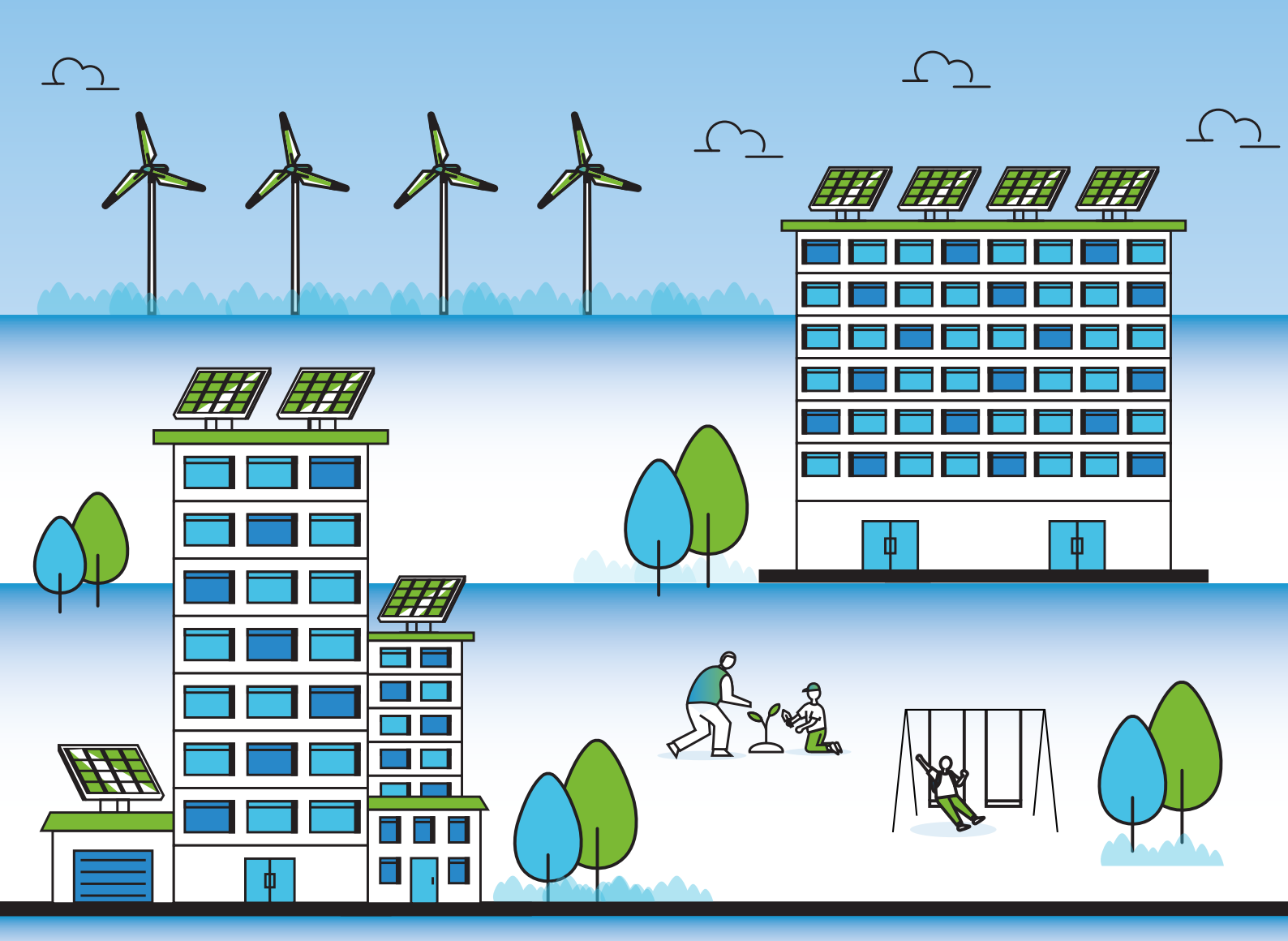


ComActivate

Enabling community action for energy sufficiency

GUIDELINES FOR DEVELOPING NEIGHBOURHOOD ENERGY SUFFICIENCY ROADMAPS

LESSONS FROM BULGARIA, HUNGARY AND LITHUANIA

D6.4 | September 14, 2026

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List of abbreviations

EPBD	Energy Performance of Buildings Directive
EU	European Union
HOA	Homeowners' associations
MFAB	Multi-family apartment building
NESR	Neighbourhood energy sufficiency roadmap
NGO	Non-governmental organisation
OSS	One-stop shops
RC	Resource Centre

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1. Shaping one neighbourhood at a time

1.1. Introduction

The ComActivate Project, funded by the EU LIFE research programme, aims to address the growing challenges of energy poverty and the poor energy performance of buildings across Central and Eastern Europe. The guidance presented in this document is based on the lessons and experience gained from the process of developing Neighbourhood Energy Sufficiency Roadmaps (NESRs) in the project's four municipalities, namely in Burgas (Bulgaria), Józsefváros (Hungary), as well as in Elektrėnai and Kaišiadorys (Lithuania).

Rather than serving as a template to be simply filled in, this document is intended to be used as a practical resource throughout the NESR development process. It provides a structured framework and step-by-step guidance to help anyone interested in developing their first NESR.

The guidelines are not intended to be followed rigidly. Instead, this document encourages the reader to adapt the approach to their local context, ensuring that the developed NESR reflects the area's characteristics, challenges and opportunities.

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2. Understanding the neighbourhood approach to energy sufficiency

2.1. What is a Neighbourhood Energy Sufficiency Roadmap?

The revised Energy Performance of Buildings Directive (EPBD)[1] requires the EU Member States to move beyond improving individual buildings and adopt a broader, neighbourhood-based approach. This framework aims to create neighbourhoods that are more comfortable, energy-efficient and sustainable, while at the same time delivering social and economic benefits. These include better access to financing, stronger social cohesion, improved neighbourhood attractiveness, reduced energy poverty, new local economic opportunities and more integrated renovation programmes.

In line with the EPBD's requirements, a NESR provides a practical way of turning these ambitions into action. Simply put, **a NESR is a plan that:**

- **Allows a neighbourhood to identify the current energy performance of its buildings**
- **Supports that neighbourhood to define where it wants to be**
- **Outlines the steps needed to get to that position**

A NESR focuses on the energy performance of a neighbourhood's housing stock. Nevertheless, the sufficiency pillar extends that scope by looking at how residents actually use energy in their everyday lives, rather than focusing solely on how well buildings are built or renovated. Energy, mobility, public space and green areas are covered separately, in Chapter 4, for stakeholders who want to take the roadmap further.

