin. For instance, insights from Milan's citizen engagement activities in renewable energy workshops provide valuable lessons e.g. in terms of App utilizations for Vaasa, where similar approaches can be refined based on local response. This iterative process allows each district to adapt proven strategies while customizing them to their unique context.
- **Having mid-term expectations:** Resident fatigue from frequent surveys and unmet expectations about project outcomes is a shared concern. Whether in Matosinhos or Vienna, managing community expectations while maintaining long-term engagement is a priority. The districts can learn from each other about pacing interactions and setting realistic timelines for visible outcomes, reducing disengagement risks.
- **Comparative Analysis and Shared Learning:** The twins act as mirrors for one another, providing opportunities to compare the effectiveness of different strategies in similar scenarios. For example, the replication of survey methodologies or engagement activities across the twins allows for comparative analysis, with results in one district enhancing the approach in its twin.

These interconnection points create a feedback loop where insights, best practices, and challenges are continuously shared between the demo districts, strengthening the overall impact of the sustainable energy and clean technology demonstrations. The hereafter SWOT analysis framework evaluates the strengths, weaknesses, opportunities, and threats across the six demo districts, allowing for comparative analysis while acknowledging local specificities. The analysis includes:

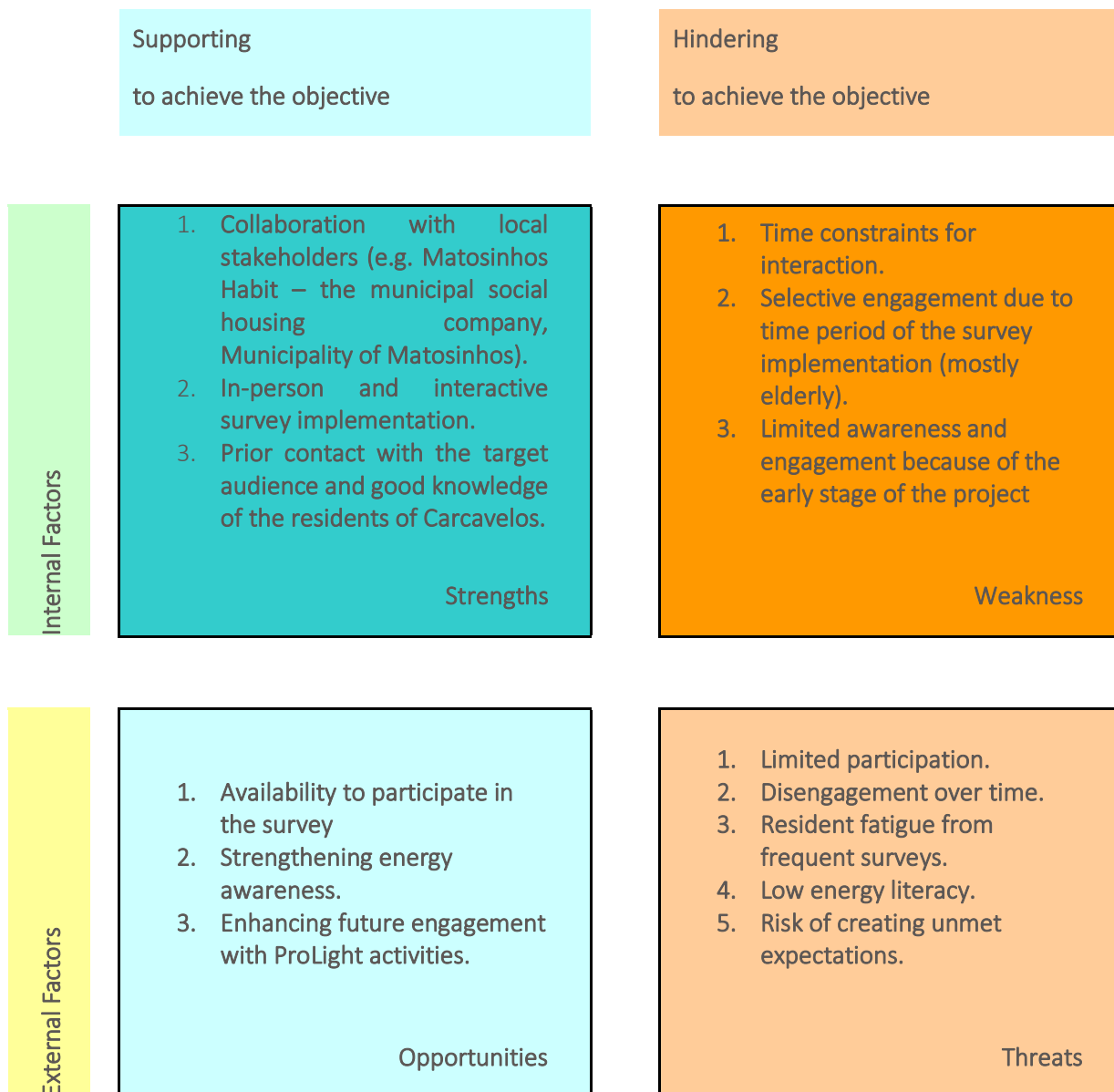
- **Internal Factors according to organizational attributes:** i) Supporting achievement: Collaboration with local stakeholders, in-person surveys, and prior knowledge of target audience. ii) Hindering achievement: Time constraints, selective engagement, and limited awareness due to early project stages.
- **External Factors according to environmental attributes:** i) Supporting achievement: Participation availability, strengthening energy awareness, and potential future engagement. ii) Hindering achievement: Low participation, disengagement over time, resident fatigue, low energy literacy, and unmet expectations.

