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Centrul Național pentru Energie Durabilă

GUIDE

to complete the

LOCAL INTEGRATED PLAN ON ENERGY AND CLIMATE FOR THE PERIOD 2025-2030

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Disclaimer

The sole responsibility for the content of this document lies with the authors. The information, opinions and results included in this plan are based on the interpretation of data collected, analyses and interviews conducted during the implementation of the task. The document may contain sensitive and confidential information.

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Foreword

The Local Integrated Energy and Climate Plan (LIECP) is the main planning instrument at the local level for the implementation of public policies in the field of energy efficiency, the use of renewable energy sources, the reduction of greenhouse gas emissions and, possibly, adaptation to climate change, in accordance with the national objectives assumed by the Republic of Moldova.

The LIECP model offers a complex and detailed structure, which involves the collection, analysis and presentation of a significant volume of technical, economic and social data. In the absence of clear and unified methodological explanations, this process can generate different interpretations, non-uniform approaches and difficulties in the practical application of the document at the level of local public administration authorities.

This Guide for LIECP was developed with the aim of supporting local public authorities, energy managers, technical specialists and other actors involved in the process of developing the LIECP, by providing detailed, explicit and applied explanations for each chapter, subchapter, table and indicator provided in the plan model.

methodological and indicative character , being designed as a practical working tool. It does not introduce additional obligations to the existing legal framework and does not replace the provisions of the normative acts in force, but rather aims to facilitate the correct, coherent and comparable application of the LIECP model.

The document is particularly addressed to:

- local public administration authorities with municipal status;
- local public authorities of level I and II that develop LIECP voluntarily;
- local energy managers;
- specialists in the fields of energy, urban planning, municipal management, environment and social affairs;
- consultants and experts involved in the development of local strategic documents.

This Guide should be used in parallel with the LIECP template , as a reference document throughout the entire process of developing, updating, implementing and monitoring the plan. Each paragraph of the LIECP is treated separately, with indications on its purpose, the data required, the recommended sources, acceptable estimation methods and common mistakes to be avoided.

By using this Guide, the aim is to ensure a unified approach at the national level, increase the quality of LIECP documents developed at the local level, and facilitate the process of evaluating, monitoring, and financing planned measures in the field of energy and climate.

Notations and abbreviations

AAC	-	Water Supply and Sewerage
DHW	-	Domestic hot water
NEA	-	National Employment Agency
ANRE	-	National Energy Regulatory Agency
ASP	-	Public Services Agency
API	-	Local Public Authority
NBS	-	National Bureau of Statistics
citizen	-	Power plant with district heating
National Health Insurance Agency	-	National Social Insurance House
CNDRA	-	National Center for Sustainable Energy
CO_2	-	Carbon dioxide
CO2eq	-	CO_2 equivalent
CoM	-	Covenant of Mayors for Climate and Energy Initiative – Eastern Partnership
PC	-	Public buildings
-R	-	Residential buildings
CT	-	Thermal power plant
CUATM	-	Classifier of administrative-territorial units
DRS	-	Simple recovery time
EE	-	Energy efficiency
E-SER	-	Electricity produced from renewable energy sources
EU / EU	-	european union
GHG	-	Greenhouse gases
IGSU		General Inspectorate for Emergency Situations
IP	-	Street lighting
JRC	-	Joint Research Centre
light	-	Light Emitting Diode
MW	-	mega watt
ENVELOPE		Integrated Local Energy and Climate Plan
PNIEC	-	Integrated National Energy Climate Plan
PV	-	Photovoltaic Panels
PUG	-	General urban plan
PUZ	-	Zonal urban plan
RV	-	Risk - Vulnerability - Adaptation
BAG	-	Centralized Thermal Energy Supply System
SERUM	-	Renewable Energy Sources
SIVE	-	Energy Vulnerability Information System
failed	-	Administrative-Territorial Unit

Introduction

The Integrated Local Energy and Climate Plan is a complex document, combining requirements from the fields of energy, climate and social policies. The LIECP model developed by the National Center for Sustainable Energy provides the mandatory structure of the plan, but does not explain in detail how each chapter should be completed and what type of information is expected from local public authorities.

This Guide for completing the LIECP was developed to support local public administration authorities in the correct and uniform use of the LIECP model, reducing the risk of different interpretations and uneven completion of the document.

LIECP is the main planning tool at the local level through which local public authorities contribute to the implementation of: the Integrated National Energy and Climate Plan 2025–2030, national policies in the field of energy efficiency, actions to reduce greenhouse gas emissions, measures to adapt to climate change, actions to prevent and reduce energy poverty.

The LIECP is not a theoretical document, but one oriented towards concrete actions, investments and monitoring.

This Guide explains, in accessible and practical language:

- what is completed in each chapter of the LIECP;
- what information is mandatory and what is indicative;
- what data sources can be used;
- how to avoid the most common filling mistakes;
- how to ensure coherence between chapters.

The guide should be used in parallel with the LIECP model, as a working tool throughout the entire development process.

To avoid confusion, it is important to emphasize that this Guide:

- does not introduce additional obligations to the existing legal framework;
- does not replace regulatory acts or public policy documents;
- does not impose technical solutions or specific investments;
- does not substitute the decisions of the local public authority.

The examples presented, in colored boxes, are indicative and can be adapted according to local specifics.

It is recommended that, before actually completing the LIECP, the local public authority:

- read this Guide in its entirety;
- designate a person responsible for coordinating the process;
- identify available local data sources;
- establish the base year for energy data.

The ultimate goal of the Guide is to support local authorities in developing a realistic, data-based LIECP, with achievable measures and measurable impact, that meets the needs of the community and national and European objectives.

1. General

1.1 Purpose and scope of the Guide

This Guide aims to explain how to complete the Integrated Local Energy and Climate Plan, in accordance with the official model developed and promoted by the National Center for Sustainable Energy.

The Guide is intended for local public administration authorities that develop LIECP, especially municipalities, as well as other administrative-territorial units that voluntarily opt for this planning tool. The Guide can also be used by energy managers, technical specialists within the ATU and consultants involved in the plan development process.

The scope of the Guide covers all chapters of the LIECP and addresses issues related to:

- energy efficiency;
- use of renewable energy sources;
- climate change;
- energy poverty;
- monitoring and reporting on the implementation of measures.

The Guide is methodological and indicative in nature. It does not introduce additional obligations and does not replace the legal framework or public policy documents in force, but supports the correct and uniform application of the LIECP model at the local level.

1.2 Definitions and classifications

In order to uniformly apply the LIECP model and avoid different interpretations at local level, this Guide uses the following definitions and classifications, taken from the relevant national and European legal and methodological framework for the energy and climate field.

Integrated Local Energy and Climate Plan - a planning document developed at the local level, which establishes objectives, measures and actions regarding energy efficiency, the use of renewable energy sources, the reduction of greenhouse gas emissions, adaptation to climate change and the alleviation of energy poverty, in accordance with the Integrated National Energy and Climate Plan.

Energy efficiency (EE) - the totality of measures that lead to the use of energy with lower consumption for the same level of comfort or energy service.

Renewable energy sources (RES) – non-fossil, naturally renewable energy sources, such as solar, wind, hydropower under 10 MW, biomass, etc.

Final energy consumption – the amount of energy delivered to end users for uses such as heating, cooling, lighting, transportation or equipment operation.

Primary energy consumption – the energy contained in natural resources before transformation or conversion into usable energy.

GHG (greenhouse gases) – emissions of CO_2, CH_4, N_2O and other greenhouse gases, expressed in tonnes of CO_2 equivalent, generated as a result of energy consumption and other anthropogenic activities

Emissions inventory – calculation of GHG emissions resulting from local energy consumption and non-energy processes.

Local energy sector – set of services and activities that involve energy consumption at the local level: buildings, lighting, transport, water-sewage, waste, etc.

Energy poverty – the situation in which a household cannot secure basic energy services (heating, cooling, lighting, cooking or mobility) at an affordable cost or is forced to restrict its energy consumption below an adequate level of comfort.

Energy manager – person designated by the local public authority, responsible for collecting and managing energy data, monitoring consumption and supporting the implementation of the measures provided for in the LIECP.

Climatic hazard - climatic or hydrometeorological phenomenon with the potential to produce negative effects (e.g. heat wave, drought, floods, frost).

Exposure - the presence of population, infrastructure or economic activities in areas affected by climate hazards.

Vulnerability - the degree to which a system or population is susceptible to the negative effects of climate hazards, determined by social, economic and physical characteristics.

Impact - the effects resulting from the interaction between hazard, exposure and vulnerability (e.g. damage, loss, impairment of health or services).

Climate resilience - the ability of a system or community to withstand, adapt and recover from an adverse climate event.

Adaptive capacity - the ability of a system or community to adjust to climate change, reduce risks and capitalize on potential opportunities.

based Solutions - measures that use natural processes (e.g. green spaces, wetlands, forest curtains) to reduce climate risks and generate multiple benefits for the environment and society.

Within the LIECP, for clarity of presentation and analysis, the following general classifications are used:

- public buildings and residential buildings;
- basic measures and additional measures;
- own sources of financing, attracted sources and co-financing;
- reactive adaptation, incremental adaptation and transformational adaptation.

The use of these definitions and classifications ensures a coherent and comparable approach to the information presented in the LIECP, regardless of the size or specificity of the administrative-territorial unit.

1.3 Responsibilities of the LPA and the energy manager in the LIECP process

1.3.1 The role of local public administration authorities

Local public administration authorities are **the holders of the LIECP** and bear **the legal, institutional and decision-making responsibility** for the development, approval, implementation and monitoring of the Local Integrated Energy and Climate Plan.

The LPA has the following main responsibilities:

a) Strategic and institutional responsibilities:

- initiates the process of developing the LIECP by administrative decision (mayor's order or local council decision);
- ensures the integration of the LIECP into the architecture of local planning documents (socio-economic development strategy, sectoral plans, etc.);
- guarantees the coherence of the LIECP with national policies (PNIEC, PNASC, energy and climate legislation);
- sets local objectives in the field of energy efficiency, renewable energy, GHG emission reduction and climate change adaptation.

b) Organizational and coordination responsibilities:

- appoints the energy manager or the person responsible for energy and climate;
- constitute, as appropriate, an intersectoral working group (buildings, transport, WSS, waste, environment);
- ensures cooperation between internal subdivisions, municipal enterprises and subordinate institutions;
- organizes consultations with local stakeholders (civil society, economic agents, citizens).

c) Responsibilities regarding approval and political commitment:

- examines and approves the LIECP by decision of the local council;
- officially undertakes the implementation of the measures provided for in the LIECP;
- ensures the inclusion of LIECP measures in the annual and multi-annual budgets of the LPA.

d) Implementation and monitoring responsibilities:

- coordinates the implementation of the measures in the LIECP through its own structures and subordinate institutions;
- ensures the collection of data necessary for monitoring (energy, emissions, investments, indicators);
- approves the annual progress reports on the implementation of the LIECP;
- submits reports to CNED, according to established requirements.

e) Responsibilities regarding attracting funding:

- uses LIECP as a substantiating document for accessing national and foreign funds;
- initiates investment projects based on the measures provided for in the LIECP;
- ensures local co-financing, as appropriate.

1.3.2 The role of the energy manager

The energy manager is **the technical and operational person responsible** for the energy and climate field at the local level and **the main technical coordinator of the development and implementation of the LIECP** .

The energy manager acts based on the attributions established by the LPA and has the following responsibilities:

a) Technical coordination of the development of the LIECP:

- coordinates the process of collecting energy and climate data;
- develops or supervises the creation of the energy consumption and GHG emissions inventory;
- contributes to defining quantified objectives (energy, CO_2, RES);
- formulates proposals for energy efficiency, decarbonization and adaptation measures.

b) Analysis and technical substantiation:

- analyzes historical consumption data and identifies potential savings;
- calculates annual energy savings and CO_2 emission reductions;
- estimates the costs and lifespan of the proposed measures;
- ensures the technical correlation of local measures with those in the PNIEC.

c) Support for the climate change adaptation component:

- supports the assessment of climate risks relevant to local energy infrastructure;
- contributes to defining adaptation measures in the LIECP, especially those related to energy infrastructure and public buildings;
- uses historical data and relevant national guidelines to substantiate measures.

d) Implementation, monitoring and reporting:

- monitors the technical implementation of the measures in the LIECP;
- collects and centralizes progress data (energy saved, CO_2 reduced, investment status);
- prepares annual technical reports on the implementation of LIECP;
- ensures technical communication with CNED throughout the life cycle of the LIECP.

e) Interface role and technical advisor:

- acts as a technical contact point between the LPA and the CNED;
- provides technical support to the LPA management in decision-making;
- supports the preparation of technical documentation for investment projects;
- contributes to growth the institutional capacity of LPAs in the field of energy and climate.

The LPA has a **decision-making, institutional and political role** ;

The energy manager has a **technical, analytical and operational role** .

The LPA **does not delegate** political or legal responsibility to the energy manager, and the energy manager **does not substitute** the administrative decisions of the LPA.

The responsibilities described above will be carried out in compliance with the principles of inclusion, ensuring balanced participation of women and men, taking into account the needs of different social groups and, where possible, using disaggregated data to identify and address differences in vulnerability and access to resources.

1.4 Procedural aspects

1.4.1 Preparation of the IECP

The development of the LIECP is a phased process, involving political decision, technical analysis, public consultation and coordination with the National Center for Sustainable Energy (CNED).

Stage 1. Official initiation of the LIECP process

Recommended period : 2 - 4 weeks
Purpose - Political and institutional ownership of the process and creation of the internal legal framework.

Table 1Actions for the official initiation of the LIECP process

API	Energy manager	CNDRA
• analyzes the legal obligation / strategic opportunity to develop the LIECP; • issues the administrative act of initiation (provision / decision); • establishes the format of the document: - ENVELOPE separate document (registered), or - LIECP integrated into a development document; • appoints **the energy manager** as technical manager; • decides to set up an intersectoral working group; • notify CNED of the initiation of the process (recommended).	• provides technical support in decision-making; • identifies the main energy sectors of the UAT; • proposes a realistic initial timetable.	• provides the LIECP Guide and the standard LIECP model; • provides methodological clarifications upon request; • recommends the use of official national data and standardised methodologies; • can provide, upon request, initial technical consultations. • It does NOT validate the initiation and does NOT intervene in decision-making.

Result - LIECP process officially launched, with clear responsibilities.

Stage 2. Process organization and internal planning

Recommended period : 2 - 3 weeks
Purpose - Transforming the political decision into an operational work process with a work calendar

Table 2Actions in process organization and internal planning

API	Energy manager	CNDRA
• mandates subdivisions and municipal enterprises to provide data; • clarifies internal roles (who provides what data); • approves the internal work calendar.	• develops the LIECP work plan: stages, deadlines, deliverables, responsibilities; • identifies existing documents (SECAP [1], strategies, studies); • defines the working methodology (energy, CO_2, adaptation).	• can provide general advice; • DOES NOT approve internal plans.

