

**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

Integrated Solutions for Positive  
Energy and Resilient Cities

D8.8

## **Severodonetsk Replication Roadmap, Planning & Bold City Vision - V1**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement n° 957751. The document represents the view of the author only and is his/her sole responsibility: it cannot be considered to reflect the views of the European Commission and/or the European Climate, Infrastructure and Environment Executive Agency (CINEA). The European Commission and the Agency do not accept responsibility for the use that may be made of the information it contains.

## Document Control Sheet

<b>Project Title</b>	integRatEd Solutions for POSitive eNergy and resilient CitiEs - RESPONSE
<b>Deliverable</b>	D8.8 Severodonetsk Replication Roadmap, Planning & Bold City Vision - V1
<b>Work package</b>	WP8 FCs Replication Plans and 2050 Bold City Vision
<b>Task</b>	T8.8 Severodonetsk Smart City Scan and Replication Roadmap and 2050 Bold City Vision
<b>Number of pages</b>	57
<b>Dissemination level</b>	PU
<b>Main authors</b>	Tetiana Biloborodova (DITA), Halyna Tatarchenko (DITA), Olexander Rysantsev (DITA)
<b>Contributors</b>	Lea Kleinenkuhnen (BRU), Damien Gillet (BRU), Federica Cugnach (RINA-C), Christine Leroy (RINA-C), Michele Valery (RINA-C), Alessandro Venturin (RINA-C)

## Reviewers

Partner	Name	Contact information
EIFER	David Goujon	david.goujon@eifer.org
EIFER	Monjur Murshed	monjur.murshed@eifer.org
ISOLUT	Igor Kotsiuba	igor.kotsiuba@isolutions.com.ua

### Dissemination level codes

PU = Public, fully open, e.g., web

CO =Confidential, restricted under conditions set out in Model Grant Agreement

CI =Classified, information as referred to in Commission Decision 2001/844/EC.

## Document Control Sheet

Version	Date	Author/Editor	Contributors	Description/Comments
<b>v.01</b>	22/07/2022	H. Tatarchenko, T. Biloborodova, O. Rysantsev (DITA)		First version of the report
<b>v.02</b>	06/09/2022		D. Goujon (EIFER)	Initial feedback from reviewer
<b>v.03</b>	27/09/2022	H. Tatarchenko, T. Biloborodova, O. Rysantsev (DITA)		Integration of feedback
<b>v.04</b>	01/10/2022		I. Kotsiuba (ISOLUT) M. Murshed (EIFER)	Improvement suggestions from the reviewers
<b>v.1</b>	07/10/2022	H. Tatarchenko, T. Biloborodova, O. Rysantsev (DITA)	M. Murshed (EIFER)	Integration of reviewers comments to prepare the final version

# Index

Executive Summary.....	1
Chapter 1 - Introduction .....	3
1.1 Objectives .....	3
1.2 Relation to other WPs and tasks .....	3
1.3 The structure of this document.....	4
Chapter 2 – Methodology .....	7
2.1 Replication methodology .....	7
2.2 Creation process for replication plan and bold city vision .....	8
Chapter 3 – Baseline for replication roadmap.....	10
3.1 Baseline description .....	10
3.1.1 Description of the city of Severodonetsk in terms of geography and climate .....	11
3.1.2 Housing stock and communications of Severodonetsk.....	12
3.1.3 City population .....	13
3.1.4 Positive energy district of Severodonetsk .....	14
3.1.5 Replication area .....	16
3.1.6 Existing citizen associations.....	16
3.1.7 On-going/ended projects.....	19
3.1.8 Existing documents.....	21
3.2 Objectives of replication roadmap .....	23
3.2.1 PED action by the strategic axe A .....	23
3.2.2 PED action by the strategic axe B .....	24
3.2.3 PED action by the strategic axe C .....	26
3.3 Stakeholders & Ecosystem .....	27
3.4 First overview of ISs/IEs.....	31
3.5 Regulation and legislation .....	34
3.6 Identified barriers, risks and impacts .....	36
Chapter 4 – Next Steps .....	39
Chapter 5 – Bold City Vision.....	41
5.1 The Vision in a nutshell.....	41
5.2 Scope and Methodology.....	41
5.3 Steps for development and implementation of the vision .....	44
5.4 Stakeholders’ participatory process – citizens engagement.....	45
5.5 Output and results.....	45

Chapter 6 – Conclusion .....	48
Appendixes.....	50
Appendix A. The main principal legal framework regulating electricity market activities .....	50

### Index of Tables

Table 1 List of on-going/completed projects in Severodonetsk.....	19
Table 2 List of existing documents .....	21

### Index of Figures

Figure 1 – The city of Severodonetsk territory.....	11
Figure 2 – Average and max wind speed and gust for Severodonetsk .....	11
Figure 3 – Average sunshine days and average sunshine hours in Severodonetsk .....	12
Figure 4 – Average temperature in Severodonetsk .....	12
Figure 5 – Severodonetsk population.....	13
Figure 6 – Severodonetsk demographics SUD.....	14
Figure 7 – Severodonetsk Positive Energy District .....	15

## Glossary

Abbreviation	Full form
<b>BM</b>	Business Model
<b>CCYC</b>	Center of children's and youth creativity
<b>CNaR</b>	Construction Norms and Regulations
<b>CPEI</b>	Communal preschool educational institution
<b>ESCO</b>	Energy Service Companies
<b>ESP</b>	Energy Security Project
<b>FC</b>	Fellow City
<b>GIZ</b>	Gesellschaft für Internationale Zusammenarbeit
<b>ICT</b>	Information and communications technology
<b>IE</b>	Innovative Element
<b>IS</b>	Integrated Solution
<b>JSC</b>	Joint-Stock Company
<b>LED</b>	Light-emitting diode
<b>LHC</b>	Lighthouse cities
<b>LLC</b>	Limited Liability Company
<b>LLC PTC</b>	Limited Liability Company Production and Trade Company
<b>ME</b>	Municipal Enterprise
<b>NBS</b>	National Building Standard, Building Code
<b>NCRECP</b>	National Commission for State Regulation of Energy and Utilities
<b>NSU</b>	National Standard of Ukraine
<b>PED</b>	Positive Energy District
<b>PJSC</b>	Private Joint-Stock Company
<b>PV</b>	Photovoltaics
<b>RES</b>	renewable energy sources
<b>SECAP</b>	Sustainable Energy and Climate Action Plan
<b>SLC</b>	Superadded liability company
<b>SME</b>	Small and medium-sized enterprise
<b>SS</b>	Secondary Schools
<b>SUD</b>	Sustainable Urban Development
<b>UES</b>	United Energy System
<b>UNDP</b>	United Nations Development Programme
<b>USAID</b>	United States Agency for International Development
<b>V2G</b>	Vehicle-to-Grid
<b>WP</b>	Work Package