A NESR is not a one-size-fits-all solution. Every neighbourhood has its own characteristics, challenges and priorities, so each NESR should reflect the local context. This means considering factors such as the condition of the housing stock, the socio-economic characteristics of residents, available infrastructure and local opportunities. By building on these local realities, the NESR becomes a practical tool for tackling energy poverty, strengthening resilience of neighbourhoods and supporting local institutions in delivering a fair and inclusive energy transition.

1 https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive_en

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2.2. Who is a NESR for?

The approach presented here can be adapted to a wide range of local initiatives that require collaboration between public authorities, residents and intermediary organisations, including one-stop-shops (OSS).

These guidelines are intended for those involved in the planning and implementation of neighbourhood energy renovation programmes:

- **Municipal staff**, including both administrative and technical personnel, who provide strategic guidance, ensure compliance with relevant policies and regulations, and integrate neighbourhood priorities into renovation programmes.
- **Resource Centre (i.e. "one-stop shop" under the recast EPBD) teams** provide technical, organisational and advisory support throughout the energy renovation programmes. Their role includes providing information, facilitating community/stakeholder engagement, identifying available funding opportunities and financial incentives, and supporting residents from the initial phase through implementation.
- **Homeowners' associations** (HOAs) play a central role in coordinating activities among residents, municipal authorities, technical experts and OSS. They represent residents' interest and facilitate collective decision-making throughout the planning and implementation phase.

2.3. Anchor the NESR

A NESR provides the strategic direction for neighbourhood energy renovation, but its successful implementation depends on having an organisation responsible for coordinating activities, supporting residents and maintaining continuity throughout the process. Neighbourhood energy renovation involves multiple stakeholders, long planning and implementation periods, and complex technical, financial and administrative procedures.

Within the ComActivate project, this role is assigned to a Resource Centre (RC) being established or further developed in each partner country. Each RC acts as the institutional anchor for the NESR by providing a dedicated point of contact where residents can obtain guidance, access reliable information and receive assistance throughout the renovation process. It also facilitates communication between residents, local authorities, HOAs and other relevant stakeholders, so that the implementation process is coordinated and responsive to local needs.

An RC is not just an information desk. At its best, its stays with residents through the entire renovation process: explaining technical requirements, clarifying who qualifies for which subsidies and grants, and being the one place people can go with a question at any stage instead of being referred to different offices.

In practice, however, RCs may operate at different levels. How much support they offer depends on their resources, expertise and institutional setup. This diversity of models is not necessarily a limitation, but it reflects the different contexts in which RCs operate.

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For energy-poor residents, the RC's role is more intensive and tailored:

- Reducing the administrative burden associated with applying for financial support and navigating renovation procedures
- Acting as a trusted intermediary to help households avoid unfair or exploitative contracting arrangements
- Conducting home visits to energy-poor residents
- Communicating clear and accessible language
- Ensuring renovation measures meet accessibility needs

The NESR defines the long-term vision, priorities and actions for neighbourhood energy renovation, while a RC provides the institutional support to implement proposed activities. Together, they link strategic planning with implementation so that energy renovation measures are accessible, understandable and achievable for residents.

2.4. Understanding the neighbourhood before planning

A comprehensive understanding of the neighbourhood's current conditions is essential before any planning work can begin. Data, reports and maps are useful, but they cannot substitute a neighbourhood visit, seeing it firsthand and speaking with the people who know it best.

A neighbourhood walkthrough can reveal details that are difficult to capture in a database. That means observing characteristics of multi-family apartment buildings (MFABs), including their age, physical condition, number of apartments, any visible sign of renovation and maintenance, etc. Additionally, public spaces, local services, transport connections and the overall character of the neighbourhood should be observed.

It is equally important to speak with people who know the neighbourhood well: staff from a municipal housing department, building managers, and other local stakeholders who might have valuable insights. They may know which buildings are most affected by high energy costs, how many vulnerable groups live in a particular MFAB, whether any renovation initiatives have already been planned, etc. These insights provide a deeper understanding of the neighbourhood and can highlight certain aspects that would otherwise be overlooked.

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2.5. The two pillars of the NESR: efficiency and sufficiency

Energy efficiency and energy sufficiency are the two main pillars of the NESR. They address energy use in different ways.

Energy efficiency. The more established and widely applied concept, energy efficiency focuses on reducing the energy needed to provide the same level of service. Typical measures include improving building and ceiling/roof insulation; replacing heating systems, doors and windows; installing roof hatches; or installing more efficient technologies. By using energy more efficiently, citizens benefit from lower energy bills, improved indoor comfort, cleaner air and new local green job opportunities. In addition, improving energy efficiency can increase the value of assets.

Energy sufficiency. While energy efficiency reduces energy per unit of service, it does not necessarily reduce overall energy demand. Global energy consumption continues to rise as living standards increase and building requirements of square metres per person expand. The concept of energy sufficiency focuses on reducing unnecessary energy demand by encouraging people to use only the energy that is genuinely needed for a decent dignified and comfortable life, while ensuring equitable access, particularly for vulnerable or marginalized populations.

> The Intergovernmental Panel on Climate Change defines sufficiency as: *"a set of measures and daily practices that avoid demand for energy, materials, land and water while delivering human well-being for all within planetary boundaries."*

Although energy sufficiency has not been formally adopted as a standalone directive or policy at the EU level, it appears in many guidance documents, analytical frameworks and academic literature. Across these sources,[2,3] energy sufficiency is generally understood as changing everyday practices of resource use in ways that lower energy consumption without compromising quality of life or creating negative social or environmental impacts.

To better understand and apply the concept, sufficiency measures can be grouped into four categories:[4]

1. **Dimensional sufficiency:** ensuring an energy service matches its actual purpose (e.g. using a vehicle suited to the travel need rather than one larger or more powerful than necessary; heating only occupied rooms to the temperature required for their specific use; converting an oversized heated basement storage into an unheated bicycle storage area with natural ventilation, eliminating heating demand entirely; using passive cooling strategies, such as external shading and green infrastructure to reduce or eliminate the need for air conditioning, etc).