Result - Realistic schedule and functional coordination mechanism.

[1] In the case of the existence of a **SECAP** developed within the Covenant of Mayors, it can be adapted to obtain a LIECP, as presented in Annex 1.

Stage 3. Data collection and baseline establishment

Recommended period: 1.5 - 2.5 months

Purpose - Determining the real energy and climate situation of the locality and creating a solid, verifiable and auditable factual base

Table 3Actions in data collection and establishing the baseline situation

API	Energy manager	CNDRA
• facilitates access to data of subordinate institutions; • intervenes administratively if blockages occur.	• collects data on: - energy consumption (buildings, lighting, transport, AAC, waste); - local energy production; - fuels used; • establishes the base year ; • consolidates data into a single inventory; • check for consistency and lack of duplication. • ensures, where data are available, their disaggregation by gender and other relevant categories of vulnerability, to ensure the identification of differences in access to resources, exposure to risks and adaptive capacity.	• recommends official data sources; • It does NOT validate raw data.

Result - Complete and verifiable energy and emissions inventory.

Stage 4. Risk and vulnerability analysis and local needs

It is recommended that the analysis of the local context integrate, where relevant and data are available, the social dimension, including gender equality aspects, to better reflect differences in needs, vulnerabilities and access to resources.

Recommended period: 3 - 4 weeks

Purpose - Identifying problems, real risks, opportunities and priority areas for intervention.

Table 4Actions in the analysis of risks, vulnerabilities and local needs

API	Energy manager	CNDRA
• validates critical infrastructures; • identifies vulnerable groups (energy poverty); • confirms local political priorities.	• analyzes energy performance by sector; • assess energy vulnerability; • carries out climate risk assessment based on historical data (UNDP guidelines); • formulate clear risks (hazard × exposure × vulnerability).	• recommends standard approaches; • It does NOT impose alternative methodologies.

Result - Solid analytical basis for defining objectives.

Stage 5. Defining the LIECP objectives

Recommended period: 2 - 3 weeks
Goal - Establish clear and measurable local targets.

Table 5Actions in defining LIECP objectives

API	Energy manager	CNDRA
• decide the level of ambition; • takes political responsibility for its objectives; • confirms the LIECP period.	• formulate quantified objectives; • correlates the objectives with the PNIEC; • proposes SMART indicators.	• provides clarifications regarding the correlation with the PNIEC; • DO NOT approve local objectives.

Result - Quantified objectives aligned with the national framework.

Stage 6. Development of the action plan

Recommended period: 1 - 1.5 months
Goal - Transforming objectives into concrete and fundable actions.

Table 6Actions in developing the action plan

API	Energy manager	CNDRA
• validates the list of measures; • establishes prioritization and feasibility; • confirms budgetary capacity.	• defines measures by sector; • calculates energy and CO_2 savings; • estimates costs and sources of financing; • defines responsibilities and deadlines.	• provides model tables; • DO NOT modify the content.

Result - Complete, quantified and implementable action plan.

Stage 7. Establishing the implementation and monitoring mechanism

Recommended period: 2 - 3 weeks
Purpose - Ensuring the applicability and reporting of LIECP.

Table 7Actions in establishing the implementation and monitoring mechanism

API	Energy manager	CNDRA
• approves the mechanism; • integrates LIECP into the budget; • undertakes official reporting.	• defines indicators; • establishes the frequency of reporting; • prepares report formats.	• establishes reporting requirements; • collects aggregate data.

Result - LIECP monitorable and compatible with CNED requirements.

Stage 8. Public consultation

It is recommended to organize consultations in an inclusive manner, ensuring balanced participation of women and men, including from vulnerable groups.

Recommended period: 3 - 4 weeks
Purpose - Increasing legitimacy and transparency.

Table 8Actions in the public consultation

API	Energy manager	CNDRA
• publishes the LIECP project; • organizes consultations;	• explains the technical content; • adjust the document.	DO NOT participate.

API	Energy manager	CNDRA
• decides on the integration of the proposals.		

Result - socially validated ENVELOPE.

Stage 9. Approval of the LIECP by the local council

Recommended period: 2 - 4 weeks
Purpose - Political and legal assumption of LIECP.

Table 9Actions in the approval of the LIECP by the local council

API	Energy manager	CNDRA
• submits LIECP for approval; • adopts the official decision of the local council; • includes LIECP in the system of official documents of the LPA (Annex 1)	provides technical support to advisors.	DO NOT participate.

Result - LIECP becomes an official document of APL.

1.4.2 Sending the LIECP to CNED and approving it

The LIECP, having been approved locally, will be sent for verification, consultation and acceptance to the CNED. This involves several actions, which can be completed within a period of 1 - 2 months and have as their ultimate **goal** the official recognition at national level of the developed LIECP.

Sending the LIECP to CNED

Table 10Actions in submitting LIECP to CNED

API	Energy manager	CNDRA
1. officially submits the following documents to the CNED: - ENVELOPE approved; - the decision of the local council; - letter of submission signed by the LPA management; 2. designate the institutional contact person (usually: the energy manager).	1. prepares the technical file for transmission to CNED; 2. checks the completeness and technical coherence of the document; 3. ensures that: - energy and emission indicators are calculated correctly; - the measures are correlated with the PNIEC.	• only receives LIECPs approved by the local council

LIECP evaluation by CNED involves several actions:

- initial evaluation: 20 - 30 calendar days;
- submission of observations (if applicable): in writing;
- review by the LPA: 15 - 30 days, depending on complexity;
- confirmation of final acceptance: 10 days.

Table 11Actions in the assessment of LIECP by CNED

API	Energy manager	CNDRA
1. ensures institutional availability for clarifications; 2. analyzes the CNED observations officially received; 3. decides, as the case may be: - acceptance of observations; - approval of a revised version of the LIECP (if the changes are substantial); 4. transmits the official position of the LPA to CNED (confirmation or revised version).	1. technically analyzes CNED observations ; 2. elaborates: - technical answers; - corrections to indicators or wording; 3. updates the LIECP, if necessary; 4. transmits the APL: - explanatory note regarding the changes; - revised version of the document; 5. communicates technically with CNED throughout the process.	CNED carries out a conformity assessment, which exclusively aims at: - compliance with the structure and requirements according to the LIECP Guide; - correlation of objectives and measures with the PNIEC; - the existence of monitoring and reporting mechanisms; - coherence of indicators (energy, CO_2, investments).

Confirmation of acceptance of the LIECP

After completing the evaluation and fulfilling all CNED recommendations regarding the content of the LIECP, the document is to be accepted by the CNED.

Table 12Actions in confirming LIECP approval

API	Energy manager	CNDRA
After receiving CNED confirmation: 1. **officially acknowledges** the acceptance of the LIECP; 2. integrates LIECP: - in the budget process; - in the operational documents of the LPA; 3. uses ENVELOPE: - as a basic document for financing; - for reporting and planning.	1. archives CNED acceptance documents; 2. updates internal implementation plans; 3. prepares the monitoring and data collection mechanism; 4. informs subordinate structures about reporting requirements.	After completing the assessment: • CNED sends the APL a confirmation of acceptance of the LIECP; • The LIECP is registered in the CNED records; • The document will be a tool for: - local planning, with a reference role; - use in financing applications; - periodic monitoring of the degree of implementation.

1.4.3 Monitoring and reporting to CNED

Although the LPA remains solely responsible for the effective implementation of the measures, several dedicated activities can be identified during this stage, which are presented in the table below.

Table 13Actions in the implementation and monitoring of the LIECP

API	Energy manager	CNDRA
1. provides the institutional framework for monitoring; 2. approves periodic progress reports; 3. sends the official (signed) reports to the CNED; 4. decides to adjust the LIECP, if necessary (biennial update or according to PNIEC).	1. collects and centralizes implementation data , including: - energy saved; - low emissions; - investments made; 2. prepares annual technical reports ; 3. monitors LIECP indicators; 4. CNED transmits:	- collects annual or periodic reports submitted by LPAs; - analyzes progress at the aggregate (national) level; - can formulate general recommendations for improvement; - uses LIECP data for PNIEC reporting and dialogue with development partners.

API	Energy manager	CNDRA
	- the requested technical data; - methodological clarifications. 5. supports updating the LIECP, if necessary	

1.5 The value of LIECP for access to financing for LPAs

ENVELOPE - more than a planning document

The Integrated Local Energy and Climate Plan is not only a strategic document, but a key tool for accessing financing , which demonstrates that a local public authority:

- has a clear vision of development;
- plans medium-term investments;
- uses public resources efficiently;
- contributes to national energy and climate objectives.

In practice, the LIECP represents the reference document through which the LPA justifies its investment projects to financiers.

LIECP as an eligibility document for funding

The Integrated Local Energy and Climate Plan is an important document for most funding programs in the field of:

- energy efficiency;
- renewable energy;
- reducing GHG emissions;
- adaptation to climate change;

there is an explicit or implicit requirement for the LPA to demonstrate that the investment:

- it is part of a strategic plan;
- contributes to national objectives;
- has continuity and coherence .

and LIECP performs exactly this function.

An ENVELOPE:

- confirms that the projects proposed for implementation by the LPA **are not isolated** , but are part of a structured plan, approved at the local level;
- provides financiers **with security and predictability** ;
- reduces the risk of rejection of funding applications.

The role of LIECP in the relationship with funders

From the perspective of funding institutions, a well-developed LIECP shows that the LPA:

- knows the real energy situation of the locality;
- assessed the impact of the proposed investments;
- set clear priorities;
- has administrative capacity for implementation.

Thus, ENVELOPE:

- **increases the credibility of the LPA** ;

- reduces project evaluation time;
- facilitates financing approval.

Types of financing opportunities generated by the existence of a LIECP

a) National funds and programs

LIECP is the document recognized and coordinated by the National Center for Sustainable Energy , which makes it:

- compatible with national programs;
- usable as a supporting document for grants and co-financing;
- tool for prioritizing local investments.

b) External funds and development partners

For donors and international financial institutions, LIECP:

- demonstrates alignment with national policies;
- shows institutional maturity;
- reduces implementation risks.

LPAs with LIECP are better positioned in grant competitions.

c) Co-financing and partnership projects

ENVELOPE:

- clearly identifies the investment needs;
- allows structuring phased projects;
- facilitates public-private partnerships;
- supports attracting private investment in local energy infrastructure.

Direct benefits for LPA from a financial point of view

Existence of an ENVELOPE:

- helps **reduce current expenses** (energy, utilities);
- allows multi-annual budget planning;
- increases the efficiency of the use of public money;
- reduces dependence on external energy sources;
- contributes to the financial stability of the LPA.

LIECP as a negotiation and decision tool

For APL, LIECP:

- provides solid arguments before the local council;
- supports negotiations with financiers;
- facilitates dialogue with central institutions;
- supports prioritizing projects based on impact, not on circumstantial opportunities.

LIECP does not automatically guarantee financing, but its absence significantly reduces the chances of financing.

A well-developed LIECP provides a coherent framework for identifying and planning local projects.

Table 14Summary – LIECP value for LPA

Without ENVELOPE	With ENVELOPE
Isolated projects	Integrated projects
Limited access to financing	Priority access to financing
Ad hoc decisions	Strategic planning
High long-term expenses	Savings and predictability
Energy vulnerability	Resilience and autonomy

LIECP is **the tool through which the LPA moves from intentions to investments** , from reactions to planning, and from energy dependence to sustainable development.

1. 6 General legal framework

The development and implementation of the Integrated Local Energy and Climate Plan is carried out based on the legal framework and public policies in force in the field of energy and climate in the Republic of Moldova.

LIECP transposes at the local level the objectives and directions established by the ***Integrated National Energy and Climate Plan for the period 2025–2030*** , approved by Government Decision No. 86/2025, and contributes to achieving national targets in the field of energy efficiency, the use of renewable energy sources and the reduction of greenhouse gas emissions.

The main legal basis for the development of the LIECP consists of:

Relevant EU directives and regulations (including Directive 2023/1791 on energy efficiency)
Relevant elements for LIECP:

- introduces the obligation for the public sector to reduce final energy consumption annually;
- establishes the principle of "energy efficiency first", mandatory in all local planning;
- recommends that local authorities develop integrated energy-climate plans;
- defines the framework for identifying energy-vulnerable households;
- sets out the indicators for energy poverty - used in chapter 5.

Law No. 139/2018 on energy efficiency
Relevant provisions for LIECP:

- establishes the obligation of LPAs to develop and implement local energy efficiency policies;
- establishes the requirement to **monitor energy consumption in public buildings** ;
- defines the responsibilities of LPAs regarding the collection and reporting of energy data;
- provides for the position of Local Energy Manager or technical manager for EE;
- sets the framework for local building renovation programs.

Law No. 74/2024 on climate action
Relevance for LIECP:

- introduces the obligation for local governments to integrate climate change adaptation into local planning;
- defines the requirements for **climate risk and vulnerability assessment (CRA)** ;
- requires the development of adaptation measures at local level;
- requires periodic reporting on implemented climate actions.

Law No. 10/2016 on the promotion of energy from renewable sources
Application in ENVELOPE:

- establishes the conditions for the integration of RES into local infrastructure;
- provides support for photovoltaic, solar thermal, biomass, biogas projects;
- defines the support schemes for self-consumption and prosumers that can be introduced in the LIECP;
- provides for the obligation of LPAs to support the development of RES infrastructure.

Law No. 282/2023 on the energy performance of buildings
Provisions included in the LIECP:

- the obligation to assess the energy performance of public buildings;
- minimum requirements for major renovations;
- the obligation of energy performance certificates for buildings;
- promoting nearly zero-energy buildings (nZEB);
- integrating the concept of phased renovation.

At the same time, according to **Article 10.** Local public administration authorities

(1) **In the field of energy performance of buildings, local public administration authorities exercise the following basic duties:**

a) ensures the inclusion of actions to improve the energy performance of buildings in integrated local energy and climate plans;

b) may contribute to the co-financing of national programs regarding the improvement of the energy performance of buildings located on the territory of the administrative-territorial unit, within the limits of local budgets;

c) contributes to informing the local community about the importance and benefits of building energy performance measures;

d) contributes, at local level, to the implementation of state policy in the field of energy performance of buildings.

(2) When issuing the permissive acts provided for by the Urban Planning and Construction Code no. 434/2023, local public administration authorities are obliged to ensure compliance with the minimum energy performance requirements, as well as other requirements established in this law.

Government Decision No. 86/2025 – Integrated National Energy and Climate Plan (INCEAP)
Direct link to LIECP:

- sets national targets for reducing emissions and increasing energy efficiency by 2030;
- specifies the local contribution to achieving RES objectives;

- defines the key sectors to be included in the LIECP (buildings, transport, industry, SACET, waste);
- foresees the need to synchronize local actions with national policies.