## Executive Summary

D8.8 delivers the Severodonetsk Replication Roadmap, Planning & Bold City Vision - V1 providing Severodonetsk replication strategy, activities planning and sustainability roadmap creation according to the most appropriate integrated solutions (ISs) and innovative elements (IEs) at the preliminary stage (M 13–24) of the RESPONSE project.

Severodonetsk Replication Roadmap, Planning & Bold City Vision - V1 paves the way for effective planning of actions towards sustainable positive energy city concept in Ukraine based on the ISs and IEs developed and implemented during RESPONSE project by Lighthouse cities (LHCs) of Dijon and Turku.

This report combines a variety of different replication activities that are covering technical, financial, economic, regulatory, administrative and social aspects. Moreover, it presents an updated overview of the Severodonetsk's set of actions and plan towards replication activities.

The next version, D8.15 Severodonetsk Replication Roadmap, Planning & Bold City Vision – V2, which is due in month 60, will identify and document the stakeholders' ecosystem creation/involvement, the analyse of the IEs that best suit the needs of the Severodonetsk, as well as the fundings research and business models creation; planning of the activities to implement the solutions; and determination of the implementation of the IEs at final stage.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## **Chapter 1**

Introduction



## Chapter 1 - Introduction

Based on WP1, WP2, WP3, WP4, WP12 and especially on WP8 (D8.1, D8.2), task 8.8 aims to deliver an elaborated Replication Roadmap, Planning & Bold City Vision at preliminary stage, which consists of definition and description of the FC' situation at the beginning of the project: baseline, objectives, regulation framework, potential barriers and constraints derived from legislation and implementation, practicalities and available stakeholders.

### 1.1 Objectives

Severodonetsk's Replication Roadmap, Planning & Bold City Vision - V1 (D8.8) defines Severodonetsk's specific replication strategy, activities planning and sustainability roadmap creation according to the most appropriate integrated solutions (ISs) and innovative elements (IEs) at preliminary stage (M13–24) taking into consideration the replication activities aspects:

- Technical aspects;
- Financial and economic aspects;
- Regulatory and administrative aspects;
- Social aspects.

The objective of D8.8 is to describe city's sustainability strategy, it also acts as a crucial component for definition and implementation of ISs and IEs for smart city projects such as RESPONSE towards to be a sustainable positive energy city.

This document helps Ukrainian cities and institutions understand baseline and foundations of PED, and to define ISs or IEs for a city in order to approximate standards towards EU during reconstruction or transformation.

### 1.2 Relation to other WPs and tasks

D8.8 is based on other WPs and associated deliverables of RESPONSE project. WP1, WP3 and WP4, especially concerning the Master City Plans prepared for each TA (D1.3, D1.4, D1.5, D3.1, D4.1, D5.2) have been used as a source of information. The practical knowledge, feedback and notion obtained during WP1 work process regarding the implementation, demonstration, and replication of integrated solutions and innovative elements is intended to explore opportunities and restriction for their implementation and exploitation.

Within WP1 the study of the current regulatory environment at the local and national levels, as well as an assessment of the current situation with the state of data privacy, existing barriers, possible risks, etc. have been conducted. Description of the planned replication activities was included in WP1 (D1.3). Analysis and identification of the regulatory framework made it possible to define barriers from existing national legislation

to the implementation of smart city innovations. Innovative solutions which are not regulated or regulated partially by Ukraine legislation were defined. For example, smart meter installation, Vehicle-to-Grid (V2G) operation, automated driving are not regulated by the current legislation. A survey of citizens and stakeholders made it possible at the first stage to identify potential stakeholders in the implementation of solutions for local energy supply based on renewable energy sources, the implementation of positive energy buildings, and made the foundation for the future Severodonetsk ecosystem through the Severodonetsk Replication Roadmap.

WP2 (D2.1, D2.2) implementation provided an opportunity to use the developed standardized methodological framework for a universal assessment of the effectiveness of innovative solutions implemented during the project or in the post-project period. Severodonetsk will use WP2 outcome as a basis and support to decide which technologies will be more relevant and will bring efficient generation, energy savings and reduction of CO2 emissions, which will be presented in the Severodonetsk Replication Roadmap. The WP2 identification of stakeholder groups provides a clear understanding of the actors involved in the process of transforming the city into an energy-positive one.

WP3 enabled comprehensive assessment Severodonetsk's ICT baseline. Cooperation with LH cities will help to obtain new knowledge and practicalities of implementation, architecture and evaluation of ICT solutions in terms of implementation.

WP4 is a source of information and the foundation of the Severodonetsk's Replication Roadmap to strengthen the active participation of citizens and stakeholders in the planned innovative solutions implementation.

D8.1 and D8.2 are the main foundation guidelines for development of this report D8.8.

WP12 (D12.6, D12.7) provided inputs on how all partners must act in an ethical and responsible manner, especially in activities of data collection, protection and cyber data security involving humans, which will be accumulated and used within creation of Severodonetsk Replication Roadmap.