2 https://journal-buildingscities.org/articles/10.5334/bc.458
3 https://enr-network.org/wp-content/uploads/Bohnenberger_EnergySufficiency_18.pdf
4 https://www.enerdata.net/publications/executive-briefing/eu-sufficiency-security-energy.html

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2. **Cooperative sufficiency:** maximising the shared use of energy services to reduce overall consumption (e.g. car sharing, collective housing arrangements, etc).
3. **Usage sufficiency:** reducing the duration, intensity or frequency of energy-intensive activities and extending equipment lifespan through optimal use (e.g. lowering heating temperatures during unoccupied periods, elevator load management, etc).
4. **Organisational sufficiency:** rationalising the use of space and arranging both physical spaces and human activities to minimise the need for transportation and resources (e.g. designing urban areas to reduce the distances required to access workplaces and essential public services, including the centralised accessible facilities specifically designed to accommodate elderly users and provide various public services within a single location).

Taken together, these four categories reflect a single idea with two boundaries:

1. As a ***minimum***, sufficiency guarantees decent living standards for everyone, ensuring that no household falls below the level of energy needed for a dignified life.
2. As a ***maximum***, it calls for avoiding unnecessary energy and resource use so that consumption stays within planetary boundaries.[5]

When putting sufficiency into practice, a clear hierarchy should guide decision-making.[6] The first priority is to preserve and make better use of existing buildings, while new construction should be considered only as a last resort and designed according to sufficiency principles. This hierarchy is summarised in Table 1.

Table 1: Hierarchy of sufficiency options: from most to least preferred

Tier	When it applies	Sufficiency solutions	Why it works
Tier 1: most preferred: optimise the existing building	• High heating bills • High summer electric bills for cooling • Vacancies in some flats • Under-occupancy in flats	• Match heated or cooled space to actual need • Use passive rather than active heating and cooling solutions • Identify why flats are vacant; bring them back into use • Offer support for flat exchanges (i.e. move into smaller flats)	• Heating only areas of the home actually used • External solar shading rather than/in addition to AC • Rather than relying solely on efficiency improvements, adjusts space needs to fit those of residents; reduces space to be heated, cooled, and lit; cuts energy demands at source

5 Prioritising Existing Buildings for People and Climate, BPIE, 2024
6 Ibid.

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Tier	When it applies	Sufficiency solutions	Why it works
Tier 2: use existing space and materials before adding anything	• Unused attic space • Empty commercial spaces on ground floor • Vacant neighbouring office building • Nearby building to be demolished	• Convert attic space into additional flats • Convert unused commercial spaces into flats • Reuse materials such as bricks, timber, etc.	• Reusing existing building structures significantly reduces embodied energy by avoiding the production of new construction materials such as concrete, steel, etc • Reusing bricks and timber from demolition avoids energy of manufacturing new materials
Tier 3: least preferred: if new construction is necessary, build in the most sufficient way	• Genuine need for new space remains after Tiers 1 and 2 have been fully explored	• Use low-carbon materials (recycled, bio-based insulation, etc.) • Design flexible layouts with movable walls • Prioritise shared spaces over private ones	• Bio-based insulation such as wood fibre requires far less energy to be produced than conventional foams • Positioning the building to capture sunlight and designing windows to let in the right amount of natural light and warmth cuts the need for heating, cooling and lighting • Flexible spatial configurations enable a building to be repurposed over time, avoiding large energy cost of rebuilding later

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Building on this understanding, the ComActivate project has developed a comprehensive interpretation of energy sufficiency based on the following principles:

- **Equitable distribution:** Reduce energy demand among high consumers while ensuring adequate energy access for vulnerable households (dimensional and cooperative sufficiency at the household level).
- **Behavioural change:** Promote energy-saving habits and discourage unnecessary energy consumption in everyday life (usage sufficiency).

This dual approach recognises that effective energy policy must address both climate goals and human wellbeing.

2.7. Building the foundation for NESRs

The development of the NESR should begin with the development of a comprehensive neighbourhood profile alongside a detailed technical assessment. Before defining the vision and objectives, it is important to gather the information needed to understand local conditions, identify priorities and decide on interventions.

A neighbourhood profile should draw on the most recent data and include both quantitative and qualitative information. It should also incorporate local knowledge gathered from the earliest stages (see *Chapter 1.3 Understanding the neighbourhood before planning*). As a minimum, the neighbourhood profile should include the following:

- **Location and administrative context:** The neighbourhood's location within the municipality, its administrative boundaries, and links to other neighbouring areas and municipalities
- **Neighbourhood characteristics:** The urban character of the neighbourhood, including whether it is a predominantly residential, commercial, industrial or rural area, as well as the presence of heritage buildings, public spaces, green areas and key community facilities
- **Climate and environmental conditions:** Climate, exposure to heatwaves, flooding, and other climate-related conditions that affect or may affect the neighbourhood
- **Demographic profile:** Population size, age and gender structure, population density, household composition, and other demographic trends
- **Socio-economic profile:** Income levels, education, employment, unemployment, poverty, vulnerable groups, energy poverty and other relevant socio-economic indicators. The assessment should also consider energy vulnerability as the result of interacting multiple social, economic and physical factors that influence residents' ability to access and afford essential energy services.
- **Housing stock:** The age, type, condition and tenure of buildings, energy performance of buildings, heritage constraints where relevant, main challenges regarding housing quality, etc
- **Neighbourhood map:** Map prepared using Google Maps, Google Earth or similar digital mapping tools to illustrate the neighbourhood boundaries and key surrounding areas
- **Existing plans, programmes and funding opportunities:** Relevant municipal strategies, ongoing renovation programmes, available national or regional funding and EU subsidy programmes that could support future renovation programmes

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Before collecting and analysing the quantitative and qualitative data, it is useful to develop a set of guiding questions. These questions help structure the assessment and ensure that the profile captures meaningful information rather than simply becoming a collection of data. Possible guiding questions are outlined below.