Government Decision No. 595/2025 – Strategy for the renovation of the real estate fund 2025–2050

Applicability for LIECP:

- establishes strategic directions for the renovation of the housing and public stock;
- introduces the concept of a "local renovation wave" that LIECP must detail;
- defines priorities for the renovation of essential public buildings (schools, hospitals, etc.);
- requires the assessment of building consumption and intervention plans.

Government Decision No. 624/2023 on the approval of the National Climate Change Adaptation Program until 2030

Relevance for LIECP:
The development of the adaptation component within the LIECP is carried out in accordance with GD no. 624/2023. LIECP ensures the transposition at the local level of the objectives and directions of action established at the national level, by identifying climate risks specific to the ATU and defining appropriate adaptation measures.

Government Decision No. 10/2024 on the approval of the Regulation on the energy governance mechanism and climate action establishes the institutional and methodological framework for the planning, implementation and monitoring of energy and climate policies.

In this context, LIECP is part of the national governance mechanism as an implementation tool at the local level, contributing to achieving national targets regarding energy efficiency, the use of renewable energy sources, the reduction of greenhouse gas emissions and adaptation to climate change.

The structure and content of the LIECP are aligned with the principles of this mechanism, including in terms of setting targets, defining measures and monitoring progress.

1.7 Setting sectoral targets in the field of EE and/or RES

This section describes **the complete methodology that LPAs must apply** to set their own targets in the field of energy efficiency and renewable energy sources, in accordance with the requirements of the LIECP, national legislation and JRC technical guides.

The methodology is structured in clear steps so that the target setting process is justified, measurable, realistic and compatible with national (NECPs) and European objectives (Directive 2023/1791).

1.7.1 Basic principles for setting targets

API must respect the following fundamental principles:

- *The principle of " energy efficiency first "* - the implementation of energy efficiency measures takes priority over the installation of new energy capacities.

- *Data-driven approach* - targets are set based on the consumption and emissions assessed in Chapter 2.
- *Comparability and transparency* - JRC standardized indicators are used.
- *Realism and feasibility* - targets must be achievable with local technical and financial resources.
- *Contribution to the PNIEC 2030 objectives* - local targets must be aligned and proportionate to national ones.
- *Social impact* - setting targets must take into account the energy-vulnerable population.

1.7.2 Methodological steps for setting local targets

The methodology for setting sectoral targets used in this Guide is aligned with the guidelines developed by the Joint Research Centre (JRC) of the European Commission for local energy and climate planning, being adapted to the national context and the LIECP model.

The percentages (% energy reduction, % RES) are ***the result of the aggregation of the impact of the PNIEC measures*** that the LPA can implement by 2030, compared to the consumption in the base year. Thus, the LPA does not indicate arbitrary values of % of consumption reduction, of increasing the share of local RES, these result from the impact of the selected measures. At the same time, the LPA does not take over the national percentages , but contributes proportionally , depending on what it can control locally.

The LPA does not choose percentages → the LPA chooses measures → the percentages result from calculations.

The following are the steps recommended to the local public authority to correctly complete the values of type "XX%" and "XXX kg CO_2e" in the chapter on sectoral targets.

Step 1 – Choosing the base year

- The last year with complete energy consumption data is selected (this may be the year preceding the year in which the LIECP was initiated)
- The base year is the same for all sectors.

Step 2 – Determining the data for the base year

For each sector (public buildings, public lighting, public transport, solid waste, etc.):

- Collects/determines energy consumption by type (electricity, gas, fuels);
- I convert all values into kWh;
- Calculate the total annual consumption (100% reference - $E_{total,0}$).

Determining the RES share in the base year:

$$\%SER_0 = E_{SER,0} / E_{total,0} \cdot 100 \quad (1.1)$$

where $E_{SER,0}$ represents the energy from renewable sources in the base year (kWh/year)

It's $_{totally,0}$ - total energy consumption in the base year (kWh/year)

Step 3 – Selection of applicable PNIEC measures

For each sector:

- Identify PNIEC measures that can be implemented locally;
- Include only realistic measures by 2030;
- Correlate the measures with the "Measures" chapter in the LIECP.

Step 4 – Estimate energy savings for each measure

For each selected measure:

- Estimate annual energy savings (kWh/year) using historical data, technical guides, energy audit reports or typical values;
- Note the savings for each type of energy separately.

Step 5 – Determining the total energy reduction

- For each sector, the annual savings of all proposed measures are summed up.
- The total annual reduction (kWh/year) is obtained.

Step 6 – Calculating the percentage of energy consumption reduction (%)

The formula applies:

$$\% \text{ reduction}_{2030} = \text{Total savings2030} / E_{total,0} \times 100 \quad (1.2)$$

Step 7 – Determining the increase in the share of energy from renewable sources (RES)

For each sector:

- Identify the energy from RES in the base year (kWh/year)
- Estimates RES production until 2030 (kWh/year) taking into account the production of new RES generating units ($E_{RES2030}$);
- Calculate the RES share for 2030:

$$\%SER_{2030} = E_{SER2030} / E_{total2030} \times 100 \quad (1.3)$$

where $E_{SER2030}$ represents the estimated renewable energy for 2030 (kWh/year)

$E_{total2030}$ - total energy consumption estimated for 2030 (kWh/year), **after the application of EE measures**

- The actual increase in the SER share (Δ%SER) is determined

$$\Delta\%SER = \%SER_{2030} - \%SER_{0} \quad (1.4)$$

The expression will be done as follows:

"Increasing the share of energy from renewable sources by **XX percentage points by 2030.** "

Step 8 – Calculating GHG emission reductions

The emission factors from Annex 2 of the LIECP Model will be used when applying the formula:

Step 9 – Convert to "XX% annually"

$$\text{GHG reduction} = \sum(\text{Energy savings} \cdot \text{Emission factor}) = \text{XXX kg } CO_2e/\text{year} \quad (1.5)$$

Once the sectoral targets for 2030 are obtained, they can easily be transformed into annual targets to determine the annual trajectory:

To determine ***the annual energy consumption reduction rate*** , it is accepted to denote the base year with Y_0 (e.g. 2024) and respectively the target year is 2030, then the equivalent annual energy consumption reduction rate (compound decrease) is :

$$XX = (1 - (1 - R_{2030})^{\frac{1}{n}}) \cdot 100 \quad (1.6)$$

where R_{2030} represents the total expected/planned reduction by 2030 (e.g. 0.30 for 30%).
n - the number of years for which the annual rate of reduction in energy consumption or increase in the share of RES will be determined
$n = 2030 - Y_0$

To determine ***the annual growth of the RES share (Δ%SER $_{an}$)*** a linear increase in percentage points will be accepted, because the RES share is a ratio and not an absolute value, it is an approach also used by the JRC and in SECAP and is much easier to understand and monitor for LPAs, and the following formula will be used:

$$\Delta\%SER_{an} = \frac{\%SER_{2030} - \%SER_0}{n} \quad (1.7)$$

<u>Recommendation - in the LIECP text, the 2030 target</u> should appear first , and "XX% annually" should be described as **a monitoring trajectory** (not as a separate target).

For a better understanding of the local target calculation methodology, a complete practical example is presented below.

<u>Accepted assumptions</u>

ATU: Municipality X, Base year: 2024, analyzed sector: Public buildings

Total energy consumption (all types of energy resources) in the base year

No.	Energy type	Consumption, kWh/year
1	Electricity	1,200,000
2	Natural gas	2 800 000
	Total ($E_{total,0}$)	**4 000 000**

Of the total energy consumption in the base year, energy from renewable sources (base year) ($E_{SER,0}$) constitutes 200,000 kWh/year, produced by photovoltaic panels.

The buildings are heated with natural gas boilers.

The measures proposed/selected for the sector for implementation by 2030 are:
- energy renovation of buildings,
- interior lighting modernization,
- installation of new photovoltaic systems).

Respectively, the share of energy from renewable resources used in the base year constitutes.

$\%SER_0 = E_{SER,0} / E_{total,0} \cdot 100 = 200\,000 / 4\,000\,000 \cdot 100\,\% = 5\%$

Energy consumption reduction measures will contribute to an estimated reduction in consumption of 1,000,000 kWh/year.

No.	Measure	Energy Reduction/Savings, kWh/year
1	Thermal insulation of exterior walls	600,000
2	Roof thermal insulation	250,000
3	Interior lighting modernization	150,000

	Total discount	**1,000,000**

The percentage of energy consumption reduction (% reduction $_{2030}$) will be:

%reduction $_{2030}$ = Total savings $_{2030}$ / E $_{total,0}$ 100 = 1 000 000 / 4 000 000 100 = 25 %

Thus, the target for reducing energy consumption by 2030 is 25%, and the annual rate of reduction in energy consumption by 2030 (r $_{reduction}$) will be:

r $_{reduction}$ = (1 – (1 - Rreduction $_{2030}$) $^{1/(2030-2024)}$) · 100 = (1 – (1- 0.25) $^{1/6}$) · 100 = 4.68% / year.

The estimated energy consumption for the year 2030 (E $_{total,2030}$) will be:

E $_{,2030}$ = Total E $_{,0}$ - Total savings $_{2030}$ = 4 000 000 - 1 000 000 = 3 000 000 (kWh/year).

Energy production from renewable sources for 2030 will constitute:

No.	**Source of RES**	**Annually produced energy, kWh/year**
1	Existing PV	200,000
2	New PV	1,000,000
	Total E $_{RES,2030}$	**1,200,000**

The share of RES in 2030 (%RES $_{2030}$) will be:

%SER $_{2030}$ = E $_{SER2030}$ / E $_{total2030}$ · 100 = 1 200 000 / 3 000 000 · 100 = 40 %,

The increase in the share of RES by 2030 (Δ%SER) will be:

Δ%SER = %SER $_{2030}$ - %SER $_{0}$ = 40 % − 5 % = 35 percentage points (pp)

The annual increase in the share of RES (Δ%SER $_{an}$) until 2030 will be:

Δ%SER $_{year}$ = (%SER $_{2030}$ - %SER $_{0}$) / (2030-2024) = (40 – 5) / 6 = 5.83% / year

The reduction in CO_2 emissions following the implementation of the measures, by 2030 will constitute:
GHG reduction $_{2030}$ = ∑(Energy savings · Emission factor) = (600 000 kWh $_{GN}$ /year + + 250 000 kWh $_{GN}$ /year) · 0.261 kg/kWh $_{GN}$ + 150 000 kWh $_{EE}$ /year · 0.203 kg/kWh $_{EE}$ = = 252 300 kg / year = 252.3 t / year

The percentage of GHG emissions reduction by 2030 is:

% $_{CO2\ reduction,\ 2030}$ = GHG reduction $_{2030}$ / GHG,0 · 100 = 252.3 / 933.8 · 100 = 27.02 %

GHG,0 = ∑(Energy consumption · Emission factor) = 2 800 000 kWh $_{GN}$ / year · 0.261 kg/kWh $_{GN}$ +
+ 1 000 000 [2]kWh $_{EE}$ / year · 0.203 kg/kWh $_{EE}$ = 933 800 kg / year = 933.8 t / year

$_{CO2}$ emissions (rCO2 $_{reduction}$) is:

r $_{CO2\ reduction}$ = (1 – (1 – RCO2 $_{reduction,\ 2030}$) $^{1/(2030-2024)}$) · 100 = (1 – (1 – 0.27) $^{1/6}$) · 100 = 5.11 % /year

[2]Only the consumption of electricity absorbed from the grid will be considered, excluding the volume of electricity produced from RES, in the respective example, with the help of photovoltaic panels (1,200,000 kWh $_{EE}$ / year - 200,000 kWh $_{PV}$ / year = 1,000,000 kWh / year)

Thus, for the accepted hypotheses and the examples presented, the following targets for 2030 for the public buildings sector result:

- reducing the final consumption of fossil energy - by 25%, with an annual reduction rate of 4.68% / year,
- increasing the share of energy from renewable sources - by 35 pp, with an annual growth of 5.83%/year
- GHG reduction – by 252.3 kg CO2e, which represents a 27% reduction in GHG emissions, with an annual reduction rate of 5.11% / year.

2. General principles of data collection and presentation

2.1 General presentation of the locality

This section will include a clear, concise and factually correct description of the administrative-territorial unit (ATU). The model below, in green boxes, can be used as a template.

2.1.1 Location and relief

The ATU **(full name of the ATU)** is an administrative-territorial unit of level **(I/II)** in the Republic of Moldova.

According to Law No. 764 of 27.12.2001 on administrative-territorial organization, the ATU is composed of:

- **Village/commune/city** : (list of component localities)
- Total number of localities: **(X)**
- Place of residence: **(name of the place)**

This administrative structure is also found in the Classifier of Administrative-Territorial Units (CUATM).

In accordance with Law No. 438 of 28.12.2006 on regional development, the ATU is part of **the Development Region (North/Center/South/UTA Gagauzia/mun. Chisinau)** .

This information is necessary because LIECP measures must be synchronized with regional development strategies.

A brief description of the UAT is recommended including:

- **geographical location** : approximate coordinates, distances from regional centers;
- **predominant relief** : plain, hills, hilly area, meadow, riverbank, etc.;
- **average altitude:** between (xy) meters (m)
- **hydrography** : rivers, lakes, ponds, artificial reservoirs;
- **local climate** : essential elements related to temperatures, precipitation, conditions relevant to energy consumption;
- **particularities relevant to energy and climate** , such as:
    - exposure to natural and/or climatic risks (drought, floods, landslides),
    - the potential for renewable energy (solar, wind, biomass),
    - local natural resources.

The UAT is located in the (north/south/east/west) part of the Republic of Moldova, in a predominantly (plain/hilly) area, with altitudes between (xy) m. The territory is crossed by the (name) river, and the climate is temperate-continental, with hot summers and mild winters. These conditions offer a high potential for solar energy and agricultural biomass.

It is recommended to include two visual elements:

1. Map of the Republic of Moldova with marking of the position of the UAT - where the UAT position will be highlighted by contour or color marking. This can be imported from https://geodata.gov.md/ , geoportal.gov.md, https://www.arcgis.com/home/webmap/viewer.html, OpenStreetMap, the eHarta portal or the locality's cadastral plans.

***2. Detailed map of the ATU* -** which must include: the administrative boundaries of the ATU, the component localities, the main roads, any industrial, agricultural or natural areas, the location of the administrative residence .

2.1.2 Land and waters

This paragraph aims to describe the territorial structure of the ATU and water resources , as a basis for planning energy measures; assessing the RES potential (biomass, solar, biogas); identifying climate vulnerabilities (drought, floods, landslides), using data from:

- Real Estate Cadastre / Public Services Agency,
- General urban plans (PUZ/PUG),
- National Bureau of Statistics,
- Environmental Agency,
- "Waters of Moldova" Agency,
- The local water supply and/or sewage operator,
- Approved local strategic documents,
- Local environmental plans,
- Local land balances.

General description of land types in the ATU

It is recommended to present:

- land structure (agricultural, constructional, forestry, water, green spaces, etc.);
- degree of use/processing;
- any current problems (degradation, erosion, landslides);
- geographical distribution of land.