### 1.3 The structure of this document

This Deliverable has been structured as follow:

- Chapter 1 introduces the deliverable, with an overview of the report and a presentation of the objectives and connections with other RESPONSE activities.
- In Chapter 2, the replication methodology and creation process for Severodonetsk Replication Plans and 2050 Bold city vision are described.
- In Chapter 3, the Baseline description at preliminary stage is provided. Firstly, city baseline description in terms of geography and climate, population, infrastructure, housing stock and communications are described. Next, existing citizen associations, the on-going and finished

projects concerning city energy efficiency are presented. Further, Severodonetsk objectives according to Sustainable Urban Development (SUD) strategy are defined. Stakeholders & Ecosystem and first overview of ISs and IEs according to replication area will be described. Regulation and legislation are identified and described. Existing barriers, risks and impact of Severodonetsk Replication Roadmap, Planning & Bold City Vision - V1 is provided, and includes a brief overview of risks and constraints at national, regional and implementation area levels.

- Chapter 4 presents a brief overview of the next steps.
- In Chapter 5, the Bold City Vision 2050 following the methodology presented in D8.1 is presented.
- Chapter 6 provides the concluding remarks.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## Chapter 2

### Methodology

## Chapter 2 – Methodology

### 2.1 Replication methodology

The methodology to create the FC Replication Roadmap, Planning & Bold City Vision was proposed in D8.1 and D8.2. They are the foundation of adoption and development of Severodonetsk Replication Plan and 2050 Bold city vision. The four clusters that a city should take into systematic consideration when dealing with a replication project<sup>1</sup> covered the following replication aspects: technical, financial and economic, regulatory and administrative, social. In addition to these clusters, the following issues should be studied, analysed and defined to build a strategy of replication: baseline determination, objectives definition, stakeholders and ecosystem creation, study and choice of the ISs/IEs to replicate, regulation and legislation, barriers and business models.

The methodology to create a FC Replication Roadmap, Planning & Bold City Vision consists of 4 phases: benchmark framework; ecosystem and ISs/IEs, funding and business models, business models finalisation and planning; implementation and monitoring. The preliminary stage corresponds the Phase 1 of the methodology, and final stage corresponds to Phase 2, Phase 3, Phase 4 of the methodology. The 4 phases are organised as follows:

- Phase 1: a state of the art of the FCs' situation at the beginning of the RESPONSE project;
- Phase 2: divided into two sub-phases, one related to the stakeholders' ecosystem creation / involvement and the analyse of the IEs that best suit the needs of the FCs; the other one related to the fundings research and Business Models creation;
- Phase 3: at this stage, solutions should be chosen, barriers should be investigated and ecosystem should be clearly active.;
- Phase 4: implementation of the solutions and monitoring.

Phase 1 is preliminary and consists in defining the state of the art of the FCs' baseline situation for the replication areas at the beginning of the project and include the following topics:

- Clear description of the baseline: city geography and climate, city population, description of the buildings, consumption and existing infrastructure in the replication area, description of existing citizen associations, list of on-going projects aimed to resolve or assess same problematics as those envisioned in the RESPONSE project, list of existing documents and their status;
- Description on the objectives Severodonetsk want to reach through the RESPONSE project inside the replication area and classify them according to the expected impact;

<sup>1</sup> <https://smart-cities-marketplace.ec.europa.eu/insights/publications/making-smart-city-replication-and-scale-innovation-europe>

- Preliminary construction of the stakeholders' ecosystem based on surveys (WP1) and D 8.2 templates;
- First overview of the ISs/IEs;
- Study and identification of the current regulations.

From these, a list of the potential barriers and risks should be addressed.

Phase 1 lasts from M13 to M24. To proceed in an efficient way, Severodonetsk will rely on material such as deliverables that were submitted during the M1 – M24 of the RESPONSE.

## 2.2 Creation process for replication plan and bold city vision

The replication plan and bold city vision are created based in the knowledge gathered from other Tasks. For example, WP1 was a foundation for replication plan and bold city vision.

Task 1.1 (WP1) helped to understand relevance and needs of citizens, interests of technical stakeholders.

Task 1.2 (WP1) provided with the information on the regulatory frameworks (local, national and EU), in particular of potential barriers for replication.

Tasks 1.3 – 1.6 (WP1) provided with the information on demonstration, replication and implementation of ISs for Severodonetsk.

Task 4.1 (WP4) was a source of information about citizens, businesses and communities' needs and opinions.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## **Chapter 3**

Baseline for replication roadmap

## Chapter 3 – Baseline for replication roadmap

### 3.1 Baseline description

Severodonetsk is located in the Luhansk region in the east of Ukraine at the left side of the river Siverskiy Donets. The city is the acting administrative center of Luhansk region. Severodonetsk has the status of a city of regional significance and one of the most important industrial cities of the region. Industrial production is carried out by 163 enterprises, of which 3 are large enterprises, 23 are medium-sized enterprises and 137 are small-sized enterprises.

In terms of its industrial and scientific development, Severodonetsk is one of the leading cities in the country. Industrial enterprises, research and production institutions play an important role in the national and regional economy. The products of Severodonetsk industrial enterprises are competitive and are exported to different countries.

Private Joint Stock Company «Severodonetsk Association «Azot» is the largest Ukrainian producer of mineral fertilizers - ammonia, ammonium, potassium, sodium nitrate, urea, formalin, methanol, ammonium carbonate salts, acetic acid, etc.

The city of Severodonetsk has many research and design institutes, and scientific production associations specializing in scientific and technical development, and engineering, which is a perspective service sector for the city. In 2017 the share of Luhansk region service sector was 67.5%.

Severodonetsk has 6 institutions of high-level education (Volodymyr Dahl East Ukrainian National University and Luhansk State University of Internal Affairs named after E.O. Didorenko, 3 institutes, 1 college), 21 secondary schools, gymnasium and 16 kindergartens.

The Russian invasion of Ukraine on February 24, 2022 radically changed Ukrainians life. The battle for control over the city of Severodonetsk continued from February 28 to June 24, 2022 during the Russian invasion of Ukraine as part of an offensive into Eastern Ukraine.