Table 2: Guiding questions for the neighbourhood assessment

Theme	Guiding questions
Neighbourhood context	1. What area does the neighbourhood cover? 2. What is its local context? (Demographics, language(s), ethnic minorities, etc) 3. What is the age structure of the population, particularly the proportion of older and younger residents? 4. What characterises your neighbourhood in terms of geography, region, climate peculiarities? 5. Are there other special features, e.g. economic/cultural/landscape characteristics? 6. What is the predominant tenure structure of the neighbourhood (e.g. privately rented, owner-occupied, social rented)?
Housing stock and energy performance	1. What kind of housing stock exists in the area? 2. How many living units exist in the neighbourhood area? 3. What is the current energy efficiency status of the housing stock in the neighbourhood area? 4. Are there buildings with particularly poor energy performance or high energy consumption that should be prioritised for renovation? 5. What is the current renovation rate and energy class of the buildings? 6. What energy efficiency measures have already been implemented or are planned? 7. Is there potential to optimise the use of existing housing stock (e.g. converting basements into shared spaces as bicycle storage, laundry rooms, etc)? 8. Are there vacant or underused flats or areas (e.g. attics, basements)? 9. What heating, cooling and occupancy patterns actually drive energy use in MFABs? 10. What are the main technical barriers to renovating the housing stock?

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Theme	Guiding questions
Cultural heritage	1. Are there culturally protected residential buildings that have already implemented energy efficiency? If so, which measures were implemented? 2. Are there any specific plans for culturally protected buildings? 3. Are there examples of successful energy efficiency renovations of protected residential buildings in the neighbourhood or wider region? 4. What are the main additional costs, administrative requirements or technical challenges associated with renovating protected buildings?
Financial support	1. What financial incentives or subsidy programmes are available for MFAB renovation? 2. What are the eligibility criteria for subsidies? 3. What is the current uptake of renovation subsidies? 4. What are the main barriers preventing residents from accessing available financial support? 5. Are there specific financial support mechanisms for low-income households or those at risk of energy poverty?
Citizen engagement	1. Has anybody already applied for renovation programmes? 2. About which renovation programmes, subsidy schemes or financing options are residents currently aware? 3. Through which channels are residents informed about renovation programmes and available support? 4. How many applications for renovation programmes have been submitted and by which types of buildings or households? 5. How many meetings or consultations related to renovation have taken place? 6. Are there groups of residents who are rarely represented in meetings and consultations? 7. What information do residents find difficult to understand?

Note: *The guiding questions can serve as a starting point for identifying priorities and developing sector-specific roadmaps.*

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The questions listed in Table 2 are intended as guidance, not as **a strict requirement**. The list of questions can be **shortened, adapted or expanded** depending on the issue being explored. Once the questions have been answered, the **answers should not automatically be treated as goals**. Instead, the following steps should be taken:

1. **Group answers that pinpoint the same problem:** Several answers may relate to the same issue. Write each answer as a separate line, then cluster the answers that describe the same problem from different perspectives.
2. **Score each cluster on urgency and feasibility:** Assess each cluster based on urgency and feasibility. Urgency means that the issue is having a significant and ongoing impact on residents. For example, consider:
    a. How many households are affected – a few, or most of the neighbourhood?
    b. Does it particularly affect energy-poor or vulnerable households?
    c. Does it involve health, safety, or cost, or is it mainly related to comfort?
    d. Do residents deal with it daily or only occasionally?

If a cluster meets none of these criteria, it is probably not urgent enough to be prioritised.

Feasible means that action can be taken with the resources currently available. For example, consider:

a. Is funding already available?
b. Could action happen within the next 6–12 months?
c. Can it be addressed without requiring a policy change or other major changes?
d. Does it require ongoing cooperation from residents? (e.g. A shared laundry room requires maintenance and agreed rules for access and use.)
e. Is there already an informal version of this taking place? (e.g. Residents are already using a space unofficially.)

If a cluster fails only criterion (c.), it should not be scored as "not feasible". Instead, it should be flagged as a structural issue. Structural issues often disproportionately affect energy-poor households and should therefore be tracked separately.

Before finalising this step, check whether feasible actions outlined include at least one measure focused on sufficiency. If not, explain why and ensure that sufficiency-related measures are not omitted from the plan.

3. **Keep what scores well on both:** Prioritise issues that are both urgent and feasible. An issue that is urgent but not yet feasible should not be discarded. Instead, place it on a watchlist and revisit when the necessary funding or capacity becomes available. Limit the number of priorities carried forward to three to five.
4. **Turn the priorities into goals using SMART criteria.** The remaining priorities should be then formulated as SMART goals. SMART criteria should be used to shape and define what matters in the first place. For more information on SMART criteria, please see the following chapter.

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3. Defining the vision and goals

3.1. Defining the vision

After assessing the neighbourhood's characteristics, challenges and opportunities, the next step is to establish a clear vision of the neighbourhood. In developing the vision, the following should be considered:

- **Future direction and sustainability principles:** The vision should establish key priorities that will guide future interventions. Beyond improving the energy performance of MFABs it should promote affordable housing, climate resilience, the well-being and quality of life of residents.
- **Alignment with existing municipal strategies and development priorities:** The vision should be consistent with existing frameworks and plans, avoid fragmented approaches and increase opportunities for securing financial and institutional support.
- **Local context:** The vision should take a tailored approach with each neighbourhood.

3.2. Defining the goals

Defining meaningful goals for a neighbourhood energy transition requires transforming a broad ambition into concrete and measurable objectives. Once the overall vision has been established, goals should define the key outcomes that the neighbourhood aims to achieve. These goals should be developed in line with the two pillars discussed in *Chapter 2.5 The two pillars of the NESR: energy efficiency and energy sufficiency*.

The goals for the NESR should be developed through a structured, step-by-step approach:

1. A key starting point is to define the desired range of energy use based on the concepts of energy efficiency and energy sufficiency. This involves defining the minimum energy level required to meet basic needs and the maximum level beyond which additional energy consumption does not provide meaningful benefit. These boundaries provide a reference point for setting realistic energy goals objectives.
2. As discussed in *Chapter 3.1 Defining the vision*, the development of neighbourhood goals should be aligned with existing municipal strategies and development priorities. If municipalities have already adopted strategic documents (such as a Sustainable Energy and Climate Action Plan or obligations arising from EU directives on building performance and efficiency, etc.) these should serve as the basis for establishing goals. Building on existing commitments avoids duplicating work and ensures neighbourhood goals are consistent with municipal and national policy.
3. The next step is to use the neighbourhood baseline data to identify the most appropriate interventions for different sub-areas. Goals should respond to the specific characteristics and needs of different parts of the neighbourhood rather than applying the same approach for the entire area. For example, an area close to public facilities might need a goal focused on improving housing affordability, while an area characterised by old buildings and deteriorated façades might need a goal focused on building envelope performance and reducing heat losses.