The SWOT approach analysis is employed to assess strengths, weaknesses, opportunities, and threats in relation to the ProLight objectives and facilitates the evaluation of factors both supporting and hindering the achievement of project goals across the various demo districts, fostering a comprehensive understanding of local challenges and opportunities. This approach facilitates a



comparative analysis across the six demo districts, even while recognizing the prevailing local specificities.

Matosinhos (PT) & Kozani (GR)



Internal Factors

Strengths



1. Collaboration with local stakeholders (e.g., Matosinhos & Kozani Habits - the municipal itself and its social housing companies):
 - This strength refers to the strong partnerships and collaboration between the ProLight project and key local stakeholders, including the local municipal bodies and social housing company. These organizations have established relationships and influence within the community, which can facilitate smoother implementation of interventions and increase the likelihood of community engagement and support. Their involvement also ensures that the project is aligned with local needs and priorities.
2. In-person and interactive survey implementation:
 - The choice to conduct surveys in person and make them interactive enhances the quality of data collected by allowing direct engagement with residents. This method often results in richer, more nuanced feedback compared to remote or impersonal survey techniques. It also helps in building trust with the participants, as they feel more involved in the process.
3. Prior contact with the target audience and good knowledge of the residents:
 - Having prior interactions with the residents – through the engagement of Matosinhos & Kozani Habits – provides the project team with a deep understanding of the community's dynamics, concerns, and expectations. This familiarity can lead to more tailored and relevant interventions that resonate well with the residents, thereby increasing engagement and the likelihood of successful outcomes.

Weaknesses

1. Time constraints for interaction:
 - The time available for engaging with residents may be too limited due to residents' schedules, ProLight Team working hours, and the overall project timeline. This can hinder the depth of interaction needed to fully understand and address community concerns. Time constraints might also lead to rushed data collection, which can affect the quality and accuracy of the information gathered.
2. Selective engagement due to the time period of the survey implementation (mostly elderly):
 - If surveys are conducted at times when certain demographic groups, such as working-age adults or younger people, are less available, the data collected may disproportionately reflect the views of those who are more available, such as the elderly. This selective engagement could lead to biased results, not fully representing the entire community's perspectives.
3. Limited awareness and engagement because of the early stage of the project:
 - At an early stage, residents may not yet be fully aware of the project's scope, goals, or potential benefits. This lack of awareness can lead to lower levels of engagement and



enthusiasm, making it more challenging to secure widespread participation and support.