At February 28, 2022 the Russian army began shelling Severodonetsk. In March, as a result of continuous shelling, severe damage was caused to several residential houses and other buildings. Since the beginning of the hostilities, continuous evacuation of the citizens, city and regional institutions was carried out. At the end of May, the situation worsened in Severodonetsk. The Russian army shot down the entire infrastructure of the city, water supply and electricity. There were still doctors in the city hospital, and some medicines were still available thanks to humanitarian aid. During the three months of the war, about 1,500 citizens were died in Severodonetsk. At the end of May, hostilities were already taking place at the edge of Severodonetsk. Fighting in the city continued for another month. At June 25, 2022 Severodonetsk was occupied by the Russian army. Currently (October 2022) the battles for control over the city of Severodonetsk are continuing.



### 3.1.1 Description of the city of Severodonetsk in terms of geography and climate

The city is located in the steppe zone at the east of Ukraine in the valley of the Siverskiy Donets River and its left tributary of the Borovaya River within the floodplain. In the city there are 2 artificial lakes Parkovoe and Chistoe. The total area of Severodonetsk (highlighted in Figure 1) is 41.551 km<sup>2</sup>, the length from east to west is 12 km, from north to south is 10 km.



Figure 1 – The city of Severodonetsk territory

The climate is temperate continental, east and west winds are characteristic. Average, max wind speed and gust for Severodonetsk are presented in the Figure 2.

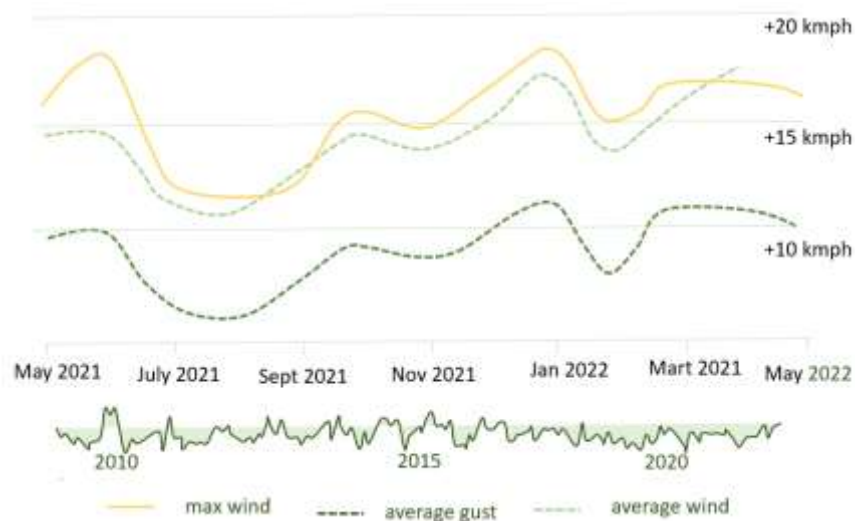


Figure 2 – Average and max wind speed and gust for Severodonetsk

The month with the most sunshine days and hours is August, and the month with the least sunshine days and hours is January (see Figure 3).

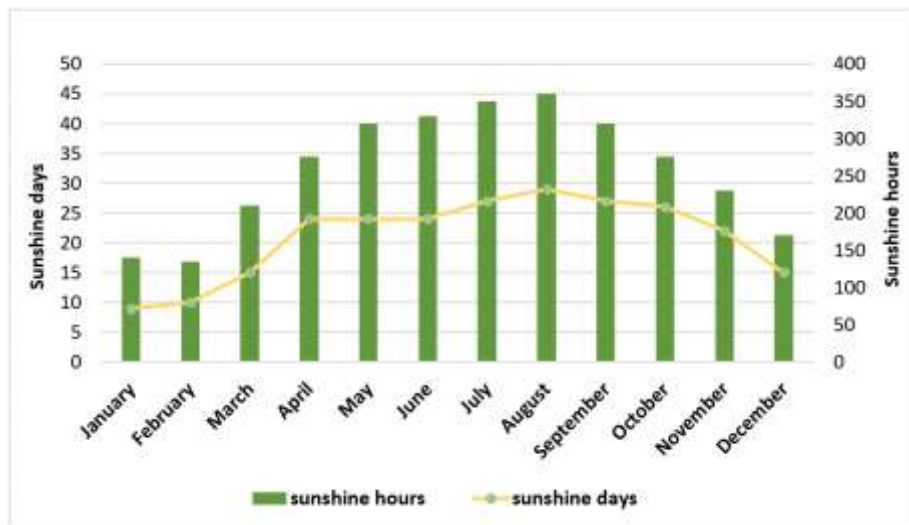


Figure 3 – Average sunshine days and average sunshine hours in Severodonetsk

Usually, summer is hot, dry, with insufficient rainfall. Winter is cold, with little snow, with frequent melting periods. The hottest months in Severodonetsk are July, and August, and June (see Figure 4).

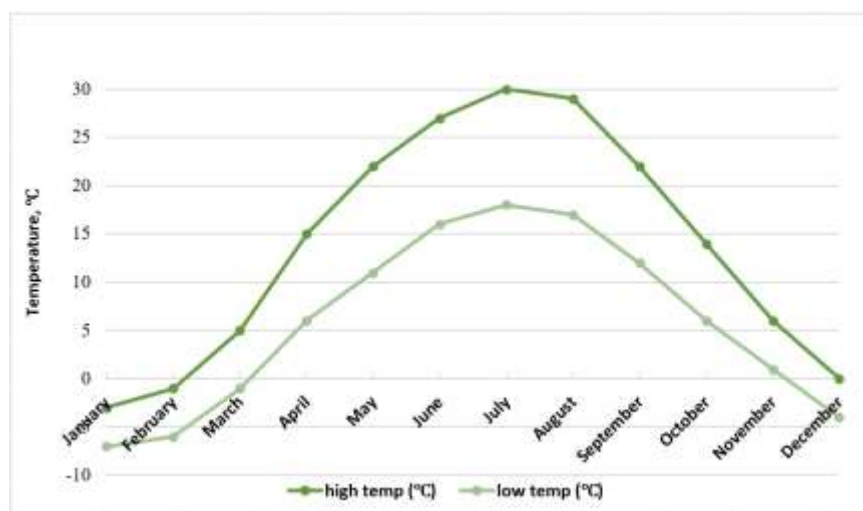


Figure 4 – Average temperature in Severodonetsk

The coldest month is January with temperatures between  $-7^{\circ}\text{C}$  at night and  $-2^{\circ}\text{C}$  at day.