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4. Before final adoption, proposed goals should be discussed with relevant institutional stakeholders and residents. Their feedback should be considered and incorporated into the final set of goals, where appropriate. Engaging stakeholders helps ensure that the proposed goals reflect neighbourhood needs and priorities. Where such consultations have not yet taken place, they should be undertaken before the goals are finalised. For further guidance on how to engage with communities, please see the Community Engagement Toolkit.[7]
5. Once the goals have been agreed, they should be further developed into specific objectives. Objectives should be assessed against the SMART criteria to ensure they are well-defined and suitable for implementation. Each goal should be:
    - **Specific:** targeting a particular area for improvement
    - **Measurable:** quantifying or at least suggesting an indicator of progress
    - **Assignable:** defining responsibility clearly
    - **Realistic:** outlining achievable results with available financial and technical resources
    - **Time-related:** defining a timeframe for implementation and expected results

For example: "Reduce average heating demand in Block B of the MFABs by 20% by the end of 2028, through envelope insulation coordinated by the RC together with the municipality."

Goals and objectives should be reviewed and, where necessary, revised at regular intervals to ensure they continue to address neighbourhood conditions and priorities.

3.3. Translating goals to action

Following the assessment of the neighbourhood and establishment of the goals, the next step is to translate priorities into a concrete action plan. The action plan forms an implementation component of a NESR and provides a link between the goals identified and actions required to achieve them.

The action plan should set out, in a clear and practical format, how each defined goal will be implemented. For each objective, it should specify the activities required, the actors responsible for leading and supporting their implementation, the target group concerned, and the expected timeframe.

This helps develop a general vision into a structured set of actions that can be assigned, monitored and implemented. The action plan should be reviewed and updated at regular intervals, and whenever new funding opportunities arise or priorities change.

7 ComActivate Community Engagement Toolkit https://www.bpie.eu/publication/comactivate-community-engagement-toolkit/

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Table 3: Suggested format for a neighbourhood action plan

The table should be completed with one row per objective, identifying the activity, who will lead and support it, the target group and a realistic timeline. If an activity is too vague or has no clear lead, this may indicate that the objective is not yet ready to be included in the action plan.

Objective	Activity	Lead actor(s)	Supporting actor(s)	Target group	Timeline (years)
Establish an up-to-date understanding of the housing stock	Conduct technical inspection of public housing stock	Municipality	External technical experts	Public housing tenants	2027–2028
Provide Block 4 residents access to shared laundry and storage facilities	Agree on access and maintenance terms	Municipality	RC HOA	All Block 4 residents	2027
	Set up agreed unit as shared laundry and storage space	Municipality	RC	All Block 4 residents	2027–2028

Beyond housing: expanding the neighbourhood roadmap

The NESR focuses primarily on the housing stock, with the chapters providing step-by-step guidance for developing a roadmap for this sector.

Municipalities and other interested stakeholders are encouraged to extend this same approach to other aspects of the neighbourhood influencing energy use, quality of life and equitable outcomes for residents, including energy-poor and vulnerable households. The following chapter therefore introduces three additional sectors: energy, mobility, and public and green spaces, each guided by the same structured set of questions.

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4. Sustainable neighbourhoods

Sustainable neighbourhoods are no longer defined solely by the performance of their buildings or technologies their buildings use.[8] Instead, they are defined by whether residents can meet their daily needs with less energy while ensuring that they have easy access to jobs, services and community life. The focus therefore shifts from constructing entirely new districts to improving the existing neighbourhoods, so they are more liveable, accessible and resilient.

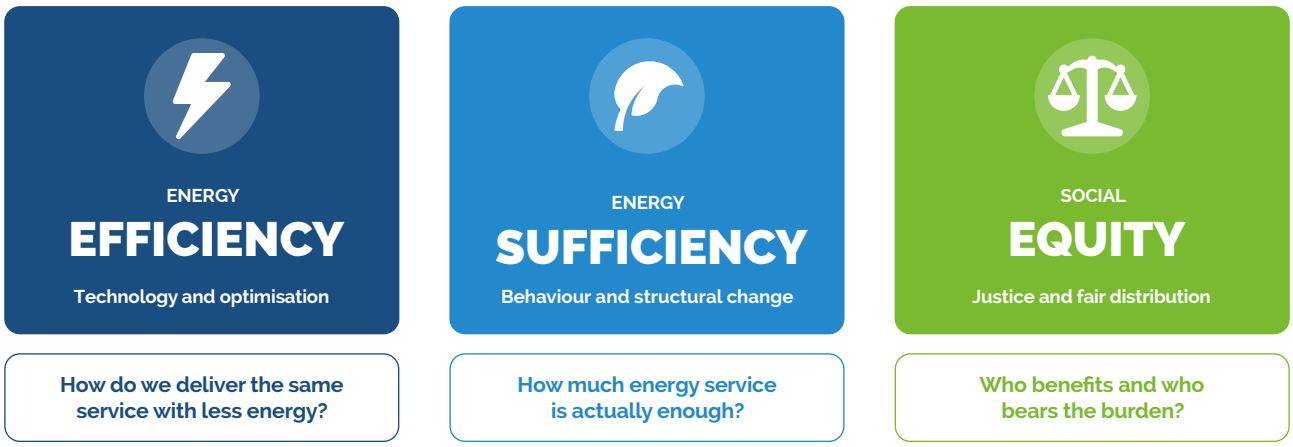
Neighbourhood design (including its transport systems and public and green spaces) plays a key role in determining how much energy people use in their daily lives. The location of public services, accessible public transport, walking and cycling infrastructure, and public and green spaces can reduce energy demand while maintaining access to essential services, enhancing quality of life and supporting more equitable outcomes.

4.1. Energy, mobility, and public and green spaces

The transition to a low-carbon, climate-resilient society takes more than replacing fossils fuels with renewable energy. It also depends on **how much energy we use**, **how we use it** and **how the costs and benefits of change are shared**.

Three dimensions structure this challenge: energy efficiency, energy sufficiency and social equity. Together they go beyond supply-side decarbonisation toward a fuller picture of demand, behaviour and fairness.