External Factors

Opportunities

1. Availability to participate in the survey:

- Residents are generally willing to take part in the survey process, which is a positive sign for the project's outreach efforts. Availability and willingness to participate can lead to a more comprehensive understanding of community attitudes and behaviors, aiding in the development of effective interventions.

2. Strengthening energy awareness:

- The project has the opportunity to enhance residents' understanding and awareness of energy issues, particularly around clean technologies and sustainable energy solutions. Increased energy literacy can empower residents to make more informed decisions and adopt behaviors that align with the project's sustainability goals. The project also facilitates this through opportunities for close interaction during survey implementation.

3. Enhancing future engagement with ProLight activities:

- Building strong relationships and demonstrating the benefits of the project early on can create a foundation for sustained engagement. As residents see the tangible benefits of their involvement, they may become more invested in future ProLight activities, leading to a more active and supportive community.

Threats

1. Limited participation:

- Despite the opportunities for engagement, there is a risk that not enough residents will participate in the surveys or other project activities. Low participation rates can undermine the representativeness of the data collected, making it difficult to accurately assess community needs and the impact of interventions.

2. Disengagement over time:

- Initial enthusiasm for the project could wane if residents do not see immediate results or if the project demands too much of their time. Disengagement can result in lower levels of participation in future activities, reducing the project's overall effectiveness.

3. Resident fatigue from frequent surveys:

- If residents feel they are being asked to participate in too many surveys or consultations, they may experience "survey fatigue." This can lead to lower response



rates and less thoughtful participation, ultimately impacting the quality of the data collected.

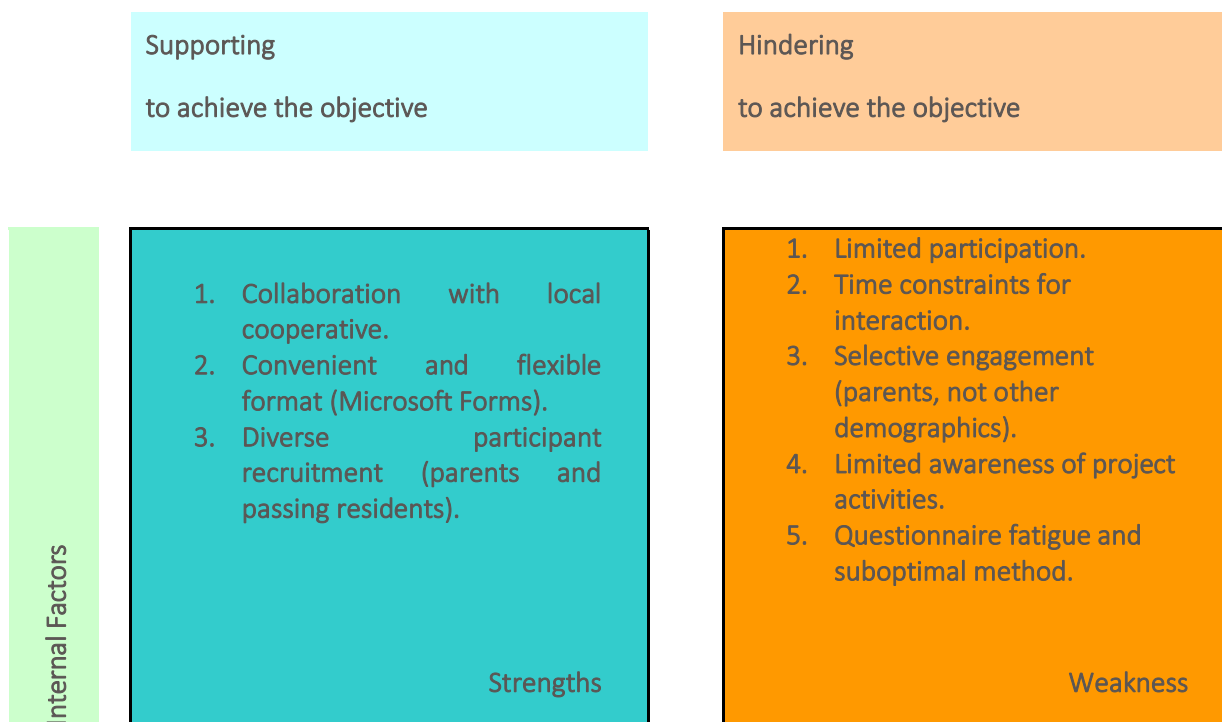
4. Low energy literacy:

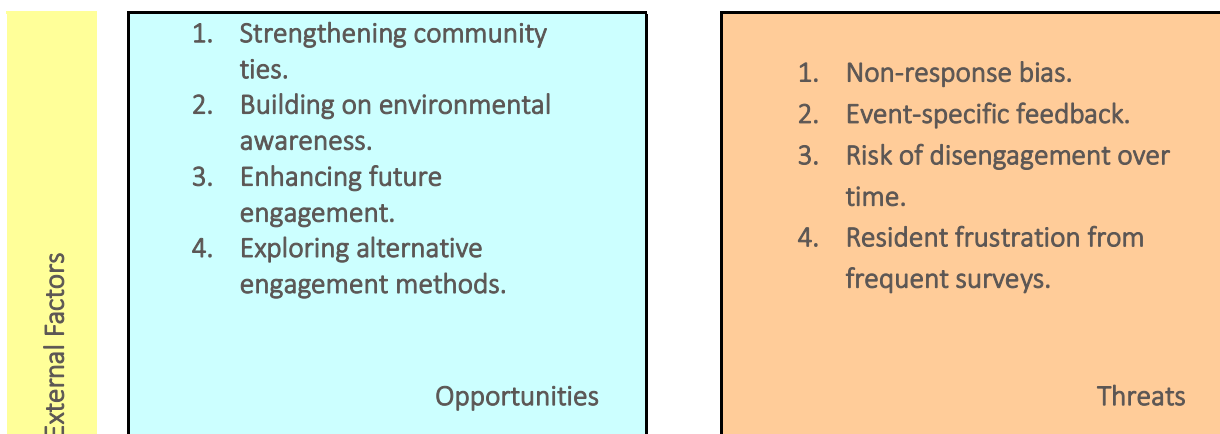
- If residents have a limited understanding of energy concepts, technologies, or sustainability issues, it may be challenging to convey the importance of the project’s interventions. Low energy literacy can hinder the adoption of new behaviors and technologies, reducing the overall impact of the project. This should also be carefully considered when designing survey questions.

5. Risk of creating unmet expectations:

- If the project raises residents' expectations about the benefits or outcomes of the interventions but fails to deliver on them, there could be a backlash. This disappointment could lead to decreased trust in the project and reluctance to engage in future initiatives. Managing expectations is crucial to maintaining community support.

Milan (IT) & Vaasa (FI)





Strength

- Local Collaboration: Partnering with a local cooperative³ that specializes in environmental and energy issues added credibility to the survey and helped establish trust with the residents.
- Context: The questionnaire was distributed during a children’s laboratory focused on renewable energy, a topic that may resonate well with the community, particularly those interested in sustainability. Responses were gathered both from parents participating in the laboratory and from other residents who were passing by, ensuring a diverse set of perspectives.
- Convenient and Flexible Format: Microsoft Forms provided a quick and accessible way for residents to complete the survey, accommodating those with limited time.

Weakness

- Limited Participation: The survey received only 12 (Milan) and 5 (Vaasa) responses, which might not be enough to draw comprehensive conclusions about the broader community’s views.
- Time Constraints: The brief interaction with parents, many of whom were in a hurry to leave after dropping off their children, limited the depth of engagement and potentially the quality of the responses.
- Selective Engagement: The setting of the children’s laboratory may have primarily attracted responses from a specific subset of the population (parents of young children), leading to a potential lack of representation from other demographic groups within the district.
- Limited Awareness of Activities: Many residents are not consistently aware of ongoing project activities, which could affect their ability to provide informed responses to the questionnaire.