### 3.1.2 Housing stock and communications of Severodonetsk

Severodonetsk location and climate are the reason for the heating season duration which is 180 days a year.

The housing stock of the city is 821 buildings (from one-story to ten-story). The total area of the housing stock is 2703,5 thousand m<sup>2</sup>. The municipal enterprise «Zhytloservice «Svitanok» manages 721 residential buildings, and housing cooperatives manage 99 houses, and one residential building is in private ownership.

The water supply and sewerage facilities of the city are served by the Municipal Enterprise «Severodonetskvodokanal», which has 2 groundwater intakes and 253,8 km of water supply networks, 2 sewage pumping stations and 154,7 km of sewerage networks.

Heat supply of Severodonetsk is carried out by centralized and partially decentralized systems. The main providers of heat supply in the city are JSC «Sievierodonetska Teploelektrotsentral» and Municipal Enterprise «Severodonetskteplokomunenergo» (MU «STKE»). The western part of the city receives thermal energy from JSC «Sievierodonetska Teploelektrotsentral», the northeastern part, including the PED, from the district boiler plant (block 83) and from the block boiler plant (block 71) MU «STKE».

The total length of heat supply networks in the city is 167,1 km, of which the length of the heat networks of the new part of the city in two-pipe terms is 25,56 km, 9.0% of them are more than 70% physically worn out; the length of the heating networks of the old part of the city in two-pipe terms is 100,57 km, 17.0% of them are more than 70% physically worn out.

### 3.1.3 City population

101 135 (2021 est.) inhabitants live on the territory of Severodonetsk. The population in recent years has fluctuated within 5 000 people, as can be seen from Figure 5.

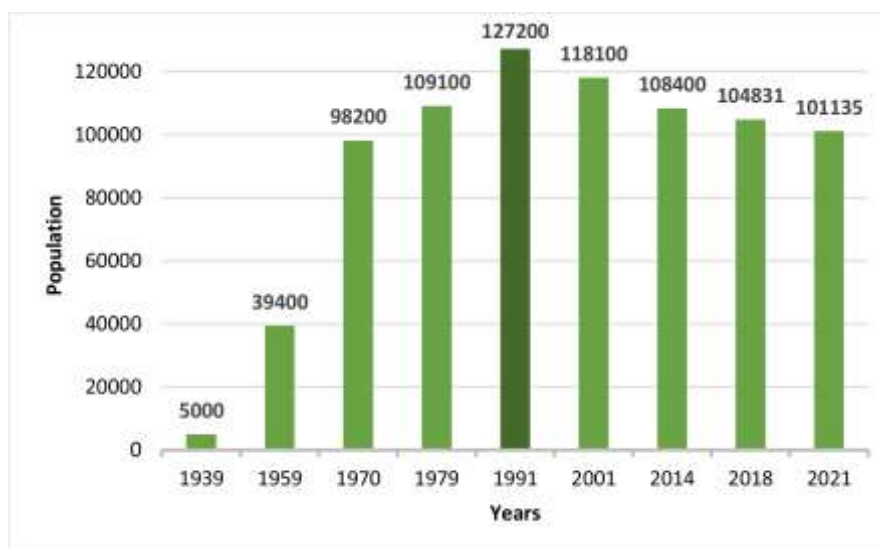
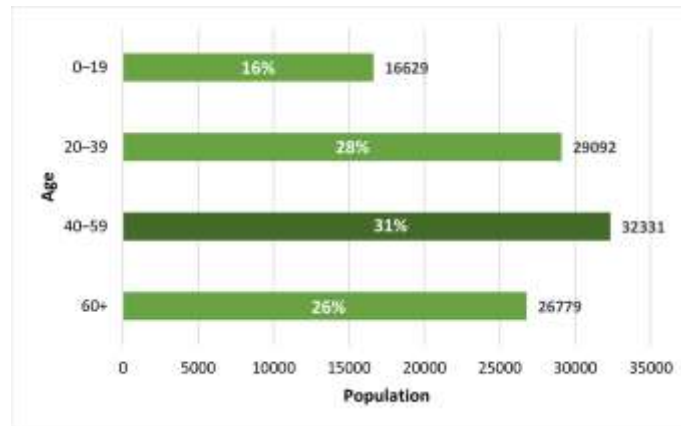


Figure 5 – Severodonetsk population

By the age, population can be divided into 4 age cohorts: children and youth (0 to 19 years old), young adults (20 - 39 years old), middle-age adults (40 - 59 years old), and senior citizens (above 60 years old) as it presented in Figure 6. The most of population cohort is a middle-age adults..



**Figure 6 – Severodonetsk demographics SUD**

The resident population is represented by 46 578 men and 58 250 women as of 2018.

Citizens of the city lead an active lifestyle. In recent years, many sports grounds have been built in the city, 5 youth sport schools provide opportunities for children to do sport. Citizens like cycling. Since 2011, Severodonetsk has been holding the all-Ukrainian action "Veloden" every year in the city, which unites cyclists in a joint bike ride along the central city streets.

### 3.1.4 Positive energy district of Severodonetsk

The PED, as we define it here, is the business and culture center of Severodonetsk, located in the southeastern part of the city. The PED is roughly delimited by the Vilesova, Nauka, Mayakovskoho, Avtomobilna streets and Hvardiisky avenu. The City of Severodonetsk chose the business and culture center to be transformed into the first Positive Energy District (PED) (see Figure 7) Some energy efficiency measures, such as installation of pellet boilers, have already been implemented in the city center.



**Figure 7 – Severodonetsk Positive Energy District**

The PED area is located in an environment formed by multi-story residential buildings - four-, five- and nine-story houses and public buildings: regional state administration buildings, university buildings, schools, kindergartens, shops, shopping centers. The PED building density is currently around 77%.