Figure 1: Framework for sustainable transformation



Each aspect provides a set of targeted questions to provide information and assist in creating a roadmap. Through a systematic approach to the three dimensions, the guidance presented in the tables below helps identify challenges, set priorities and design strategies that are both sustainable and inclusive.

8 Recyling the City: 5 Sustainable Neighbourhoods Giving New Life to What Already Exists: https://citiestobe.com/recycling-the-city-5-sustainable-neighbourhoods-giving-new-life-to-what-already-exists/

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Note: *The questions below are intended as examples to help municipalities and other interested local stakeholders explore the topic from different perspectives. They are not intended as a checklist that must be fully completed. Depending on the local context, some questions may be more relevant than others and not all questions may be possible to answer.*

4.1.1. Energy

Table 3: Guiding questions for developing a roadmap for energy efficiency and energy sufficiency in a given energy sector

Energy efficiency	Energy sufficiency	Social equity
Energy efficiency refers to the use of improved technologies, equipment and processes to reduce the amount of energy required to deliver a given service while keeping the service and quality of that service the same. Examples include replacing conventional lighting in buildings with energy-efficient LEDs or appliances meeting EU energy-label minimum standards, deploying real-time sensors and automated switching systems to reduce technical losses in electricity transmission and distribution networks, incorporating passive design solutions (orientation, insulation, shading) that reduce heating and cooling demand, etc.	Energy sufficiency refers to a deliberate reduction of energy demand by questioning how much energy is actually needed in the first place. It involves changes in behaviour, lifestyle, and consumption patterns to avoid unnecessary energy use while maintaining wellbeing and quality of life.	**Social equity** in the energy sector is the fair distribution of energy resources and benefits and risks among all members of society, highlighting equal access to affordable and sustainable energy irrespective of income level, ethnicity, race, etc.
Conceptual framework What is our energy vision for the neighbourhood area?		
Define a vision of energy efficiency for the neighbourhood area **Guiding questions** • What is the current energy mix in the neighbourhood? • What is the potential for energy renewable generation? • What are the technical, financial or legal barriers for implementing renewable energy?	Define a vision of energy sufficiency for the neighbourhood area **Guiding questions** • What is the minimum energy requirement for each household for basic services, health and comfort? • What are the main energy uses (heating, cooling, appliances)?	Define a vision for the neighbourhood area that is inclusive of all residents, including vulnerable people **Guiding questions** • Which households currently experience energy poverty or insufficient access? • Could planned interventions increase energy costs for vulnerable people?

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Energy efficiency	Energy sufficiency	Social equity
Establish baseline		
Guiding questions ● What is the total energy consumption for the sector? ● How does consumption vary by season and time of day? ● Which energy equipment is most energy-intensive? ● Are there frequent energy shortages and blackouts? ● Are there any energy audits or monitoring systems already in place?	**Guiding questions** ● What is the average living/working space per person? ● Are there opportunities for shared spaces or multi-functional use? ● What behaviours contribute most to energy use (leaving appliances in standby mode, long showers, etc)? ● How much energy demand could be shifted, reduced or eliminated? ● What natural resources are underutilised (daylight, natural ventilation, etc)? ● Which sufficiency measures would have the greatest impact with the least impact on wellbeing? ● How can energy sufficiency be promoted through local generation and reduced consumption? ● How many devices are left on standby mode?	**Guiding questions** ● What population groups are overconsuming energy? ● What percentage of a household's income do vulnerable people spend on energy? ● How many households must choose between heating/cooling and other basic needs (e.g. food, medicine, etc)? ● How does energy poverty affect mental health and social isolation? ● Are households using potentially dangerous equipment/appliances (e.g. portable gas heaters)? ● What social protection mechanisms exist (e.g. energy subsidies)? ● Do vulnerable people experience discrimination in accessing energy services? ● What is the level of energy literacy among vulnerable people (e.g. familiarity with energy efficiency, knowing their rights, etc.)? **Community engagement** ● Have vulnerable people been consulted about their energy needs and challenges? ● What energy needs do vulnerable people see as most urgent? ● What community organisations work with vulnerable people on energy issues? ● Which methods (digital platforms, surveys, etc.) should be used to collect and incorporate feedback from residents and other stakeholders?

4.1.2. Mobility

Table 4: Guiding questions for developing a roadmap for energy efficiency and energy sufficiency in mobility

Energy efficiency	Energy sufficiency	Social equity
The concept of **energy efficiency** in mobility involves providing the same mobility service through reduced energy consumption. It is primarily a technological and operational approach that focuses on optimising existing systems without necessarily requiring changes in people's travel habits. Examples include improving vehicle fuel economy, adopting electric powertrains, reducing vehicle weight, optimising traffic flow to minimise stop-and-go conditions, etc.	**Energy sufficiency** in mobility focuses on the necessity of energy use for transport and whether mobility systems operate within sustainable planetary boundaries. It seeks to reduce the overall demand for energy-intensive travel while maintaining access to essential services and opportunities. From a practical standpoint, the objective is to minimise travel demands by improving urban planning, which includes concepts like mixed-use neighbourhoods and proximity. Additionally, it emphasises shifting from motorised to active modes like walking and cycling, decreasing the frequencies of trips, substituting physical travel with virtual connectivity where appropriate, and questioning car-dependent lifestyles.	**Social equity** in mobility ensures that the transition toward lower-energy mobility does not disproportionately harm vulnerable or marginalised groups and that access to essential destination remains fair. It seeks to guarantee equitable access to jobs, education, healthcare, etc. A just mobility system guarantees that a decrease in car usage does not negatively impact residents of remote regions. It also dictates that investments in public transit and transportation prioritise underserved communities, and that the financial aspects of eco-friendly mobility do not disproportionately affect lower-income populations.

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Energy efficiency	Energy sufficiency	Social equity
Conceptual framework What is our mobility vision for the neighbourhood area?		
Define a vision of energy efficiency for the neighbourhood area. **Guiding questions** • How can the neighbourhood improve energy efficiency in transport? (e.g. Use less energy-intensive modes of transport per kilometre such as walking, cycling, shared mobility etc) • What are the main challenges in shifting to energy-efficient transport? • What legal, financial or organisational barriers exist?	Define a vision of energy sufficiency for the neighbourhood area. **Guiding questions** • What measures could reduce overall energy demand? (e.g. Reduce total distance travelled and reduce use of motorised transport) • Which activities could be localised to reduce long-distance travel?	Define a mobility vision for the neighbourhood area that is inclusive of all residents, including vulnerable people. **Guiding questions** • What is our mobility vision for the neighbourhood area with regard to vulnerable people? • What are the mobility needs of the neighbourhood's population? • How can mobility contribute to social equity and quality of life in the neighbourhood? • How could mobility improvements benefit vulnerable people and address transport poverty?