³ Cascina Biblioteca is an Italian social cooperative in Milan that focuses on cultural and social activities. It provides educational workshops, art exhibitions, and events to enhance community engagement and cultural development. We have decided to involve them in our laboratory activities due to their role in organizing after-school programs in the district. Their established connections with parents and experience in energy and environmental topics make them a valuable partner for our initiatives.



- Questionnaire Fatigue: Repeatedly administering written surveys may become burdensome for residents, potentially leading to reduced participation over time or causing frustration within the community.

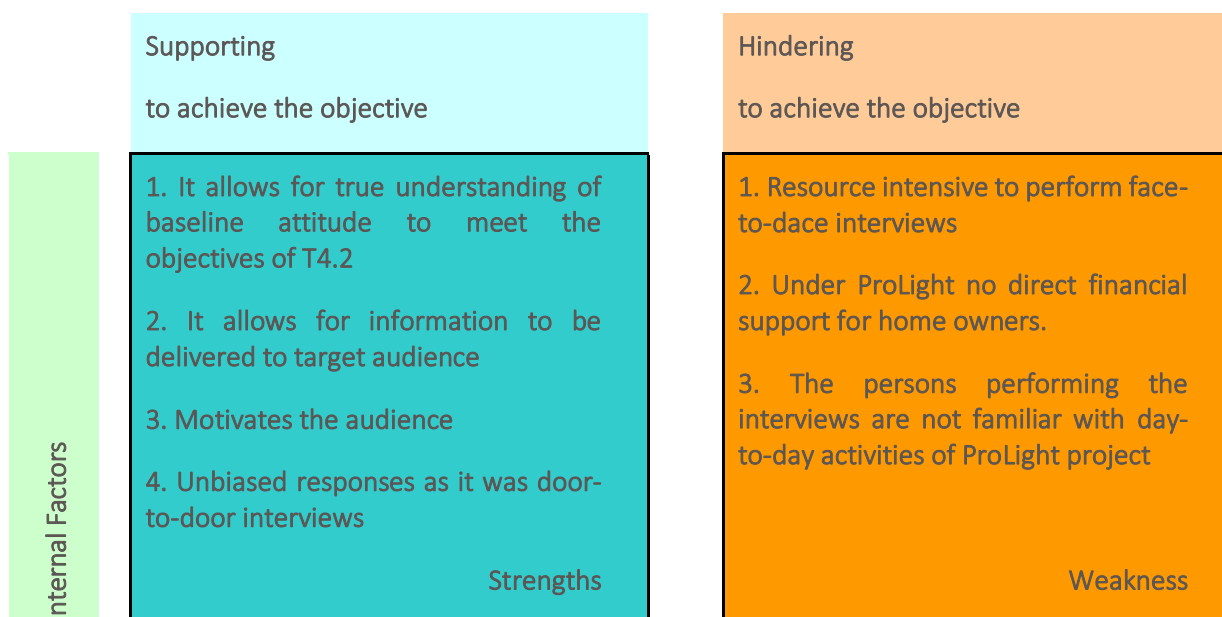
Opportunities

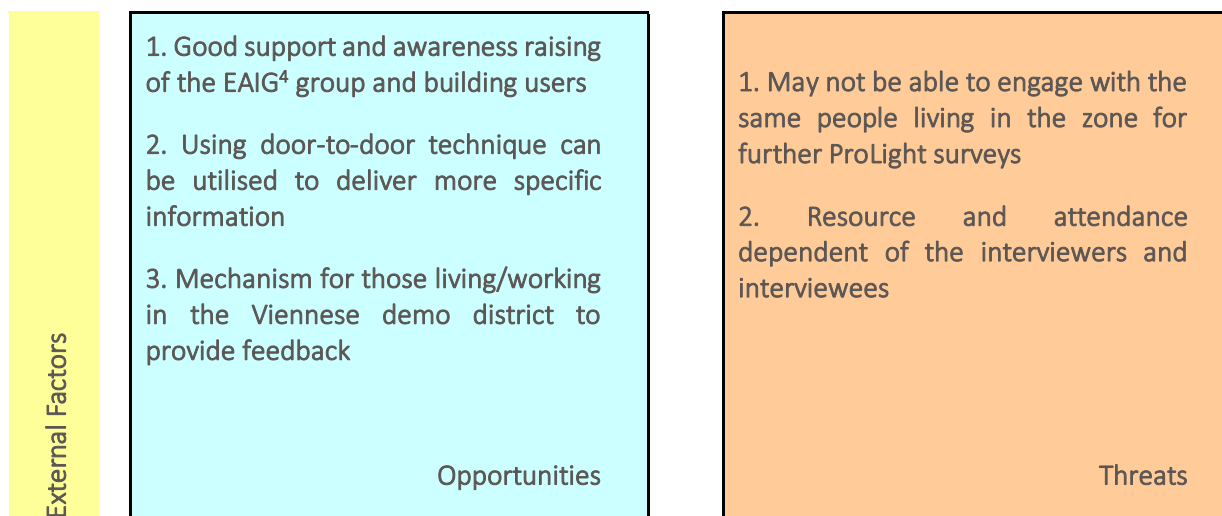
- Strengthening Community Ties: The collaboration with the local cooperative and the focus on environmental topics could serve as a steppingstone for building stronger community relationships and promoting future initiatives.
- Enhancing Future Engagement: The experience gained from this initiative can inform better strategies for engaging residents in future surveys or community activities, potentially leading to higher response rates and more comprehensive data.
- Exploring Alternative Engagement Methods: The limitations identified in this approach could lead to the exploration of alternative, more interactive methods of engagement, such as focus groups or community meetings, which may yield richer insights.

Threats

- Non-Response Bias: The small number of responses and the specific context in which the survey was conducted may result in a biased understanding of the community's views, potentially overlooking the opinions of less engaged or less accessible residents.
- Event-Specific Feedback: Responses may have been influenced by the specific context of the environmental laboratory, limiting the applicability of the findings to broader community issues.

Vienna (AT) & Gernika (ES)





Strength

- Conducting door-to-door interviews allows us to provide interviewees with additional information directly. This approach also enables the interviewer to be well-prepared and to encourage building users to participate in post-evaluation activities. By using door-to-door interview techniques, we can ensure unbiased responses while delivering targeted information.