Attractions such as the Holy Christ Nativity Cathedral, Ivonin park, Victory square and Victory Monument are located in the PED.

In this part of the city of Severodonetsk, heat supply is provided by ME «STKE». Boiler plant with 3 water-heating gas-oil boiler units of the PTVM-30-150 type is used for heat generation. A centralized scheme for the heat supply and hot water supply is provided.

Three buildings of education relevance have been identified. They are: educational building, laboratory building of V. Dahl EUNU and student residence, marked in red in Figure 7 and shown in Figure 8.



a)



b)



c)

**Figure 8 – PEBs: a) educational building, b) laboratory building, c) student residence**

Several measures to increase PED energy efficiency are investigated, such as building insulation, equipping heating units with automated coolant preparation modules that implement local regulation of the heating

system coolant temperature depending on weather conditions, replacing heating appliances using thermostats on each of them and mandatory elements for automatic hydraulic balancing system.

### 3.1.5 Replication area

The city is actively implementing alternative sources of energy, and with the financing of the European Investment Bank, two pellet boilers were built in the PED: in the Severodonetsk Primary Health Care Center (outpatient clinic No. 3) and in secondary school № 8.

The transfer of management of the housing stock to housing cooperatives will allow the implementation of efficient energy management in every residential building in the PED. In order to attract funds from homeowners for the maintenance of buildings, it is planned to provide information and material support for the creation of housing cooperatives. A dialogue and educational platform on energy efficiency issues will be provided.

### 3.1.6 Existing citizen associations

Students, universities, entrepreneurs, professionals, private investors, organizations, research centers, investors, funds, companies are all participants involved in the process of creating the innovation ecosystem of Severodonetsk.. However, the leading role in this network belongs to the Severodonetsk City Military - Civil Administration of the Severodonetsk and Volodymyr Dahl East Ukrainian National University, who generate initiatives and project ideas, coordinate around them stakeholders and participants in the innovation ecosystem.

The innovation ecosystem is based on four key components, such as:

- Science, engineering, higher education institutions, playing the role of the main suppliers of innovative ideas for commercialization
- Fundraising and attraction of investments in the ecosystem of financial resources and business competencies necessary for the formation of innovative companies and the transformation of their business structure
- Infrastructure that ensures the functioning of innovative companies. It can be both material (business incubators, development institutions, etc.) and intangible (various services specially adapted to the needs and specifics of innovative companies, such as services for the protection of intellectual property, for the withdrawal and promotion of innovative products to overseas markets)
- steady demand for high-tech products, technologies and startups.

Thus, the existing association of ecosystem participants includes Energy utilities, Consumers, Technologies and Services Providers, Policy-Making Bodies and Governance, Citizens, Representative Citizen Groups. More

information about the existing associations regarding them as stakeholder groups is provided in Section 3.3. Existing Severodonetsk Representative Citizen Groups below.

Severodonetsk Representative Citizen Groups includes the following citizens institution: Community organization «The University of Future (UF)», Community organization “Severodonetsk youth council”, Community organization “Severodonetsk agency of community development”, Charitable Foundation “Vostok SOS”, Community organization “Crisis media-center “Siverskyi Donets”, Community organization business-club “European choice”.

**Community organization «The University of Future (UF)»** is a society, community organization. The purpose of the organization is to strengthen the role of higher education institutions in promoting the development of potential and transformation of the community and society.

**Community organization “Severodonetsk youth council”**. The goal of the organization is the development of civic competence through non-formal education and support of public initiatives, promotion and implementation of educational, environmental, health, sports and educational activities. Community organization “Severodonetsk youth council” actively interacts with the community, authorities and business to develop and implement socially significant initiatives. The organization is accredited in international exchange programs. It is known in the country, is a reliable partner, interacts with youth formalized communities and civil society institutions of Ukraine.

Community organization “Severodonetsk youth council” has proven itself as an effective mechanism for the implementation of youth projects and events, youth dialogue with the authorities, and protection of the rights of young citizens.

**Community organization “Severodonetsk agency of community development”**. The main goal of organization is the promotion of positive economic, social, cultural and informational development of the territorial community of the city of Severodonetsk, as well as assistance in the implementation of the scientific, creative, economic, organizational potential of the representatives of the city.

Community organization “Severodonetsk agency of community development” has implemented about 40 projects. Since September 2015, the organization has been implementing the United Nations Development Programme (UNDP) project "Gogol Square - a place of action and hope!"

In 2017, Severodonetsk agency of community development implemented a project within the framework of the UNDP program “Local development, community-oriented “Smart Places”. The result of the project was the introduction of an electronic voting system at the Severodonetsk City Military - Civil Administration of the Severodonetsk.



**Charitable Foundation “Vostok SOS”.** The Foundation is one of the leading organizations that provides comprehensive assistance (legal, psychological, humanitarian) to displaced persons and victims of the conflict in eastern Ukraine with the aim of revitalizing Ukrainian society and reducing the consequences of the armed conflict. The Foundation initiates the development of civil society for the affirmation of democratic values and human rights by conducting educational and cultural and artistic activities, providing mentoring support for initiatives of local communities. Constant contact with citizens and city institutions help to understand specific features of regulatory and legal frameworks implementation. The fund initiates and participates in the development of regulatory framework and drafts the laws aimed at improvement of the city situation, in particular, city energy efficiency.

**Community organization “Crisis media-center “Siverskyi Donets”** works on building a society with a high level of trust and cooperation, with a transparent and democratic way of decision-making in the community through the development of its own potential and the mobilization of public support through the development of an analytical resource center and a dialogue communication platform.

The organization works on the topic of implementing reforms at the local and regional levels and has the potential to develop creative ideas for promoting reforms in the region, implementing information campaigns to highlight reform processes, thereby increasing the number and quality of supporters of reforms.

Crisis media center "Siverskyi Donets" is a member of national and international coalitions.