The territory of the UAT (name) has a varied land base, consisting mainly of agricultural land, followed by land intended for construction and green spaces. Forest lands are concentrated in the area of (north/east/south/west), while aquatic resources are represented by the river (name), local ponds and several small streams. In certain sectors, especially in area (X), there are lands affected by landslides or moderate erosion.

To complete "Table 2. *Land area by destination"* , it is recommended to use data from land balance sheet extracts, general urban plans, local land cadastre, and the interpretation of the categories in the table is as follows:

Table 15Interpretation of land categories

No.	Land destination	Interpretation
1.	Construction and landscaping	Buildings, roads, platforms, industrial areas
2.	Forest fund	Forests, forest curtains
3.	Water fund	Rivers, lakes, ponds, their beds
4.	agricultural	Arable land, vineyards, orchards, pastures
5.	Special destination	Technical infrastructure, railways, special areas
6.	Protection of nature and cultural heritage assets	Protected areas, natural/cultural monuments

Thus, for each land use category in Table 2, the following will be indicated:

- to the *Total area* which implies the area of all the objectives in the corresponding category.
    - Area – the summary area of the objectives in the category, in ha,
    - Share – share of land area in each category in the total area

$$\text{Weight (\%)} = \text{Category area} / \text{Total area} \times 100 \quad (2.1)$$

The same will be done with the "processed area" indicator.

The presentation of relief units can be done in narrative form complemented by a map for visualizing the information, such as: hypsometric map (contour curves), relief unit map, slope classification map.

The relief of the UAT is characterized by (plain/hills/hilly), with moderate slopes in the (X) part and areas susceptible to erosion near the (village/river). The main relief units are: (enumeration).

For the visual presentation of **land use,** it is recommended to present maps of land use, green spaces / ecological corridors.

When presenting **soils and areas at risk of landslides,** the soil map (pedological), the map of vulnerable areas (landslides, erosion), with the possible description below, can be applied.

The predominant soils in the UAT are of the type (chernozem/loam/clay), characterized by fertility (high/medium/low). Areas with territorial restrictions or vulnerabilities are identified in the UAT, such as (landslide areas/flood zones/degraded lands), located in (brief description of the location), according to (source: PUG/environmental plan/local studies).

The description of the hydrographic resources of the UAT will include information about rivers, lakes, ponds, streams; groundwater (wells, wells, catchments); water quality (if there are studies: potable, poorly mineralized, polluted, etc.); water use (irrigation, household, recreation, fish farming, etc.). Images may also be presented showing the map of watercourses, the map of water quality (if there is data), the map of ponds and their destination.

The hydrographic resources of the UAT include surface water bodies such as (river/stream/canal/lake/pond) (names), mainly used for (drinking/irrigation/technical/recreational/fish farming). Regarding water supply, the UAT uses (underground sources – wells/wells/springs) and/or (surface sources), managed by (WAW operator/city hall), according to (source). The water quality is described as (drinkable/acceptable/with quality problems), based on information available from (WAW operator/ANSP/Environmental Agency).

The UAT faces risks related to water resources, such as (drought/decrease in flows/flooding/clogging), which may influence infrastructure planning and climate change adaptation measures. These aspects will be detailed in the chapters dedicated to energy consumption, climate change adaptation and planned investment measures.

2.1.3 Population

This paragraph will provide a descriptive and analytical presentation of the UAT population, based on data provided by the National Bureau of Statistics (NBS), the UAT Socio-Economic Development Strategy **,** approved local statistical documents , as well as updates provided by the city hall. The data will be presented for the last **10 years** , indicating the reference year used in the LIECP (the one in the PNIEC).

The demographic structure of the population is recommended to contain information on: the total number of resident population, population dynamics in recent years, the evolution of birth, mortality and migration, trends relevant to energy consumption (aging, decrease in the number of households, depopulation, etc.) and may have the following formulation:

According to NBS data, the population of the ATU (name) was **(X) inhabitants** in the year (year). In the last 10 years, the population of the locality has registered a trend of (increase/decrease), mainly influenced by (external migration/decrease in birth rate/etc.). The demographic structure reveals a moderate degree of aging, with a share of **(X)% people over 65 years old.**

Population structure by age group can be presented in tabular or graphical or narrative form with the following content:

The population group 15–64 years old represents (X)%, which defines the active work capacity of the locality. The share of the elderly population (65+) is (Y)%, above the national average, which suggests a potential risk of increased consumption for heating and lighting at the level of vulnerable households.

The population structure by gender can be presented in tabular form or as follows:

The population structure by gender remains balanced. In (year), women represented **(X)%** of the total, according to NBS data. The gender ratio is relevant in assessing energy poverty, as single-parent families headed by women are at high risk of energy vulnerability.

The population structure by occupation/economic status is extremely important for assessing energy consumption and identifying vulnerable households. This can be presented in tabular or narrative form as shown below.

Table 16Population structure by occupation

No.	Occupation/status	Number of people	Weight (%)	Source*
1	staff			ANOFM RM / City Hall
2	Unemployed			
3	retirees			National Health Insurance Agency
4	Pupils / Students			
5	Inactive people			
6	Go abroad			Local records

* *- data from the National Statistical Office (population and housing census, UAT socio-economic development strategy, approved local statistical documents, City Hall/Territorial Statistical Directorate) can also be used.*

The economically active population represents (X)%. The high proportion of pensioners ((Y)%) may influence the structure of energy consumption, especially for heating. The share of people in temporary migration is (Z)%, which reduces the actual energy consumption in some households, but increases the degree of data non-uniformity.

The population analysis will include the identification of categories vulnerable to climate change (children, elderly, people with disabilities, households in energy poverty, etc.), in order to correlate them with local climate risks and substantiate adaptation measures. It is recommended, where data are available, to present socio-demographic indicators disaggregated by gender, to highlight any differences relevant for the planning of energy and climate measures.

2.1.4 Local institutional framework responsible for energy and climate

This paragraph aims to clearly identify **the institutional structure** , **responsibilities** and **key individuals** within the ATU that ensure the development/planning, implementation, monitoring of energy and climate policies, including those related to the LIECP and the LIECP reporting.

The LPA will present **the official organizational chart of the UAT administration,** in the form of **a figure (graphic diagram)** , indicating the official names of the subdivisions and highlighting with color or outline the structure responsible for energy and climate. The organizational chart presented must be approved by administrative act (Council/Local Council decision) and must result from it:

- the general structure of the administration;
- existing departments / services / offices;
- the position of the subdivision with responsibilities in the field of energy and climate;
- hierarchical and functional relationships.

The organizational chart of the UAT administration is presented in Figure 2. The structure responsible for the energy and climate field is highlighted distinctly.

The presentation of the structural subdivision responsible for energy and climate is carried out by explicitly indicating:

- the full name of the subdivision (e.g.: Municipal Administration Department, Infrastructure Service, Local Development Department, etc.);
- its duties in the field of:
    - energy efficiency;
    - renewable energy sources;
    - climate change;
    - monitoring energy consumption;
    - implementation of the measures in the LIECP.

Responsibility for coordinating activities in the field of energy and climate lies with **[name of subdivision]** , which has responsibilities regarding the planning, implementation and monitoring of the measures provided for in the LIECP.

Positioning the energy manager in the LPA structure is carried out by indicating:

- the existence of a **designated energy manager** (according to the legislation in force);

- his/her position in the organizational chart;
- the subordination relationship;
- main responsibilities in the context of LIECP.

The UAT energy manager is part of the **[subdivision]** , reporting directly to **[function]** . He coordinates the collection of energy data, monitoring consumption and reporting on the progress of the LIECP implementation.

If the LPA/UAT **does not have a designated energy manager** :

- **the temporarily responsible person** will be indicated ;
- the estimated deadline for official designation will be mentioned;
- the mechanism for ensuring the function will be specified (e.g. outsourcing, technical manager).

In the absence of a designated energy manager, the duties are temporarily provided by **[position]** , until the official designation of the energy manager .

"Table 3. Contact details of the person(s) responsible in the ATU for energy and climate" in the LIECP Model is completed as follows:

- at least one responsible person is indicated;
- the data must be current and functional;
- It is recommended to include an institutional email;
- a working phone number is indicated.
- if there are more people, rows can be added.

The requirements submitted " *Figure 2 - Organizational chart of the UAT administration"* are:

- be clear and legible;
- contain all the main subdivisions;
- to clearly highlight:
  - the structure responsible for energy and climate;
  - the position of energy manager;
  - the official, already approved organizational chart should be used (if it exists).

The information to complete this paragraph, in addition to those stated, can be taken from the Regulation on the organization and functioning of the ATU, Decisions of the Local Council, Approved Organizational Chart, Contracts/orders for the appointment of the energy manager, etc.

2.2 Energy consumption in buildings

2.2.1 Building utilities

Information to describe **the existing centralized services at the UAT level** , which serve public, residential and economic buildings, and which have **a direct impact on energy consumption** can be taken from:

- ***for the Water Supply and Sewerage Sector (WSS):***
  - **the local AAC operator** (water and sewerage company);

- annual reports of the operator;
- accounting/energy statements of the operator;
- documents submitted to the LPA;
- electricity supply contracts (for consumption).

➢ ***for the District Heating Sector (BAG):***

- the SACET operator;
- activity reports;
- energy records;
- fuel bills;
- internal documents of the LPA.

The combinations " XXXXX" are replaced with the relevant text, such as: UAT name, operator name, year, energy consumption values, volume of water/thermal energy delivered in the respective year, etc.

"Table 4. Level of coverage with centralized water supply and sewage services" and *"Table 5. Thermal energy supply"* will be completed indicating for each type of consumer:

- Total number of objects - the total number of buildings/objects existing in the ATU;
- Connected objects - the number actually connected to the public service, either water supply or wastewater/sewerage, or to the public service for thermal energy or domestic hot water supply.
- The grid connection share is determined by applying the formula:

$$\text{Weight } (\%) = \text{Number total of objects/Objects connected} \times 100 \quad (2.2)$$

The *Description of the centralized water supply and sewage system* will indicate:

- types of services provided (drinking water supply, sewage, wastewater treatment),
- the general condition of the system (modern / partially modernized / old),
- the existence or lack of metering,
- the main components of the system: capture sources, pumping stations, distribution networks, treatment plants with a detailed description of each component.

For *Figure 3. Images of centralized water supply and sewage system (all possible components to create an overview of the system.) Images of* pumping stations, tanks, networks, and treatment plants are expected .

When *presenting the method of covering the heat demand during the heating season in the locality, the following* will be indicated:

- all forms of thermal energy supply , even if some are limited in share ;
- the standard period of the heating season (e.g. October–April) ,
- the fact that the thermal energy supply is carried out: centralized (SACET) , individual (individual power plants) or mixed (if applicable),

for ***SACET,*** if any:

- whether the system serves the entire locality or only certain areas,

- whether SACET covers all or part of the thermal energy needs;
- the name of the company/companies supplying the thermal energy,
- approximate year of commissioning (optional),
- type of production sources: CHP, CT and the types of fuel used by them (natural gas , biomass, others),
- the services provided by them (thermal energy for heating, domestic hot water),
- the categories of consumers of each source,
- whether the DHW is supplied centrally or individually (electric boilers, etc.),
- types of sources used for DHW,
- the existence of solar systems for DHW (if any).

for **individual power plants** :

- what are the predominant types of individual systems (natural gas boilers, solid fuel stoves, electric heating),
- what are the fuels used,
- What is the approximate share of buildings with individual heating systems?

The heat demand in the UAT (name) during the heating season is provided by a mixed system. The centralized heat supply system is managed by (operator), which supplies heat for heating and, where applicable, domestic hot water to the connected buildings. The system uses (fuel type) and serves mainly (consumer categories).

In the rest of the locality, the heat requirement is provided by individual heating systems, mainly based on (system types). Domestic hot water is provided (centralized/individual), using (sources).

For *Figure 4. Images of centralized heat supply system (all possible components to create an overview of the system)* It is recommended to present images of the energy production source/sources, and respectively for each of the identified sources: the elements of the distribution network (pipe networks, thermal points, valve chambers, pre-insulated pipes), the consumption points (individual thermal points, entrances to buildings connected to SACET).

2.2.2 Current energy consumption in public buildings[3]

This paragraph aims to carry out, **for a single complete calendar year** , for which consumption data is available, **the basic energy inventory** of public buildings owned or managed by the UAT, in order to:

- establish the reference situation in the base year,
- underpin energy efficiency and decarbonisation targets,
- identify buildings and sectors with high consumption.

Here, energy consumption will be presented only for public buildings owned or managed by the UAT, excluding private or rented buildings without consumption managed by the LPA.

[3]Public buildings located on the territory of the LPA, but not under its management, may be included in the LIECP exclusively for informational and strategic purposes, as they influence local energy consumption and emissions. The LPA does not assume investment or implementation obligations, the responsibility falling to the specialized central public authorities .

Actual consumption data will be used , from electricity and natural gas bills, official accounting records of public institutions, reports of the SACET operator, the property registers of the LPA, official internal documents. Estimates are accepted **only in case of lack of data** , with explicit mention of the fact and the assumptions assumed.

The reference year is explicitly mentioned. Public buildings will be classified only according to the categories presented in the LIECP.

The energy consumption of public buildings will be presented both in an aggregated form, to establish the reference situation, and divided by energy carriers (electricity, natural gas, thermal energy), which implicitly reflects the main uses. Explicit separation by types of use (heating, DHW, other uses) will be achieved only if there are distinctly metered data .

The values in *Table 6. General data on the annual energy consumption of public buildings in the locality* presents summary values for all public buildings in the UAT and is determined as follows:

- ***Average total consumption*** represents the average annual consumption for a public building:

$$\text{Total average consumption} = \text{Total energy consumption} / \text{total number of public buildings} \quad (2.3)$$

- ***Specific consumption*** – specific energy consumption per m ^{2} of total surface area:

$$\text{Specific consumption} = \text{Total energy consumption} / \text{Total area} \quad (2.4)$$

- ***Total energy consumption*** – the sum of all energy consumption (electricity, natural gas, thermal energy, etc.) for public buildings, possibly converted into kWh.

When completing the values for *Table 7. Energy consumption by building groups* , for each of the listed categories, the following aspects will be taken into account:

- ***Total area*** – represents the total area of the public buildings considered, the values are taken from the cadastre, property registers of the LPA, records of public institutions,
- ***Heated surface*** – the surface area actually heated during the cold season. This can be estimated if exact data is not available, but with mention of this fact and the assumptions made.
- ***Total energy consumption*** – the sum of all energy consumption (electricity, natural gas, thermal energy, etc.) for all buildings in the respective category, possibly converted into kWh.
- ***Specific energy consumption*** is determined according to expression (2.3) for buildings in each category.