Weakness

- Conducting door-to-door interviews requires dedicated human resources. The interviewers, who in our case were students, encountered responses from tenants who had limited influence on the interventions. Additionally, these interviewers were not fully familiar with the day-to-day operations of the T4.2 team.

Opportunities

- At the local level, the EAIG in Vienna and selected households in Gernika fully supported this survey and committed to backing future surveys as well. Utilizing door-to-door techniques allows for targeted information delivery, addressing specific knowledge gaps among building users. Tailoring these messages to the socio-economic background of the interviewees is crucial. The ad-hoc feedback provided during the survey will also be valuable for comparative analysis in future surveys.

⁴ End-Users Advisory & Interest Group (EAIG)



Threats

- When conducting the T4.2 survey, it may not be feasible to interview the same individuals in subsequent surveys of other ProLight Tasks. Door-to-door interviews, as we did with the involvement of students, require significant human resources.

3.3. Consolidated synthesis

In summary, the responses indicate a growing awareness and understanding of sustainability among urban residents, especially in areas where sustainability initiatives like the Social Affordable Housing Initiative are actively promoted. However, the 20% of residents uncertain about their knowledge highlights the need for ongoing, targeted educational efforts to ensure comprehensive understanding across the community.

There is a clear demand from residents for regular, detailed updates on the Social Affordable Housing Initiative, reflecting their interest in addressing the implications of climate change. This knowledge is particularly important for those involved in refurbishment projects, as being well-informed empowers them to actively participate and make informed decisions.

A significant motivator for residents joining Renewable Energy Communities (REC), such as in Gernika, is the potential to reduce energy costs. Many are interested in becoming "shareholders of a PV system," indicating that cost savings, rather than merely reducing electricity consumption, are a primary concern. This focus on financial incentives is critical for driving participation in renewable energy initiatives.