**Community organization business-club "European choice"** unites representatives of small and medium-sized businesses of the region. The business club conducts a dialogue with various branches of government at the regional level, takes an active part in the creation of effective business self-regulation mechanisms, constantly organizes meetings of businessmen with representatives of the government, bankers, lawyers, which allows it to play a significant role in the formation of the industrial policy of the region.

Community organization «The University of Future (UF)» and Community organization “Severodonetsk youth council” directed to communication and cooperation between youth people and different institution. These institutions can help to disseminate information positive energy and renewable sources of energy among youth people. Community organization “Severodonetsk agency of community development”, Charitable Foundation “Vostok SOS”, Community organization “Crisis media-center “Siverskyi Donets”, Community organization business-club “European choice” can help in cooperation between consumers, technologies and services providers, policy-making bodies and governance in the city transformation towards energy positive city.



### 3.1.7 On-going/ended projects

The issues of increasing energy efficiency, reducing the consumption of energy resources and, accordingly, the rational use of budgetary funds are now relevant for Severodonetsk. Therefore, in order to ensure sustainable development, Severodonetsk takes part in a number of projects and programs (see Table 1).

**Table 1 List of on-going/completed projects in Severodonetsk**

Projects	Status (on-going / completed)
<b>USAID Energy Security Project (ESP)<sup>2</sup></b>	on-going (2021-2026)
<b>Government social welfare program 2022</b>	on-going (2022)
<b>Covenant of Mayors for Climate and Energy<sup>3</sup></b>	on-going
<b>Program “Energodim”</b>	on-going
<b>Increasing energy efficiency in Ukraine<sup>4</sup></b>	on-going (2020-2025)
<b>Energy Efficiency in Municipalities II<sup>5</sup></b>	Completed (2017-2020)
<b>USAID Municipal Energy Reform Project<sup>6</sup></b>	Completed (2013-2018)

Those projects are presented in detail hereunder.

#### 3.1.7.1 USAID Energy Security Project

USAID Energy Security Project (ESP) implies the provision of technical assistance to municipal stakeholders in the reform’s implementation aimed at optimizing and developing the heat supply infrastructure. The following actions were planned within the project: development of the Severodonetsk Heat Supply Scheme, development of a long-term strategy for the development of the heat supply system and a certain list of priority actions to improve the heat supply system, for defined priority investment actions, development of a concept, estimates, assessment of investment impact and identification of potential financing sources<sup>7</sup>.

Plan of Severodonetsk Heat Supply Scheme development<sup>8</sup> has been presented in the beginning of December 2021. The plan contains the definition of the stages of development of the heat supply scheme, the schedule for the implementation of work, the analysis and definition of key aspects of the development of the heat supply scheme.

<sup>2</sup> <https://energysecurityua.org/ua/>

<sup>3</sup> <https://www.eumayors.eu/en/>

<sup>4</sup> <https://www.giz.de/en/worldwide/102378.html>

<sup>5</sup> <https://www.giz.de/en/worldwide/57141.html>

<sup>6</sup> <https://merp.org.ua/us/>

<sup>7</sup> <https://sed-rada.gov.ua/usaaid-proiekt-energetichnoyi-bezpeki/uvaga-zaversheno-konkursniy-vidbir-mist-partneriv>

<sup>8</sup> <https://sed-rada.gov.ua/sites/default/files/static-page/2021/nid45781-prezentaciya-rozroblennya-shemi-teplopostachannya-75761.pdf>

### 3.1.7.2 *Energy Efficiency in Municipalities II*

Project Energy Efficiency in Municipalities II implemented in cooperation with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH provides services for energy efficiency for large buildings: conducting energy audits, analysis of the economic performance of visits to improve energy efficiency; in the implementation of on-line systems and energy monitoring; distribution of design documentation for entry into the change of consumption in energy, thermo-modernization, establishment of ITP; other consulting services, which are focused on improving the energy efficiency of community buildings. Received grant of 2000 Euros for conducting additional energy-efficient audits in the public sphere.

### 3.1.7.3 *Program “Energodim”*

“Energodim” is a program of energy modernization of apartment buildings through the partial reimbursement of costs for energy efficiency measures. The program provides partial costs reimbursement of 20–50% of the cost of eligible measures/works. The expected average level of savings of energy resources consumption for all projects financed under the Program is at least 20%.

### 3.1.7.4 *Covenant of Mayors for Climate and Energy*

The Covenant of Mayors for Climate and Energy brings together local and regional authorities voluntarily committing to implementing the European Union’s climate and energy objectives on their territory. Signatory local authorities share a vision for making cities decarbonised and resilient, where citizens have access to secure, sustainable and affordable energy.

Follow the Covenant of Mayors for Climate and Energy, ESCOs was defined as one of the key tool in achieving energy efficiency targets

The essence of the energy service concept is that energy-efficient measures in the buildings of public institutions (schools, kindergartens, hospitals, universities, etc.) are implemented by private investors - Energy Service Companies (ESCO), and payment is made exclusively through energy saving (reduction of costs for the consumption of communal services and energy carriers) achieved as a result of implementing energy-efficient actions<sup>9</sup>.

### 3.1.7.5 *Projects results*

Results of implemented energy effectiveness projects and perspectives for expansion of ESCO projects are described below.

Implemented energy-efficient actions with ESCO contracts for educational institutions of the Severodonetsk City Military - Civil Administration are:

<sup>9</sup> [https://decentralization.gov.ua/uploads/library/file/282/Guideline - ESCO.pdf](https://decentralization.gov.ua/uploads/library/file/282/Guideline_-_ESCO.pdf)

- Dispatching and online energy monitoring have been installed in 10 institutions: Communal preschool educational institution “Lastivka” (CPEI “Lastivka”), Communal preschool educational institution (CPEI) № 38, Secondary Schools (SS) № 1, 5, 8, 10, 13, 15, Gymnasium, Center of children's and youth creativity (CCYC);
- Individual heating points have been installed in the 7 institutions of the education department;
- 9 heat energy metering units were replaced;
- Facilities management (ESCO-monitoring).