Tables 8-10 will present the energy consumption per each energy source (the table corresponding to thermal energy will present the thermal energy supplied centrally for heating and domestic hot water, only if metered) and category indicated . If the use of energy resources is identified, which are not found in the LIECP, (e.g. biomass, coal, etc.), their consumption (total and specific) will be presented in tables of a similar form with the indication of the type of resource.

Figures 5-8 will visually present the information from the tables corresponding to energy consumption by energy resources. They can be readable graphs and serve to facilitate the interpretation of the information and the identification of high consumption categories.

All detailed information on consumption in public buildings will be summarized in Annex 2.

2.2.3 Current energy consumption in residential buildings

This paragraph will present, in aggregate form, **the energy consumption of the housing stock in the UAT** , for a single year - the reference year, for which complete data are available, for the purpose of the following:

- identification of energy efficiency potential;
- planning of EE and RES measures in the residential sector;
- energy poverty assessments;
- determination of the residential sector's contribution to the PNIEC targets by 2030.

The calculations allow **justified estimates** where direct data are not available and the data source and reference year will be explicitly mentioned. The data will be presented only for the building categories presented in the LIECP (administrative, educational, medical, cultural, social).

Table 11. General information on residential buildings will be completed with the following information:

Number of buildings – the total number of buildings in each category will be indicated. The value can be taken from the National Bureau of Statistics, cadastre, PUG, city hall records.

Total area represents the unfolded built area of buildings , measured inside the boundary elements (walls), which includes all functional spaces of the building **,** regardless of whether they are heated and/or used or not.

Data can be taken from: cadastral documentation (ASP), local government property registers, General Urban Plan (PUG), building technical sheets, justified estimates (only if official data is missing), with explicit mention.

Heated surface represents only the part of the total area that is currently heated in the cold season.

Table 12. Energy consumption in residential buildings presents energy consumption by type of residential building and by type of energy.

The specific consumption indicated here represents the average value of the result of dividing the total energy consumption by the total area of each individual building in the group.

In the absence of direct energy consumption data, estimated values may be presented, but these must be documented, coherent and reasoned. Examples of estimates are presented below: average consumption per household × number of households, average consumption per m² × total area, data taken from the National Bank of Romania adjusted at local level, recent national studies or reports. It is necessary to indicate the mention of the estimate, the assumptions made and the sources of information.

2.3 Energy consumption for public lighting

This paragraph describes the current situation of the public lighting system in the UAT through:

- analysis **only of public lighting** managed by UAT,
- using consumption data for **a single full calendar year** (reference year),
- use of **real data** (invoices, technical records),
- avoiding unjustified estimates, explicitly mentioning the service operator/operators.

The combinations " XXXXX" are replaced with the relevant text, such as: UAT name, operator name, year, energy consumption values, number of lighting fixtures, etc.

For each operator, the type of service provided will be indicated (street, pedestrian, architectural lighting - if any).

The power range of the lighting fixtures (W) will be specified, and the total installed power (kW) will be calculated as the sum of the products of the nominal power of each lighting fixture and their number:

$$P_{inst.total} = \sum \text{Nr. corpuri}_i \cdot \text{ Putere nominală}_i \quad (2.5)$$

It is recommended to indicate the average annual operating time (T_M in hours/year) of the public lighting system, its type of operation (automatic with twilight sensors or manual according to a fixed program).

Information on energy consumption for public lighting can be taken from the records of the local public authority, the municipal enterprise or directly from the electricity distribution system operator, based on existing contracts. If direct energy consumption data is missing, it is determined by applying the formula:

$$\text{Annual consumption} = P_{inst.total} \cdot T_M \quad (2.6)$$

Indicators in *Table 13. Overview of the light sources used in the public lighting system* have the following meaning:

Number of lighting fixtures – total lighting fixtures, which will be taken from the operator's records ,

Body weight – percentage value of the number of bodies of type ***i*** out of the total number of bodies:

$$\text{Body weight}_{\textit{and}} = \text{No.}_{\text{ of bodies i}} / \text{Total No.}_{\text{ of bodies}} \cdot 100 \quad (2.7)$$

Installed power – the sum of the powers for each group of lighting fixtures, will be determined according to formula (2.4),

Power share – the share of the installed power of a category of lighting fixtures compared to the total power of the lighting system, which is determined by the formula:

$$\text{Pondere}_{putere\ i} = {}^{\text{Putere}_i}/_{P_{inst.total}} \cdot 100 \quad (2.8)$$

In *Figure 9. Images of public lighting in the locality (all possible components, to facilitate the creation of an image of the system)* It is recommended to present lighting poles, lighting fixtures, power panels, types of street lighting in the UAT.

2.4 Energy consumption related to the waste sector

This paragraph describes the energy consumption associated with solid waste management activities carried out on the territory of the ATU, which is limited to to the energy consumption of the sanitation service **.** The amount of energy generated from waste is presented separately.

Only energy consumption under the direct or indirect responsibility of the UAT **,** associated with the following activities, will be presented here :

- solid waste collection;
- waste transportation;
- operation of collection platforms;
- operation of sorting/transfer stations (if any);
- operation of landfills (if managed locally).

It will begin with a general description of the sanitation service, listing the operators involved, the types of activities carried out (collection, transport, storage, sorting, if any), the categories of consumers served (population, public institutions, economic agents).

When identifying and describing the types of energy consumption used, the following will be mentioned:

- fuel used for transportation (diesel, gasoline used by collection trucks or transport vehicles)
- electricity consumption for sorting stations, transfer stations, platform lighting, fixed equipment,
- other sources, such as captured and used biogas or energy produced from waste, are described separately, if any,
- The total annual energy consumption (for a reference year, to be specified) will be presented separately for each form of energy.

All this information can be collected from the reports of the sanitation operator(s), fuel accounting records, electricity bills, service contracts, internal documents of the LPA. Estimates are accepted only if official records are missing , with explicit mention.

In *Figure 10. Sanitation infrastructure images (all possible components, to facilitate the creation of an image of the system)* These can be images of the collection platform(s), special vehicles, warehouses, sorting stations, etc.

2.5 Energy consumption for public transport[4]

Present a description of the road network and routes by mentioning the main public transport routes/itineraries in the ATU, the existence of national/regional/local roads, their condition (good, satisfactory, requires rehabilitation), their lengths.

In *Figure 11. Map of public transport routes in the locality* a legible, recently updated map is presented that includes transport routes, main stopping points, serviced areas, with reference to the source. Information on private road transport is presented separately, following the same principles.

Table 14. Presentation of types of transport in the locality is completed by indicating the means of transport owned by the UAT, including transport involved in the waste sector,

Vehicle type for each category is taken from the presented classification, taking into account the fuel used by them (if they are vehicles of the same type, but on different fuel, the vehicle type will be repeated for each type of fuel).

Number of vehicles represents the total number of vehicles in the respective category. The information is taken from the records of the LPA or the transport operator.

Fuel type – indicate the type of fuel used by the vehicle.

Annual distance traveled - the summary distance traveled by the vehicles in the respective row of the table.

Annual fuel consumption – data can be taken from accounting or city hall, operator reports, etc. and is determined by summing the monthly/annual consumption for each vehicle (*i*) considered.

Average fuel consumption will present an aggregated value per type of transport in the corresponding row of the table, indicating the unit of measurement (liters/100 km - for liquid fuels, kWh/100 km - for electric vehicles) .

$$\text{Consum mediu comb} = {}^{\text{Consum anual comb}_i}/_{\text{Număr vehicule}_i} \quad (2.9)$$

Vehicle Age represents the average age of the fleet for the type in that row.

The information can be consulted at the municipal administration/transport department of the LPA, PUG and urban planning documents, records of public transport operators or the LPA's car fleet, local planning documents, roadmaps, internal reports, accounting documents.

2.6 EE and/or RES measures implemented

This subchapter aims to present the concrete actions already implemented on the territory of the ATU before the LIECP planning period (2025–2030) and is necessary to highlight the progress already achieved, avoid double reporting of measures, realistically substantiate future targets and

[4]Within the LIECP, the "Transport" chapter exclusively covers local public transport, transport operated by municipal enterprises, the car fleet managed by the LPA and the local transport infrastructure. Road transport activities carried out by private companies, which operate commercial routes on the territory of the locality, but are not under the control of the LPA, are excluded from the detailed analysis of the LIECP and are mentioned, where appropriate, for informational purposes only.

measures, and demonstrate the LPA's capacity to implement projects in the fields of energy and climate.

Only completed or operational/in progress measures , implemented in the period 2020–2024 , which had an impact on: reducing energy consumption, increasing the use of RES, reducing GHG emissions, will be presented here .

Table 15. EE and/or RES measures implemented in the period 2020-2025 are completed by entering one measure in each row, grouped by year, with data obtained based on supporting documents.

Object name – indicates the building, street, system or facility where the measure was applied.

Name of implemented EE/SER measure - short and clear description (facade thermal insulation, 50 kW PV installation),

Investment value **-** the total cost of the investment, regardless of the financing source.

Savings achieved **-** the resulting annual financial savings, if known, can be estimated from before/after invoices.

Primary energy savings **-** indicates the annual energy savings, calculated based on the difference in consumption before/after implementation.

CO_2 reduction **-** is calculated using the emission factors from Annex 2 of the LIECP Model.

DRS stands for The simple recovery period of the measure **,** enter the value from the documents corresponding to the related project **.**

3. Identification and presentation of measures to reduce energy consumption

3.1 General aspects

This subchapter establishes the general logic for identifying, selecting and structuring the measures that will be included in the Integrated Local Energy and Climate Plan for the period 2025–2030 . It connects the analysis of the existing situation (chapter 2) and the planning of interventions (chapter 3), ensures the alignment of local measures with the PNIEC , and defines the unitary rules for presenting measures for all sectors.

In addition to the information in Chapter 3.1 of the LIECP, regarding the presentation of the measures:

- ***order number***	the number assigned to each sector and the number of the measure will be indicated, respectively for measures in *the building sector* the numbering will be done by *CP_1, CP_2* etc., for measures in *the public lighting sector* – by IP_1, IP_2 etc.; measures in the public transport sector – by TP_1, TP_2 etc..
- ***Measure name***	*one of the names of the measure numbered with 2 digits (for example 1.1. or 2.3.), from the category corresponding to the sector, will be indicated.*
- ***PNIEC measure code***	*For the measure proposed in the LIECP, the code of the corresponding measure from the PNIEC will be indicated, in order to correlate the measures proposed at local level with those provided at national level.*
- ***Objective name***	*the name of the building, street, etc. will be indicated, depending on the sector category, where the measure will be directly implemented* .
- ***Implementation category***	*for example: own sources, attracted sources, co-financing, etc.*
- ***Measure category***	*it will be indicated:* ***basic*** *or* ***additional*** .
- ***Description of the measure***	*a description will be made as detailed as possible, presenting the volumes and materials used, indicating the minimum technical specifications* [5].
- ***Annual energy savings, kWh/year***	*represents the energy savings forecasted following the implementation of the measure . Present, in Annex 5, the methodology for determining the savings, LIECP.*
- ***CO2 emission reduction , t $_{CO2}$/year***	*the forecasted value of the reduction in greenhouse gas emissions in tonnes of CO2 equivalent will be indicated. (The calculation of emission reductions will be carried out by multiplying the resulting energy savings by the CO2 emission factor (see Annex 2 LIECP).*

[5] MINIMUM TECHNICAL REQUIREMENTS AND SPECIFICATIONS FOR ENERGY EFFICIENCY WORKS AND THE PROMOTION OF RENEWABLE ENERGY SOURCES , https://cned.gov.md/sites/default/files/document/attachments/specificatii_tehnice_min_ee_ser_final_201023_0.pdf

- ***Lifetime of the measure***	*the value of the lifetime of the proposed measure will be indicated, in years*
- ***Planned investment value***	*the estimated value of the planned investments will be indicated, in Moldovan lei. Present the source for the costs of the measures*
- ***Value of own resources from the investment***	*the estimated value of the own contribution to the planned investment will be indicated, in Moldovan lei.*
Share of own resources	*the value of the share of the own contribution in the planned investment will be indicated, in %*
- ***Co-financing sources***	*The potential co-financier for the investment will be indicated.*
- ***Implementation duration***	*The planned year/interval for the implementation of the measure will be indicated.*
- ***Implementation reporting frequency***	*The frequency of reporting during the implementation period will be indicated.*

When identifying measures for the period 2025-2030, it is recommended to consider the following aspects:

- analysis of the results from chapter 2 of the LIECP and highlighting the sectors with high energy consumption. For these, the existing infrastructure, the degree of wear and tear and possibly the impact of the measures implemented in the period 2020-2024 will be analyzed,
- correlation with PNIEC measures by choosing those that are locally applicable and realistically possible to implement by 2030,
- Priority will be given to measures, including those not explicitly listed in Table 16 , provided that they are justified, that directly contribute to reducing energy consumption, reduce GHG emissions, can be realistically financed within the mentioned period, and have an impact on public services and the population.

Thus, each measure proposed and described in the LIECP, regardless of the sector to which it belongs,

- derives from the results of the analysis of the current situation,
- is clear, singular (presents a single measure, not a complex of measures) and quantifiable,
- can answer the following questions: what is being done? Where? How much? And with what energy result?,
- can be assigned to a category in the PNIEC,
- has an estimable and justified energy impact,
- has a real implementation plan and costs that can be covered,
- can be scheduled in time (2025–2030),
- its implementation and result can be tracked through indicators,
- can be implemented by 2030.

In the table on the monitoring of the measure, the cells corresponding to the preparation and implementation stages are marked with an "X" or by coloring, thus indicating the periods planned for these activities.

3.2 Sectoral measures

For each sector, only the measures that are proposed for implementation in the period 2025-2030, have financial coverage and are achievable within this period will be presented.

For each proposed measure, the energy consumption reduction table and the implementation planning table will be completed , according to the model in LIECP table 17. The calculation methodology, as well as the actual calculations applied to determine the indicators, will be presented in detail in Annex 5 for each measure.

All measures related to the sectors managed by the ATU are to be concentrated in Annex 3 of the LIECP, to form the Energy Consumption Reduction Plan.

3.3 Monitoring and evaluation of the Energy Consumption Reduction Plan

Planning the monitoring of the implementation of measures and its detailing represents the clear vision and can determine the success of the implementation process.

energy consumption reduction measures provide a consolidated picture of the financial feasibility of the LIECP . At the LIECP development stage, it is not mandatory that the financing (financier attracted) be confirmed **,** but a realistic option must be indicated.

Table 26. Monitoring the implementation schedule of energy consumption reduction measures presents the aggregate implementation schedule of all measures in the LIECP. The schedule in Table 26 must be identical to the schedule in the individual measure table (chap. 3) **.** This table allows:

- a visual tracking of the implementation;
- correlation between measures and execution periods;
- periodic reporting to the competent authorities.

Monitoring is carried out throughout the entire implementation period (2025–2030) and is mandatory **,** according to the legal framework in force.