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Energy efficiency	Energy sufficiency	Social equity
Establish baseline		
Guiding questions • How is local transportation currently organised in the neighbourhood? • What is the energy demand of each transport mode in the neighbourhood and which modes could be replaced with less energy-intensive alternatives? • What are the current travel patterns, energy use and accessibility gaps? • Who travels how much and why? (Disaggregate by gender, age, income, etc) • What targeted programs or subsidies are available for vulnerable groups, such as reduced fares or accessible transport options?	**Guiding questions** • What activities are being undertaken by stakeholders (local businesses, schools, community groups, NGOs, etc) to promote and support sustainable mobility (e.g. walking, cycling)? • What infrastructure is needed to make walking and cycling more attractive? • What obstacles or safety concerns hinder sustainable mobility, and how do they affect travel behaviour?	**Guiding questions** • Do specific population groups experience unequal impacts from energy-intensive travel needs (e.g. obliged to rely on private cars due to lack of public transport)? • Who lacks adequate access to essential destinations? • Are there barriers such as poor infrastructure or unsafe routes that force specific groups to rely on costly and energy-intensive modes of transport? • Are transport costs a barrier to reaching essential destinations such as work, school, healthcare, etc.? • Do safety or infrastructure issues (e.g. unsafe streets, lack of sidewalks, poor visibility, etc.) prevent certain population groups from using sustainable transport (e.g. walking, cycling, car sharing, etc.)? • How would a new vision for sustainable mobility affect residents' daily activities and what measures are needed to ensure that all population groups (e.g. the elderly, people with disabilities, caregivers, etc.) can access essential services and destinations? **Community engagement** • Who are the key stakeholders in local transport? • How can residents, especially the vulnerable groups, be engaged in shaping mobility solutions? • Which methods (digital platforms, surveys, etc.) should be used to collect and incorporate feedback from residents and other stakeholders in transportation planning? • How does transport planning consider and accommodate vulnerable groups such as people with disabilities, low-income households, etc.?

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4.1.3. Public and green spaces

Table 5: Guiding questions for developing a roadmap for energy efficiency and energy sufficiency in public and green spaces

Energy efficiency	Energy sufficiency	Social equity
Energy efficiency in public and green spaces focuses on delivering the same services with less energy through measures such as high-efficiency LED and smart-controlled public lighting, efficient pumps for irrigation and water features, efficient heating, ventilation and air conditioning in public buildings, and the "efficiency first" principle, which mandates evaluating whether an efficiency solution is more cost-effective and environmentally friendly before investing in new infrastructure.	The concept of **energy sufficiency** in public and green spaces means designing and managing them to meet community needs while using minimal energy. Key elements are prioritising passive design, the utilisation of natural cooling effects derived from vegetation and shade, and the encouragement of shared and adaptable space configurations.	**Social equity** in public and green spaces ensures that these spaces are safe, inclusive, well-maintained and accessible to all community members. It focuses on fair distribution of spaces, equitable maintenance, accessibility for people with disabilities and vulnerable groups, and meaningful participation of underserved communities in the planning, design and management of public spaces.

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Energy efficiency	Energy sufficiency	Social equity
Conceptual framework What is our vision for the neighbourhood area?		
Define the vision of energy efficiency for the neighbourhood area. **Guiding questions** ● How can public and green spaces contribute to energy efficiency? ● What are we trying to achieve? (e.g. Carbon neutrality, cost savings, resilience, etc) ● What are barriers to implementing green space or water saving initiatives? (e.g. Resources, maintenance, etc.)	Define the vision of energy sufficiency for the neighbourhood area. **Guiding questions** ● Which services and amenities[9] are truly essential for achieving our vision? ● Can we shift from energy-intensive to passive solutions? (e.g. Natural cooling, daylighting, etc) ● How can we design spaces that require less energy? ● Which nature-based solutions can help reduce the neighbourhood's energy dependence?	Define the vision for the neighbourhood area with regard to vulnerable people. **Guiding questions** ● How do we ensure planned changes don't disproportionately affect vulnerable groups? ● How to balance energy goals with other objectives? (e.g. Safety, accessibility, recreation) ● Could interventions unintentionally increase inequalities? How can this be prevented? ● What demographic or usage pattern changes should we anticipate?

9 There are many different types of amenities that can be provided to support recreation, social interaction and community life, such as playgrounds, sports facilities, outdoor gyms, picnic and sitting areas, fountains, gardens, performance spaces, markets and other similar features