Currently, no specific ProLight demo actions are directly aimed at maximizing energy savings in the mobility sector. Instead, efforts have focused on raising awareness, with some RECs introducing initiatives like providing e-bikes or e-scooters. While these measures promote sustainable mobility, they do not yet include broader, direct actions for enhancing energy savings in this area.

Interviewees recognize the importance of energy efficiency in mitigating global warming, and they understand how various enabling options contribute to environmental goals. The analysis shows that in areas where energy-saving measures are still in the planning phase, such as Vaasa and Milan, residents perceive energy efficiency as less important. However, in Vienna and Gernika, where implementation is more advanced, residents report satisfaction with living quality and energy cost savings, suggesting that the perceived importance of energy efficiency increases as tangible benefits become apparent.

According to the SWOT analysis results interviewees acknowledge the critical role of energy efficiency in addressing global warming and demonstrate a clear understanding of how different enabling solutions support environmental sustainability objectives.

When considering Life Cycle Cost (LCC) models and intervention payoffs, it is clear that renewable energy community (REC) approaches offer more immediate cost savings, whereas investments in building efficiency measures in demo districts tend to provide long-term benefits. This explains the varying levels of motivation among residents, with REC residents seeing quicker financial gains.

Overall, the survey results and interviewee feedback indicate that the most commonly adopted household energy-saving measures focus on smartly reducing heating and overall energy consumption, underscoring the importance of practical, cost-effective actions in driving community engagement.



Green-pricing programs have revealed a significant gap between respondents' willingness to pay (WTP) and their actual payment behavior. A separate survey under T2.2 found that 40% of respondents are struggling with energy bills, exceeding the 10% threshold for energy poverty. This underscores that a major incentive for joining Renewable Energy Communities (RECs) is the potential to lower energy costs.

The analysis shows that around 35.1% to 37.8% of residents in demo districts and 45% to 35% in RECs believe their actions align with moderate to high expectations for the ProLight project. This suggests a correlation between satisfaction and the amount of information provided, highlighting the need for transparent and consistent communication.

Community members and residents are requesting regular updates on project progress. Data on home and flat sizes indicates a range from 50m² to over 130m², with Milan (IT) and Vaasa (FI) data not applicable. Residency duration shows that approximately 69% have lived in their homes for less than 10 years, 14% for 10 to 20 years, and 27% for over 20 years. Age distribution data reveals about 20% of occupants are under 17, 51% are between 18 to 65, and 29% are over 65. Data from Vaasa (FI) and Vienna is not applicable here. Average indoor temperatures are reported with 92% of respondents maintaining temperatures below 23°C in winter, and 76% experiencing temperatures above 23°C. Summer data from Vaasa (FI) and data from Matosinhos (PT) and Vienna (AT) are not applicable.

4. Conclusion

The SWOT analysis reveals growing sustainability awareness among urban residents, especially in areas with active initiatives like the Social Affordable Housing Initiative. However, 20% remain uncertain about their knowledge, indicating a need for ongoing education. Residents also seek regular updates on the initiative, particularly those involved in refurbishment projects, to make informed decisions.

In Gernika, financial benefits, such as energy cost reduction, are key motivators for joining Renewable Energy Communities (RECs). Although ProLight lacks direct energy-saving actions in the mobility sector, some RECs have introduced e-bikes and e-scooters to promote sustainable transport.

Perceptions of energy efficiency vary by location—while residents in Vienna, Matosinhos and Gernika, where measures are more advanced, report satisfaction with cost savings, those in Kozani, Vaasa and Milan, where plans are still in development, see efficiency as less important.

REC approaches offer quicker cost savings compared to longer-term benefits from building efficiency measures, explaining varying resident motivations. Most adopted household measures focus on heating and energy consumption reductions, reflecting a preference for practical, and cost-effective actions.

A separate survey found that 40% of respondents face energy poverty, reinforcing the financial incentive for REC participation. Overall, residents' satisfaction correlates with transparent communication, & highlighting the need for consistent project updates.