Monitoring of the implementation of the LIECP is carried out annually , through:

- checking the progress of each measure;
- comparing the achieved stage with the initial planning;
- identifying any delays or necessary adjustments.

At each annual monitoring cycle, the LPA is recommended to prepare an evaluation sheet , which should include:

- the implementation status of each measure;
- the volume of work carried out;
- difficulties encountered;
- proposals for adjusting or completing the plan.

This sheet is an internal tool and is not part of the LIECP.

Table 27. Monitoring the volumes of executed *energy consumption reduction measures* is used to monitor the physical volumes of works executed , representing the main indicator of the real progress of implementation and is to be completed at the LIECP implementation stage.

4 Climate change adaptation

4.1 General aspects

Chapter 4 will be completed respecting the following principles:

- Adaptation is necessarily oriented towards local risks, of the UAT (hazard (existing conditions) → exposure → vulnerability → measure);
- The assessment of risks and vulnerabilities is carried out mainly on the basis of available historical data , made available by official or verifiable sources, without requiring the carrying out of additional complex studies at local level ;
- The proposed measures must correspond to specific sectors/infrastructure (roads, AAC, green spaces, buildings, SACET);
- Adaptation is correlated with climate change mitigation (chapter 3), but is not to be confused with it;
- Adaptation must aim to increase adaptive capacity, strengthen resilience and reduce vulnerability;
- Adaptation must be planned and implemented equitably, with special attention to the most vulnerable populations and sectors;
- Each adaptation measure will be provided with clear indicators and physical monitoring volume and implementation calendar/schedule (Table 29 + Annex 4);
- Adaptation measures should include, whenever possible, nature-based solutions (green spaces, forest curtains, wetland restoration, water retention);
- Monitoring will be carried out annually, by establishing the status of the recorded evolution (D/C/B/A) and physical volume achieved (Table 33);
- The LPA will use existing data and tools (where accessible): weather data, local records, urban maps, loss/damage data, plus Climate-ADAPT/Copernicus references as good practices.

, official or verifiable sources will be used :

For climate risks/phenomena

- Hydrometeorological Service (historical data: extreme temperatures, precipitation, drought, heat waves);
- IGSU / Civil Protection (events, floods, interventions);
- Environmental Agency / environmental reports (vulnerable areas, water resources);
- "Apele Moldovei" / WSS operator (flows, water problems, treatment, local floods).

For territorial vulnerability

- PUG / urban planning documents;
- flood/landslide maps (if available in the PUG or local studies);
- LPA registers (critical infrastructures, public buildings, networks).

In the process of developing the adaptation component, the local public authority will use official or verifiable data sources, structured according to the methodological role they have in the analysis of climate risks.

In this regard, the data sources are delimited as follows:

Sources for identifying climate hazards

Used for the analysis of relevant climatic and hydrometeorological phenomena (extreme temperatures, precipitation, drought, floods, etc.):

- data from **the State Hydrometeorological Service** (historical series, climate extremes);
- information on events and interventions provided by **the General Inspectorate for Emergency Situations** ;
- **Environmental Agency** data and reports on climate conditions and natural resources.

Sources for exposure assessment

Used to identify population, infrastructure and activities in risk areas:

- urban planning documentation (PUG, area plans);
- thematic maps (flood zones, landslides);
- LPA records regarding:
    - public buildings,
    - critical infrastructures,
    - technical and municipal networks;
- statistical data on the population and its distribution.

Sources for vulnerability analysis

Used to assess the degree of impact on the population and local systems:

- socio-demographic and statistical data;
- information on the technical condition of the infrastructure;
- reports of **the National Agency for Public Health** on the impact on health;
- data on access to essential services (water, health, energy);
- local records on vulnerable groups.

Sources for monitoring results

Used to track the evolution of risks and the effectiveness of measures:

- operational data of local public services;
- information provided by operators (e.g. water, energy);
- data on losses, damages and interventions;
- performance indicators established in the LIECP.

The guide will use the full and official names of data providing institutions and institutional partners to help ensure institutional accuracy and methodological clarity in the use of data sources, including:

- **State Hydrometeorological Service**
- **Public Institution National Administration "Waters of Moldova"**
- **Environmental Agency**

- **General Inspectorate for Emergency Situations**
- **National Public Health Agency.**

4.2 Approaches to climate change adaptation

The three possible approaches will be described and the approach adopted by the ATU will be specified and justified. The choice of approach will be based on:

- local climate risk level (high/medium/low) or main locally identified hazards (heat waves, drought, heavy rains/floods);
- exposed infrastructure (AAC/SACET/roads/urban green space);
- administrative capacity (who coordinates, who implements, how is it monitored);
- financial availability (budget, possible financing or own/attracted sources, phased implementation).

Local public authorities can use the following indicative matrix for selecting and justifying the approach.

Table 17Adaptation approach choice and justification matrix

No.	Criterion	Low level	Medium level	High level
1	Climate risk	Rare events	Frequent events	Severe/recurrent events
2	Infrastructure exposure	Limited	Moderate	Extended / critical infrastructure
3	Population vulnerability	low	Average	High (vulnerable groups)
4	Administrative capacity	Limited	Average	Hello
5	Financial resources	Limited	Moderate	Available

The LPA will analyze the criteria in the matrix and select the type of approach corresponding to the local profile.

The choice does not have to be exclusive - **combined approaches** (e.g. incremental + transformational) can be used for different sectors.

Table 18Correlation of local profile with type of approach

No.	Approach type	When to apply	Features
1	Reactive	Low risks or limited capacity	Punctual interventions, response to events
2	increment	Moderate risks	Gradual improvement of infrastructure and services
3	Transformation	High risks / critical infrastructure	Structural changes, long-term solutions

It is recommended that the UAT assume *that the adaptation approach pursues continuous progress towards resilience and vulnerability reduction and does not consider vulnerable populations and nature-based solutions.*

Based on the climate risk analysis, the main risks identified at the UAT level are (e.g.: heat wave and drought), which directly affect (e.g.: vulnerable population and water supply systems).

Considering the level of exposure and vulnerability, as well as the administrative capacity and available resources, the LPA opts for a predominantly (incremental / transformational) approach, complemented by reactive interventions where necessary.

This approach allows for the progressive adaptation of local infrastructure and services, while ensuring the response to identified climate risks.

The content of *Table 28. Main advantages/disadvantages of approaches to climate change adaptation* can be kept, but It should be highlighted, either by underlining or ticking in the text, which is the dominant approach in the UAT and 1–2 local risks (e.g. drought / floods / heat waves) should be mentioned as an example.

4.3 Priority adaptation actions

This subchapter will present the identified adaptation measures. These can be grouped into two categories: ***measures*** *from chapter 3 that* have ***adaptation co-benefits*** (which are only described) and ***dedicated adaptation measures*** (A_01…A_XX) – which will be introduced in Table 29 and concentrated in Annex 4 will form the Climate Change Adaptation Plan.

It is worth noting that the energy efficiency and renewable energy measures planned in Chapter 3 can generate significant climate change adaptation co-benefits (PNASC 5.2 - energy infrastructure resilience) , including reducing thermal stress, increasing energy autonomy and enhancing the resilience of critical infrastructure. ***The monitoring*** of these ***co-benefits*** is carried out through the ***energy measures monitoring mechanism*** , ***only in Chapter 3.***

If a measure already exists in chapter 3, it is NOT reintroduced as measure A_XX, even if it has adaptation co-benefits.

For a better understanding of the differentiation between the two categories of climate change adaptation measures, see the table below.

Table 19Characteristics of types of adaptation measures

Elements	Adaptation co-benefit	Dedicated adaptation measure
Risk analysis	Yes	Yes
Main objective	Energy consumption reduction (EE/SER)	Climate adaptation
Main chapter	Chapter 3	Chapter 4
Code	CP/CR/IP/TP etc.	A_01 - A_XX
indicator	Energetics	Physical (m², km, ha)
mONITORING	Chapter 3	Chapter 4
Is it doubling?	Not	Not

In climate change adaptation planning, the standard chain is used:

Hazard → Exposure → Vulnerability → Impact → Measure (response)

- identification and selection of locally identified climate ***hazards (*** heat waves, drought, intense rainfall/floods, landslides, strong winds, frost);
- identifying ***the exposure of*** assets/infrastructure to the identified hazard – what is affected (critical public buildings - schools, hospitals; WSS - capture, pumping, treatment, sewage;

critical roads/ bridges/access areas; SACET; vulnerable residential areas; public spaces, and densely populated areas) ;

- identification ***vulnerability*** - why it is affected, the determining cause (characteristic that makes the assets/infrastructure sensitive to the identified hazard);
- dETERMINATION ***iMPACT*** possible;

Vulnerabilities are described concisely, in a "cause → impact" format, and are directly linked to adaptation measures or co-benefits of energy measures.

Below are some examples of ***vulnerability → impact***

Buildings and thermal comfort

- Old buildings without insulation → internal thermal stress in heat waves and extreme cold
- Old, leaky windows → high heat loss in winter and overheating in summer
- Uninsulated or dark-colored roofs → excessive heat accumulation
- Lack of natural/forced ventilation → thermal discomfort and health problems
- Public buildings without sun protection (shading) → high exposure of children/elderly people to heatwaves

Water supply

- Water sources without protection zones → contamination and reduction of water quality during drought periods
- Old WSS networks, with high losses → water shortage during dry periods
- Pumping stations dependent on electricity → water supply interruptions during extreme events
- Insufficient water storage capacity → inability to ensure service continuity

Sewerage and stormwater

- Undersized sewerage → urban flooding during heavy rains
- Mixed systems (domestic + rainwater) → backflow and pollution during heavy rainfall
- Lack of retention basins → overloading of the sewage network
- Clogged gutters and footbridges → water accumulation and local damage

Green spaces and urban ecosystems

- Deficit of urban green spaces → intensification of the heat island effect
- Lack of mature trees → lack of shade and increased perceived temperature
- Degradation of existing green areas → reduced water infiltration capacity
- Lack of forest curtains → exposure to winds, drought and soil erosion

Critical infrastructure and public services

- Hospitals and schools without energy backup systems → service interruption in extreme situations
- Unsuitable roads and bridges → rapid damage during heavy rains or freeze-thaw
- Lack of protection of energy infrastructure → frequent interruptions during extreme phenomena

Mobility and transportation

- Public transport not adapted to extreme temperatures → decreased service reliability
- Lack of infrastructure for active mobility → increased vulnerability to heatwaves
- Transport stations without shade → exposure of the population to thermal stress

Population and social vulnerability

- Large elderly population → increased risk of heat and cold waves

- Low-income households → inability to adapt housing to climate extremes
- Degraded housing (dampness, dampness) → worsening health problems
- Energy poverty → under heating the home in winter and overheating in summer

Planning and governance

- Lack of climate risk maps → reactive, not preventive decisions
- Lack of event response procedures extreme → delayed reaction and increased losses
- Reduced institutional capacity → slow implementation of adaptation measures

Vulnerabilities can be formulated as follows:

- "Old public buildings, without thermal insulation, are vulnerable to heat waves, which leads to indoor thermal stress and affects the comfort of users."
- "Undersized sewerage represents a major vulnerability in the context of increasing torrential rains, generating urban flooding."
- "The lack of urban green spaces accentuates the heat island effect and increases risks for vulnerable populations."

- Select ***measure*** with direct impact respecting the criteria : effectiveness; feasibility; cost and possible financing; co-benefits (energy, health, biodiversity); impact on the vulnerable.

The vulnerability assessment will also take into account relevant social factors, including gender differences, when they influence adaptive capacity or exposure. The vulnerability analysis will pay attention, where relevant and data are available, to differences in exposure to heat and cold, access to resources for adaptation, and the effects on older people, people living alone, caregivers and single-parent households.

For each dedicated measure identified and selected, ***monitoring indicators are defined*** (physical indicators (m²/ha/km/pcs.) and, where possible, result indicators (e.g. number of protected people, areas served) ***implementation plans are made*** and the necessary ***financial resources are identified/allocated*** . It is worth noting that the measures chosen for implementation must be in correlation with the measures in chapter 3 and with the PNASC (actions 5.2/5.3/5.6).

EU documents emphasize that **water is one of the main ways in which climate change affects society** (drought, floods, water scarcity), and recommend investments in the resilience of water supply systems.

Examples of **adaptation co-benefits** generated by energy measures are presented in Annex 3 to this Guide.

To prioritize measures, it is recommended to use a simplified assessment based on the following criteria.

Table 20Prioritization grid for adaptation measures

No.	Criterion	Score 1 (low)	Score 2 (average)	Score 3 (high)
1	Effectiveness	Low impact	Moderate impact	High impact
2	Technical feasibility	Difficult	make	Easily implementable
3	Estimated cost	High	environment	Low
4	Social/environmental co-benefits	Limited	Moderate	Multiple
5	Critical infrastructure protection	low	Partial	high

No.	Criterion	Score 1 (low)	Score 2 (average)	Score 3 (high)
6	Relevance for vulnerable groups	low	Average	high

Thus, each measure can be evaluated by assigning a score (1–3) for each criterion, and measures with a higher total score will be considered **priority** .

For each proposed adaptation action, the local public authority, under the heading "Description of the measure", will explicitly present the following elements:

- **the targeted climate hazard** (e.g. heat wave, drought, floods);
- **the sector / infrastructure / vulnerable group targeted** ;
- **the identified exposure** (what is affected);
- **the specific vulnerability** that is sought to be reduced;
- **the estimated impact** (what happens in the absence of intervention);
- **the proposed adaptation measure** ;
- **the desired result** (effect of the measure).

This can be done according to the model below, developed for the climate risk of heat waves.

Climate hazard - frequent and intense heat waves

Targeted sector / infrastructure / vulnerable group - sector: health and public services; Infrastructure: schools, kindergartens, hospitals; Vulnerable groups: children, elderly people

Exposure - urban population and users of public buildings exposed to high temperatures

Vulnerability - poorly insulated buildings, lack of shading and ventilation systems, presence of sensitive groups

Impact - severe thermal discomfort, health risks, decreased service capacity

Adaptation measure - management of green spaces and shaded areas; thermal rehabilitation of public buildings

Targeted result - reducing the temperature indoors and in public spaces; protecting the health of the vulnerable population.

When presenting adaptation measures, two types of indicators will be used:

- output indicators – which reflect the implementation of measures;
- outcome indicators – which reflect the effects of measures on reducing vulnerability and increasing resilience.

Output indicators

Achievement indicators reflect the degree of implementation of measures and are usually expressed in physical units or quantitative values.

Examples:

- number of adapted buildings;
- surface area of landscaped green spaces (ha);
- length of modernized drainage network (km);
- number of systems installed (e.g. shading, water retention).

Outcome indicators

Result indicators reflect the effects of measures on the local system and allow the assessment of their contribution to:

- reducing vulnerability;
- increasing adaptive capacity;
- strengthening resilience.