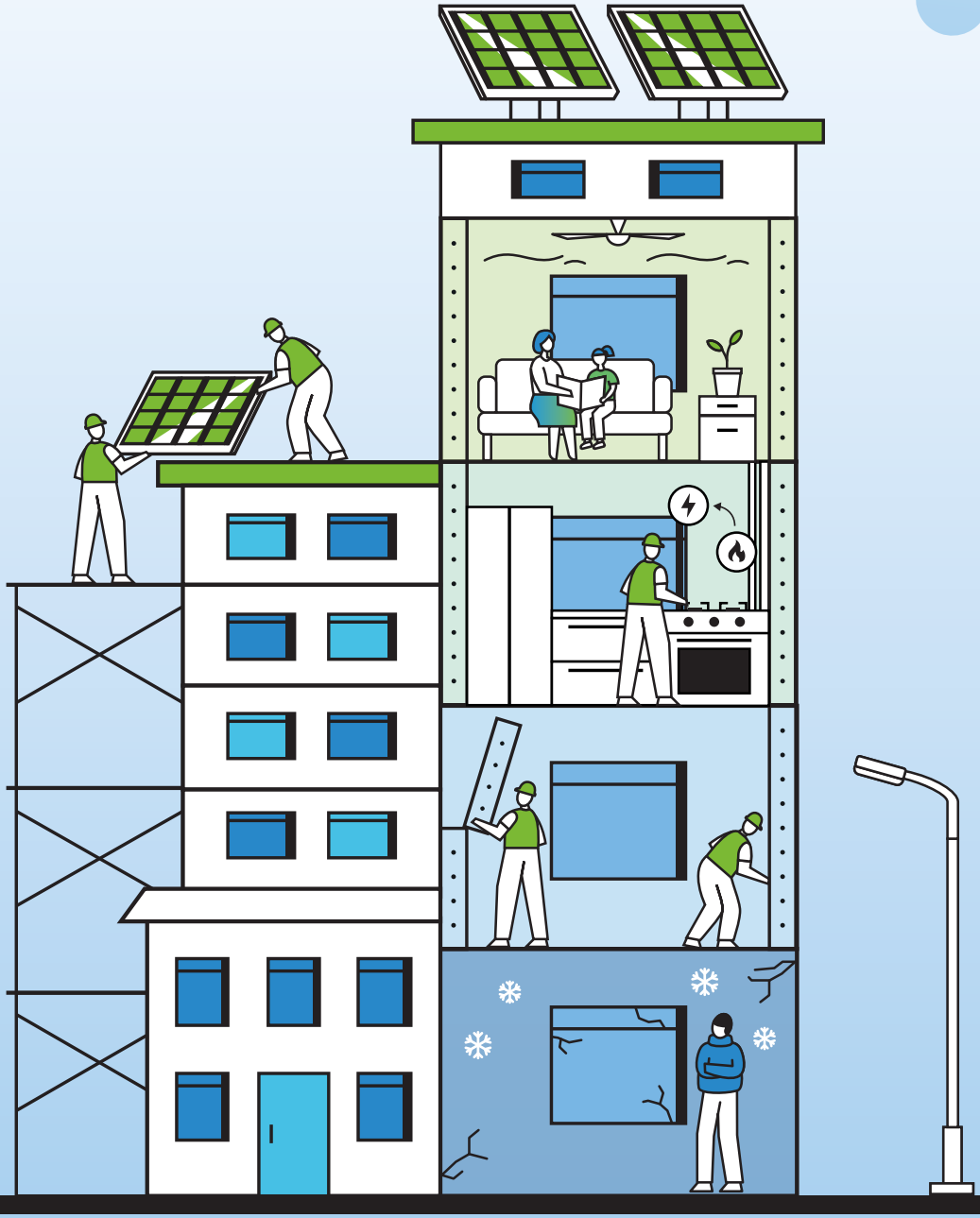
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Energy efficiency	Energy sufficiency	Social equity
Establish baseline		
Guiding questions • What amenities, facilities and services currently exist across public and green spaces in the neighbourhood? (e.g. Lighting, pools, fountains, sports field lighting, gardens, etc.) • What energy sources are currently used to power facilities and infrastructure? (e.g. Grid electricity, renewable sources) • What is neighbourhood total energy consumption across all public and green spaces (by type, location, and season)? • Which amenities/ facilities are the most energy-intensive and why? • How much energy is consumed when facilities are closed or unoccupied? • What maintenance activities consume energy? (e.g. Blowing leaves, mowing lawns, trimming edges, irrigation, etc.)	**Guiding questions** • Which amenities, facilities and services could be redesigned to require less energy while still ensuring sufficient energy for their proper functioning? • What maintenance and operational practices can reduce overall energy consumption without compromising service standards? • How can underutilised facilities or areas be optimised or combined with other functions to reduce unnecessary energy consumption?	**Guiding questions** • Who are the most vulnerable populations in the neighbourhood? (e.g. Elderly populations, single-headed households, people with disabilities, refugees, single parents, ethnic minorities, etc.) • What is the actual visitor/user number for each facility/amenity? • What do users value about green spaces beyond amenities? (e.g. Nature connection, quiet, beauty, etc) • Are energy-intensive amenities used equally across all demographic groups? • Are there populations dependent on specific services (e.g. accessible facilities)? • Which population groups are overrepresented or underrepresented as users? • Do elderly or disabled populations depend on specific features? (e.g. Accessible restrooms, climate-controlled spaces, etc) • Would reduced maintenance (lighting, cleaning, safety) create disproportionate risks; if so, for whom? • Are there population groups for whom public spaces are essential, not optional? • Are public spaces critical for physical activity for those who can't afford gyms or lack safe outdoor space?

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Energy efficiency	Energy sufficiency	Social equity
Establish baseline (continued)		
		Guiding questions (continued) ● Do elderly, young or medically vulnerable populations depend on specific amenities? ● Are there population groups for whom well-maintained public spaces provide safety from domestic or neighbourhood violence? ● Do facilities host culturally important gatherings, celebrations or practices? **Community engagement** ● What kind of engagement process should we have to reach diverse communities? (e.g. Language access, meeting times, locations, formats, etc.) ● Which community groups, NGOs, businesses, etc. should be engaged? ● How can it be ensured that voices of vulnerable people are not absent or ignored? ● What challenges exist in engaging residents in public and green space management? (e.g. Lack of interest and understanding, lack of skills and time, institutional barriers, etc.)

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5. Conclusion

It is demonstrably clear that a NESR is not a box-ticking exercise. It's a working plan for making a neighbourhood more energy-efficient and energy-sufficient, developed together with people who actually live there.

A few things are worth keeping in mind before starting developing a neighbourhood roadmap:

- **A site visit tells you what data can't.** Reports and databases are a starting point, but should be paired with an actual walk through the neighbourhood while talking to residents, building managers, etc.).
- **Run the energy analysis before setting goals, not after.** Knowing where energy is actually being lost or overused is what turns a general ambition into a realistic target.
- **Use the guiding questions to prioritise, not to overwhelm.** Not every question needs an answer. Cluster what you find by theme and check it against urgency and feasibility before turning it into a goal.
- **Energy-poor and vulnerable households need a different engagement approach.** Treating every group in the same way risks producing a roadmap that isn't actually inclusive.
- **Community engagement is an ongoing process**. Use the ComActivate Community Engagement Toolkit[10] if you are unsure where to start.
- **The first version is a starting point, not a final one.** A NESR develops further as more local data and feedback come in.

Start with what you can do now. Not having every answer isn't a reason to wait. Take the steps that are available to you today – whatever you can't accomplish this time will become part of the next version.

10 See footnote 7

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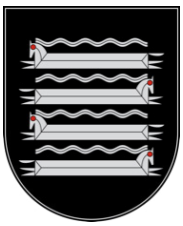

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