Examples:

- reduction of the average temperature in public spaces (°C);
- reducing the number of people affected by heat waves;
- reducing the frequency or severity of service interruptions;
- increasing the continuity of water supply during periods of drought;
- reducing the areas affected by floods .

For each identified dedicated adaptation measure, a table with the structure and content indicated in *Table 29. Model table for presenting climate change adaptation measures ,* respecting all the mentioned criteria, is completed, and the monitoring table for the respective measure is also completed. Table 29 will include only measures whose implementation can be achieved by 2030. And the implementation stages for all dedicated adaptation measures will be presented in Table 31. Monitoring the implementation of *climate change adaptation measures* .

4.4 Monitoring and evaluation of the Climate Change Adaptation Plan

The energy efficiency and renewable energy measures presented in Chapter 3 generate climate change adaptation co-benefits. Their monitoring is carried out exclusively within the monitoring mechanism of the measures in Chapter 3, without duplicating them as distinct adaptation measures.

Monitoring the implementation of the measures will be carried out annually by checking *the implementation status* (D/C/B/A), *the physical volume achieved* (m², ha, km, pcs.), the correspondence of reality with the planned calendar (Preparation/Implementation) and capitalization/attraction financing (own/attracted).

Monitoring the implementation of measures by applying the indicators in *Table 30. The key for evaluating and monitoring climate change adaptation actions* can be achieved by adding columns, for each monitoring year, to the table in Annex 4 LIECP, where one of the categories in the evaluation scale (D, C, B or A) will be indicated. For more detailed monitoring, Table 31. Monitoring the implementation of *climate change adaptation measures will be used* , possibly by adapting the information contained therein with the aim of successfully implementing the measure by 2030.

At the LIECP development stage, it is recommended to complete Table 32. Sources of financing for *climate change adaptation measures ,* similar to table 25, and if the funder is not confirmed, the status (confirmed / planned / to be identified) will be indicated.

5 Energy poverty alleviation

5.1 Presentation of the situation in the locality regarding energy poverty

Energy poverty is a specific form of socio-economic vulnerability, which manifests itself in the difficulty of households to secure essential energy services – such as heating, cooling, lighting, domestic hot water or mobility – at an adequate level and at an affordable cost. It is determined by a combination of factors, including income levels, low energy efficiency of housing, high energy prices and limited access to efficient energy sources. Its analysis also includes, where data are available, relevant differences between women and men, as well as the specific situation of vulnerable groups, such as single-parent households and elderly people living alone. The proportion of vulnerable households headed by women and elderly people living alone will be used as an indicator.

In the administrative-territorial unit, the assessment of energy poverty is carried out using a multidimensional approach, which combines official administrative data, quantitative indicators and, where appropriate, qualitative information. The main source for identifying energy vulnerable households is the Energy Vulnerability Information System (SIVE), established at national level, which classifies households according to the degree of energy vulnerability, based on disposable income and energy expenditure.

The number of households affected by energy poverty is determined based on aggregated data available for the UAT, including households classified in the high, very high and extreme energy vulnerability categories, for the LIECP reference year.

The analysis highlights that energy poverty disproportionately affects certain categories of the population, including low-income households, the elderly, families with children, single-parent households and people with disabilities. Also, the recent context of energy crises and states of emergency has amplified energy vulnerability, underlining the need for structural and sustainable measures to reduce it. ***The determination of the number of households affected*** by energy poverty will be achieved by applying a *only main methods* , chosen depending on data availability:

Priority method **-** the number of affected households is taken from the aggregated data of the Energy Vulnerability Information System, using households classified in the categories of high, very high and *extreme energy vulnerability* (optionally: and *medium* , if the UAT justifies).

$$\text{No. of households affected} = {}_{\text{Extreme}}V + {}_{\text{Very High}}V + {}_{\text{High}}V \qquad (5.1)$$

where $V_{extreme}$ signifies the number of households in the ATU identified with the extreme vulnerability category

${}_{\text{Very high}}V$ - number of households in the ATU identified with the very high vulnerability category

${}_{\text{High}}V$ - number of households in the ATU identified with the high vulnerability category

The result is recorded in Table 34 , with a clear indication of the reference year, the source (national system, aggregated data), and the categories included.

This method is recommended because it is official , it is aligned with EU experience and requirements (vulnerability targeting), it is comparable between UATs, and it avoids speculative estimates.

Alternative method applied in the absence of data from the national system based on direct and indirect indicators (proxy indicators) , such as:

- arrears on energy/utility bills;
- inability to maintain an adequate indoor temperature;
- excessive share of energy expenses in the household budget;
- inappropriate living conditions (humidity, dampness).

Indicators can be taken from data from the National Bureau of Statistics, aggregated data from utility operators, local surveys or polls.

Here, initially the proportion/weight (%) of affected households (*affected proportion)* is obtained from a source (NBS, operators, surveys), which is applied to the total number of households in the ATU:

$$\text{Nr. gospodării afectate} = \text{Nr. total gospodării} \cdot {}^{\text{Proporția afectată}}/_{100} \quad (5.2)$$

If several indicators are used, the highest value will be accepted for *the affected proportion* (cautious approach) or the aggregation method (weights that were accepted) shall be explained.

When applying this method, Table 34 will explicitly describe the method and indicators used.

This method provides a conservative and comparable estimate of the number of households affected by energy poverty and is recommended when complete administrative data are not available. The method should be applied consistently throughout the implementation period of the LIECP.

Last resort method It is used only if administrative data are missing, by conducting a local survey (minimum 5 - 10% of households or a representative sample, so as to reflect all types of housing (individual houses/apartments), territorial distribution (neighborhoods, component localities), general socio-demographic structure), with extrapolation of the results to the entire ATU.

The unanimously applied questionnaire must necessarily include questions regarding:

- *thermal comfort* (the possibility of maintaining an adequate indoor temperature during the cold and/or hot season);
- *arrears on utility bills* (electricity, gas, heating);
- *the main type of heating* in the home;
- *difficulties in paying* energy expenses (need to reduce consumption for financial reasons).

Arrears indicate energy poverty already manifested, while payment difficulties indicate the risk of entering energy poverty.

A household is considered affected by energy poverty if it meets *at least one* of the investigated criteria (thermal discomfort, arrears, payment difficulties), or a minimum set of criteria explicitly established by the LPA.

Table 34 will explicitly indicate the method used - Estimation by local survey, the year of the survey, the sample size, the criteria used to define the affected households.

The local survey method must be used consistently throughout the implementation period of the LIECP . Any subsequent change to the method must be explicitly justified.

A single method is used in the LIECP . The method is not changed annually without justification. The indicators must be verifiable and documented. suitable.

Thus, regardless of the method chosen, Table 34 . *Households affected by energy poverty* will be completed as follows:

Number of households affected is completed numerically by indicating the number of households with the specification of the reference year

Unit (1) **-** households (pcs.),

Reference year (2) **-** the year for which data is available (preferably the base year of the LIECP)

Determination method **-** describe one of the three methods mentioned in 1–2 sentences (e.g. Estimation based on the application of a set of energy vulnerability indicators)

Criteria and data (including source) **-** list the criteria used + source (compensatii.gov.md / utility operator / NBS / survey etc.) (for example: - Bill payment arrears - Inability to keep the home adequately heated; - High share of energy expenses (>10%); - Energy underconsumption ("hidden energy poverty"); - Limited access to transport services **Sources:** statistical data, household surveys, CNED etc.)

Table 35. Reporting of indicators related to energy poverty contains **voluntary indicators (V)** ; LPA must complete what is available. Accepted sources are NBS data / budget surveys / Eurostat (where relevant) or operator data / regulated tariffs (ANRE) – if LPA has access to official values during the reporting period,

"X" represents the reference year (the base year of the LIECP or the year for which the main assessment is made);

"X-3" - the value of the indicator three years before the reference year ;

"X-2" - the value of the indicator two years before the reference year .

5.2 Measures to reduce energy vulnerability

Energy poverty in ATUs is addressed through a combination of structural energy efficiency measures and the use of renewable sources, complemented by mechanisms for identifying and monitoring vulnerable households. Monitoring is carried out annually, based on defined indicators and available administrative data.

The role of this subchapter is to translate the diagnosis of energy poverty (from subchapter 5.1) into concrete and measurable targets , to establish local objectives assumed for reducing energy vulnerability by 2030, to ensure the correlation of energy measures (chapter 3) with the social dimension, and to allow annual monitoring of progress.

This subchapter ensures a clear link between energy poverty analysis and concrete energy measures, so that the reduction of energy vulnerability can be tracked and demonstrated over time.

The formulation of energy vulnerability reduction targets will be achieved, possibly by using the indicative targets proposed in the LIECP model, with the following methodological clarifications:

1. ***About 50% of the electricity consumed by the population should be produced locally from renewable sources, especially locally installed PV sources.***

base year (with the share of E-RES in that year), the estimated volume of E-RES for 2030 (kWh/year) and the method of implementation (PV on buildings, energy communities, collective self-consumption) will be indicated . And the target "about 50%" is indicative and can be adjusted, with justification.

2. ***Approximately 70% of the electrical and thermal energy used by local governments and related institutions should be produced from renewable sources (biomass and PV solar panels), including those attracted through investments and partnerships.***

This will be directly correlated with the measures in chapter 3 (PV, biomass, heat pumps), and with the PNIEC (codes PM_DC20, PM_DC23, PM_DC24 etc.) with the targeted institutions and the types of renewable sources used being expressly specified. The target of "around 70%" is a target strategic and not a rigid obligation.

3. ***To reduce energy vulnerability, and therefore energy poverty, so that only less than 10% of the population is affected.***

Here it is necessary to clearly define what is meant by "affected" (households in categories X–Y from compensatii.gov.md or the criteria used in Table 34, LIECP). The target "<10% of the population" should be related to the base year and the initial measured value.

4. ***To reduce the energy vulnerability of local public institutions so that they are provided with autonomous sources capable of ensuring energy needs for a period of at least 60 days, and to cover practically the entire energy bill from renewable sources.***

When defining the target for increasing the energy resilience of public institutions, it will be indicated which institutions are considered critical (hospital, social center, etc.) and what "autonomous sources" mean (generator + storage + RES type). The "60 days" indicator represents a resilience reference and not a detailed technical requirement.

Measures may also be provided, avoiding duplication of measures in Chapter 3, while respecting the requirements before the specific measures (what? where? when? how much? base year and monitoring indicators) , such as:

- *creating/opening a one-stop shop for energy advice (* information, simplified audits, support for accessing programs) ,
- *targeted renovation and EE* of homes with poor energy performance and prioritizing vulnerable households (through social services) ,
- *replacement of inefficient equipment* (household appliances, heating systems) ,
- *access to RES for vulnerable households* (PV for self-consumption , collective self-consumption, local energy communities)
- *information campaigns + frontline workers (social workers)* .

For each assumed objective (O1, O2, O3, etc.), a table will be completed with the content of *Table 36. Local objectives for reducing energy vulnerability,* as follows:

Name of the local objective – it formulates clearly and concisely (Reducing the number of energy vulnerable households by 20% by 2030),

Description – it will be indicated what problem is being addressed, who is targeted (households, pensioners, families with children, vulnerable population, institutions, etc.),

year target – 2030 (according to the LIECP period).

Progress towards the achievement of the objective - is mainly used in the monitoring phase of the LIECP. At the stage of developing the plan, this field is completed with a mention of the new nature of the objective or of the initial situation, without reporting non-existent progress, possibly choosing one of the expressions below:

New target set. Progress will be monitored annually starting with year X+1.
At the time of the LIECP development, the objective had not yet been implemented. The base year value constitutes the reference point for monitoring.
Preliminary measures were initiated before the LIECP period, which constitutes the basis for achieving the objective.

Name of the progress monitoring indicator - 1-2 clear indicators will be selected , preferably from Table 34 (number of affected households) and/or Table 35 (context indicators) and these must be measurable and available annually (% households in arrears, % households with thermal discomfort, number of vulnerable households (compensatii.gov.md).

The base year represents the reference year of the LIECP.

Value in base year represents the numerical value determined in chapter 5.1.

Unit will indicate the unit of measurement of the indicator (households, %, kWh, etc.)

X-3 and ***X-2*** represents the value of the indicator three and two years before the reference year respectively . To be completed only if data are available . They have an informative role for establishing the trend. If data are missing, indicate "n/a".

Details on the monitoring strategy – the data source (SIVE, social data, operators), the monitoring frequency (annual) and the person responsible (social service, LPA subdivision) will be indicated.

References to assessments and supporting technical reports - the sources of information will be indicated ***(*** link/mention: social report, operator report, evaluation sheet, etc.).

5.3 Monitoring objectives and measures to reduce energy vulnerability

Monitoring of objectives and measures to reduce energy vulnerability will be carried out annually , throughout the entire implementation period of the Integrated Local Energy and Climate Plan.

Energy vulnerability monitoring aims to track **the real evolution of energy poverty** at the local level and to assess **the impact of the measures implemented** within the LIECP.

Monitoring will be carried out annually , starting with the year following the adoption of the LIECP, for the previous calendar year, using the same method of determining affected households as in the base year.

Progress will be assessed by monitoring:

- ***social outcome*** (energy poverty situation) by updating the number of households affected by energy poverty (Table 34, LIECP) and relevant context indicators (Table 35, LIECP).
- ***the evolution of local objectives*** (Table 36, LIECP) by comparing the value of the indicator from the current year with the value from the base year, evaluating the direction of evolution (decrease / stagnation / increase), completing the "Progress recorded" field with a brief description of the stage.
- ***respecting the correlation*** between the evolution of social indicators and the implementation of energy efficiency measures and the use of renewable sources provided for in Chapter 3.

Energy measures do not double as separate measures of energy poverty; their social impact is reflected through the evolution of indicators.

The data used for monitoring will primarily come from **national and local administrative systems** , including the Energy Vulnerability Information System, as well as from other statistical sources or aggregated data provided by utility operators. In their absence, justified estimates, applied consistently, may be used.

Monitoring will be based on: Table 34 - households affected, Table 35 - context indicators, Table 36 - objectives and progress and an annual internal monitoring sheet (recommended), and the progress recorded in achieving each objective will be reflected in **Table 36** , by updating the indicators annually and by completing the "Progress recorded" field. The monitoring results will be used to assess the effectiveness of the implemented measures and, where appropriate, to adjust the planned interventions.

This important stage of energy vulnerability monitoring, being a continuous process, aimed at improving local policies and sustainably reducing energy poverty, can be carried out by the subdivision responsible for energy/development, the social assistance service or the energy manager (where applicable).

Annex 1 Development of the LIECP based on a SECAP CoM

Prior to the presentation of the transition from SECAP **(Sustainable Energy and Climate Action Plan)** at LIECP, the difference between SECAP and LIECP will be presented in several aspects.

Definition and origin

SECAP	ENVELOPE
- is a document **voluntarily developed** by LPAs within the framework of the European **Covenant of Mayors initiative** ; - is based on commitments undertaken by LPAs towards EU objectives regarding: i. reducing CO_2 emissions; ii. energy efficiency; iii. adaptation to climate change; - It is mainly oriented towards **policies and reporting at the European level.**	- **national** planning document , regulated by the legal framework of the Republic of Moldova; - directly contributes to the implementation **of the PNIEC** ; - it is **mandatory** for LPAs with municipal status and optional for other LPAs; - is the tool recognized by **the National Center for Sustainable Energy** for the coordination, planning and periodic monitoring of local projects.

Key substantive differences

Criterion	SECAP	ENVELOPE
Reference framework/methodological basis	EU initiative (Covenant of Mayors)	National Policy (PNIEC)
Character	Voluntary	Mandatory / regulated
Coordinating institution	Covenant of Mayors	CNDRA
Legal role	Political commitment	Official planning document
Budget integration	Indirect	director
National funding eligibility	Limited	high
mONITORING	Local with reporting to the EU platform	Local with reporting to CNED
Adaptation to the PNIEC	Optional	CoMPULSoRY

Differences in content and structure

Indicator	SECAP	ENVELOPE
objection	set in relation to EU targets (e.g. -40% CO_2 by 2030).	established **in correlation with the PNIEC** , adapted to the local context.
Action plan	- emphasizes strategic actions; - allows a greater degree of flexibility; - quantification is recommended but not always standardized.	- requires **mandatory quantification** (energy, CO_2, costs); - requires the correlation of each measure with PNIEC measures; - it is used as a basis for project funding and official reporting.
Monitoring and reporting	- reporting every 2 years to the EU platform; - emphasis on overall progress.	- periodic reporting to CNED; - locality-level data used for national reporting; - standardized monitoring mechanism.
Institutional and responsibility differences	- responsibility is predominantly political; - implementation depends on the will and capacity of the LPA; - Failure to report does not entail direct administrative consequences.	- responsibility is **institutional and administrative** ; - is integrated into the local budget cycle; - conditions access to certain financing.

Thus, SECAP **is not equivalent** to LIECP, but it can be:

- a **valuable technical base** ;
- a starting point for:
  i. energy data;
  ii. planning experience;
  iii. the initial structure of the measures.

The LIECP developed based on a SECAP must be a new document , updated and aligned with the PNIEC. CNED only evaluates and accepts **LIECP for local public administration authorities with municipal status** , regardless of whether or not it starts from an existing SECAP.

SECAP is a voluntary commitment to a European initiative (through which the LPA shows that it wants to do something), and the LIECP is an official planning document at the local level, mandatory for local public administration authorities with municipal status, used to achieve and achieve the PNIEC objectives and access funding (through which the LPA shows that it knows what to do, with what money and when).

Developing the LIECP based on an existing SECAP

1. General principle

When a local public administration authority already has a **Sustainable Energy and Climate Action Plan** , it can form **the starting point** for the development of the Integrated Local Energy and Climate Plan.

LIECP **does not automatically replace SECAP** , but:
- **updates** it ;
- **aligns** it with the PNIEC ;
- **complements** it with the specific national requirements of LIECP.

CNED accepts the LIECP developed based on a SECAP **only if the final document fully complies with the LIECP requirements** , regardless of the existence of the previous SECAP.

2. Prerequisites for using a SECAP as a basis

Before initiating the process, the LPA must verify that the existing SECAP:
- is **officially approved** by the local council;
- contains an **energy and emissions inventory** ;
- includes a **structured action plan** ;
- is sufficiently **recent** or can be updated with new data.

If one or more conditions are not met, the SECAP can **only be used partially** (as a source of data or experience).

3. Stages of developing the LIECP based on a SECAP

Stage 1 – LPA decision and initiation of the process

Local government:	- adopts a decision to initiate the development of the LIECP based on SECAP; - designates the energy manager as technical manager;

- inform the National Center for Sustainable Energy of the intention to use an existing SECAP.

Stage 2 – SECAP comparative analysis – LIECP requirements

The energy manager carries out a **compliance analysis** , which identifies:

a) Elements that can be taken directly from SECAP [6]:
- description of the locality;
- energy consumption inventory (with updated data);
- measures already implemented;
- the general structure of the action plan.

b) Elements to be updated:
- base year and reference data [7];
- current energy consumption;
- GHG emissions;
- status of SECAP measures.

c) Missing elements that need to be added:
- explicit correlation with the PNIEC;
- PNIEC measure codes;
- the energy poverty component;
- national monitoring and reporting mechanisms to CNED;
- standard LIECP structure.

The result of this stage is a **SECAP → LIECP conversion plan** .

Stage 3 – Updating and adapting SECAP content

Based on the comparative analysis, the following will be carried out:

3.1. Updating the energy inventory
- consumption data by sectors is updated;
- CO_2 emissions are recalculated;
- the calculation methodology is aligned with national requirements.

3.2. Review of objectives
- SECAP objectives are reformulated to correspond to:
  i. the PNIEC period;
  ii. national targets;
- is clearly differentiated:
  i. objectives achieved;
  ii. remaining objectives;

[6] For the SECAP developed starting with 2026, where the LIECP is presented as an annex to the SEADP (SECAP), for these common elements it is sufficient to refer to the chapter/subchapter/paragraph containing the corresponding information, in order to avoid duplication.
[7]Take into account the reference year for quantifying greenhouse gas emissions, which in the PNIEC and in the LIECP is 1990.

iii. new goals.

3.3. Review of the action plan[8]

- expired or irrelevant measures are eliminated;
- the measures currently being implemented are updated;
- new measures are added, requested by LIECP;
- each measure is:
  i. energetically quantified;
  ii. correlated with PNIEC;
  iii. framed by sector.

Stage 4 – Restructuring the document in LIECP format

Even if it starts from SECAP, the final document must:

- to comply with **the standard LIECP structure** ;
- use **the LIECP tables and indicators** ;
- have a title, period and objectives LIECP [9];
- be identifiable as **LIECP** , not as revised SECAP [10].

The SECAP may be included as **an annex** or reference document.

Stage 5 – Approval of the LIECP by the LPA

Local government:
- submits the LIECP (result from SECAP) to the local council for approval;
- make a **decision distinct** from the approval of the LIECP;
- assumes implementation and reporting according to LIECP.

Stage 6 – CNED submission and evaluation

CNED:
- evaluates **the final LIECP** , not the SECAP;
- check:
  i. compliance with LIECP requirements;
  ii. correlation with PNIEC;
  iii. the existence of monitoring mechanisms;
- may request clarifications or additions additional.

The existence of a SECAP **does not automatically shorten** the CNED procedure, but **it significantly reduces the effort of the LPA** .

SECAP is a valuable starting point, but LIECP is a new document, adapted to the national framework.
LIECP developed based on SECAP must be **equivalent in rigor and content** to a LIECP developed from scratch.

[8]ONLY measures will be introduced in the LIECP, which REALLY can be implemented in the period for which the LIECP is being developed.
[9]The objectives and commitments in the LIECP should be strictly correlated with the measures provided for therein.
[10]It is recommended that the SEACP, developed starting in 2026, include an annex dedicated to the LIECP, with the structure and presentation of the measures according to the model

Annex 2 Integration of LIECP into LPA development documents

1. General principles regarding the integration of LIECP

The Integrated Local Energy and Climate Plan can be:

- **prepared as a separate document** , or
- **integrated into a broader local planning document** , such as:
  - UAT socio-economic development strategy;
  - Sustainable development plan;
  - Local sectoral strategies (energy, environment, infrastructure).

Regardless of the form chosen, **the LIECP must be clearly identifiable, delimited and verifiable** , so that:

- objectives, measures and indicators can be monitored separately;
- LPA responsibilities should be explicitly assumed;
- CNED can assess the document's compliance with the PNIEC.

2. Accepted ways of integrating LIECP

Variant A – ENVELOPE as a separate document (recommended)

- The LIECP is a distinct document, approved by decision of the local council;
- the document can be annexed or explicitly mentioned in other local strategies;
- this is **the simplest option and the easiest to evaluate** by CNED.

Variant B – LIECP integrated into a development document

The LIECP can be integrated into a larger document **only if the minimum requirements below are cumulatively met** .

3. Minimum mandatory requirements for LIECP integration

For a LIECP integrated into a development document to be **accepted by CNED** , **all of** the following requirements must be met:

a) Clear structural demarcation

The document must contain:

- a distinct chapter or a clearly separate section , explicitly entitled "Local Integrated Energy and Climate Plan (LIECP)" ;
- own numbering and structure (subchapters, tables, dedicated annexes).

Diffuse or implicit integration of LIECP into multiple chapters without clear delimitation is not accepted.

b) Explicit correlation with PNIEC

The ENVELOPE section must contain:

- clear reference to the PNIEC;
- presenting local objectives in direct correlation with:
  - energy efficiency;

- decarbonization;
- renewable energy;
- climate change adaptation (if included).

It is mandatory **to indicate the PNIEC measure codes** corresponding to the local measures.

c) Compatible planning horizon

The integrated ENVELOPE must:

- covers the planning period established by the PNIEC;
- explicitly specify the implementation period of the measures;
- clearly differentiate between measures already implemented and those planned.

LIECP covering periods not correlated with PNIEC is not accepted without updating.

d) Complete and quantified action plan

The ENVELOPE section must include, at a minimum:

- list of measures by sector (buildings, lighting, transport, AAC, waste, etc.);
- for each measure:
  - clear description;
  - estimated energy savings;
  - estimated reduction in CO_2 emissions;
  - the value of the investment;
  - sources of financing;
  - implementation deadline;
  - responsible for implementation.

General or declarative measures, without quantification, are not accepted.

e) Monitoring and reporting mechanism

The document must provide:

- clear monitoring indicators;
- reporting frequency (minimum annual);
- institutional responsibility (LPA / energy manager);
- connection with reporting to CNED.

f) Formal approval by the local council

Regardless of the document format:

- **explicitly** adopt :
  - the development document **and**
  - the ENVELOPE section included in it.

The approval decision must:

- explicitly mention LIECP;
- confirms the assumption of objectives and measures.

4. Conditions for acceptance of the integrated LIECP by the CNED

CNED will accept an integrated LIECP only if :

1. the minimum requirements in point 3 are fully met;
2. The LIECP is clearly identifiable as a distinct unit of analysis;
3. the document is approved by decision of the local council;
4. the structure and content allow:
    - separate monitoring;
    - standardized reporting;
    - use for financing purposes.

CNED **does not accept** :

- extracts or summaries without the full document;
- documents without formal approval;
- documents in which LIECP cannot be methodologically separated.

To facilitate the CNED evaluation and subsequent use of LIECP, **it is recommended** :

- including a dedicated LIECP annex , even when integrated;
- use of the standard LIECP table model ;
- clear mention of the energy manager as the technical responsible person.

LIECP integration is permitted, but does not reduce content requirements ;

The form does not substitute the fund : the integrated LIECP must be equivalent to a separate LIECP;

CNED evaluates compliance, not the editorial form of the document.

Annex 3 Examples of adaptation co-benefits generated by energy measures

Co-benefits from the renovation of public buildings (CP)

Energy measures

- Thermal insulation of facades, roofs, floors;
- Window replacement;
- Modernization of heating and ventilation systems.

Adaptation co-benefits

- reducing indoor overheating during hot weather;
- maintaining thermal comfort during cold waves;
- protection of vulnerable users (children, elderly, patients);
- increasing the resilience of critical buildings (schools, hospitals) to climate extremes.

Form template

Energy renovation of public buildings contributes to climate change adaptation by reducing indoor thermal stress and ensuring the continuity of public services in extreme temperature conditions.

Co-benefits from the installation of photovoltaic systems (CP, CR, IP)

Energy measures

- Photovoltaic systems on public buildings;
- PV for self-consumption / energy communities.

Adaptation co-benefits

- increasing energy autonomy in case of extreme events;
- reducing grid dependence in times of crisis;
- ensuring the functioning of critical infrastructure (AAC, social centers);
- indirect support for vulnerable households (energy stability).

Form template

The installation of photovoltaic systems increases local energy resilience and the ability to adapt to power supply interruptions in the context of extreme weather events.

Co-benefits from SACET modernization / alternative heat sources

Energy measures

- Integration of biomass boilers;
- Heat pumps;
- Modernization of high-efficiency CHP.

Adaptation co-benefits

- ensuring continuity of heating during periods of extreme cold;
- diversification of sources → reduction of the risk of shortage;
- adapting systems to hydrometeorological variability;
- increasing urban energy resilience.

Form template

Modernizing thermal energy supply systems contributes to climate adaptation by increasing the security and flexibility of energy supply in extreme temperature conditions.

Co-benefits from energy efficiency in WSS

Energy measures

- Efficient pumping;
- Automation;
- Loss reduction.

Adaptation co-benefits

- increasing the resilience of water services to drought;
- maintaining water pressure and quality during critical periods;
- reducing the risk of water supply interruption;
- protecting vulnerable populations in climate crises.

Form template

Energy efficiency measures in the water supply sector increase the resilience of essential services in the context of drought and climate variability .

Co-benefits from efficient public lighting (LED)

Energy measures

- Replacing lighting with LED;
- Intelligent control and remote management systems.

Adaptation co-benefits

- maintaining public safety in extreme events;
- stable operation in high temperature conditions;
- reducing the risk of system failure;
- support for safe night-time mobility in emergency situations.

Form template

Modernizing public lighting, possibly designed and implemented with climate resilience criteria, including equipment resistant to extreme temperatures, surge protection and emergency business continuity mechanisms, contributes to adaptation by ensuring the reliable operation of urban infrastructure in extreme climate conditions.

Co-benefits from efficient public mobility

Energy measures

- Energy efficient public transport Measures/electric;
- Route optimization.

Adaptation co-benefits

- reducing the population's exposure to heat and pollution;
- maintaining access to essential services;
- increasing the resilience of urban mobility in extreme conditions.

Form template

The development of efficient public mobility contributes to climate change adaptation by maintaining access to essential services and reducing the vulnerability of the population to extreme climate conditions, in particular by ensuring the continuity and flexibility of the transport system.

Co-benefits from metering and energy management

Energy measures

- Individual metering;
- Energy management systems.

Adaptation co-benefits

- rapid detection of malfunctions;
- early reaction to overconsumption / breakdowns;
- improving the capacity to respond to extreme events.

Form template

The implementation of energy metering and management systems contributes to adaptation by increasing the capacity for monitoring and rapid response to malfunctions or abnormal consumption generated by extreme weather phenomena, increasing the resilience of public infrastructure.

Co-benefits from home renovation (CR)

Energy measures

- Home insulation;
- Efficient heating systems.

Adaptation co-benefits

- reducing mortality associated with heat/frost;
- improving the health of vulnerable populations;
- reducing the risk of energy poverty in extreme climate conditions.

Form template

Energy renovation of homes contributes to climate change adaptation by reducing the vulnerability of households to extreme temperatures and increasing the protection of the population exposed to climate risks, especially vulnerable groups.

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