The total savings in natural units for two heating seasons amounted to 3253,17 Gcal, as it is presented in Figure 9.

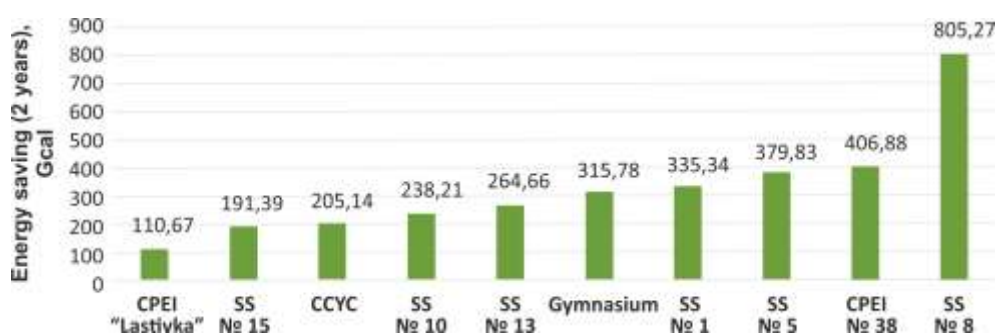


Figure 9 – Energy saving in seasons of 2019-2020, 2020-2021, Gcal

As a result of energy efficiency actions, there has been a decrease in CO<sub>2</sub> emissions into the atmospheric air, starting from 2016 from 9484 tons per year to 9027 tons in 2019. In total, 480 more potential ESCO objects for investors have been identified in the city.

### 3.1.8 Existing documents

In January, 2021 the Implementation plan 2021-2023 of Sustainable Urban Development (SUD) strategy and Sustainable Urban Development strategy 2021-2027 the City of Severodonetsk has developed and presented. These two and other existing or to be created documents are listed in Table 3.

Table 2 List of existing documents

Existing documents	Status (to be created/updated or already submitted)
<b>Severodonetsk Sustainable Urban Development strategy 2021-2027</b>	Published and into action since January 2021
<b>Severodonetsk SUD implementation plan 2021–23</b>	Published and into action since January 2021
<b>Sustainable Energy and Climate Action Plan (SECAP) 2030</b>	Under elaboration and to be published at the end of 2023

<b>Severodonetsk district heating schemes (USAID ESP Project)</b>	Under elaboration
<b>Emission Inventory</b>	Under elaboration and to be published at the end of 2023

Severodonetsk Sustainable Urban Development strategy 2021-2027 aims at solving problems and implementing tasks for the rational use of resource potential, creating comfortable living for the population, and ensuring environmental safety.

SUD Strategy, consists of 3 strategic axes such as A. SMART-transformation of economy, B. Environmental sustainability and smart energy, and C. Innovative solutions to connect local government and communities. Severodonetsk SUD implementation plan includes project proposals of primary importance for the city, according to 3 strategic axes presented above.

Severodonetsk SUD strategy activities will aim at introduction of the municipal energy management system, developing an Action Plan for sustainable energy development of Severodonetsk until 2030, involving the public in joint actions in response to local energy challenges.

In order to ensure sustainable development, in April 2021, by ordinance of the head of the Severodonetsk City Military - Civil Administration, Severodonetsk joined the European Union initiative "Covenant of Mayors for Climate and Energy". According to the Covenant, Severodonetsk has to reduce its territory's CO2 emissions by at least 30% by 2030 through energy efficiency and renewable energy actions, and increase sustainability through climate change adaptation. In accordance of the Covenant of Mayors for Climate and Energy, Severodonetsk has committed to prepare a Baseline Emission Inventory, conduct a Climate Change Risk and Vulnerability Assessment, and, within two years, develop Severodonetsk Sustainable Energy and Climate Action Plan (SECAP) until 2030.

The project "Promotion of Energy Efficiency and Implementation of the EU Directive on Energy Efficiency in Ukraine", implemented in Ukraine by the company "Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH", on behalf of the Governments of Germany and Switzerland, funded expert consultations on the development of Severodonetsk Sustainable Energy and Climate Action Plan (SECAP) until 2030.

On 01.10.2021 the first visit of the project experts took place, together with whom work was started on the development of SECAP until 2030, discussions were held and organizational issues were considered to start work.

In addition, in order to provide information support to the partner communities of the project "Promotion of Energy Efficiency and Implementation of the EU Directive on Energy Efficiency in Ukraine", a series of online

webinars on the development of SECAP was held within the framework of the project in October-November 2021:

- 26.10.2021 - Covenant of Mayors. Basic statements. SECAP Development.
- 09.11.2021 - New Challenges of the Covenant of Mayors. Strategic goal - 2050. Three pillars of the Covenant of Mayors.
- 12.11.2021 - Introduction of amendments to the adopted SECAP. Foundations and procedures. Transition from the city SECAP of the to the community SECAP.
- 19.11.2021 – Monitoring of Covenant of Mayors initiative. Requirements and procedures. Preparation of the final monitoring report on SECAP.
- November 22, 2021 an online meeting was held between representatives of the department for energy management and the introduction of energy-saving technologies for the management of economic development with project experts to draw up a roadmap for the document development and start information collecting for the SECAP development.

### 3.2 Objectives of replication roadmap

The Replication Roadmap leading the community to a strategic vision, will be provided by the development of strategic actions determined by a working group of Severodonetsk City Military - Civil Administration of the Severodonetsk.

SUD Strategy has defined 3 strategic axes of action towards energy positive city:

- A. SMART-transformation of economy;
- B. Environmental sustainability and smart energy;
- C. Innovative solutions to connect local government and communities.

To this end, the targets objectives to carry out an energy positive city are described below.

The tasks, coordinators, responsible partners and future results of all targets are defined by SUD strategy.

Severodonetsk SUD implementation plan includes project proposals that are of primary importance for the development of the city, according to 3 strategic axes defined by SUD Strategy.

To achieve a shared vision on the following axes more detailed PED objectives and actions are described below.

#### 3.2.1 PED action by the strategic axe A

The objectives of the city by strategic axes A: SMART-transformation of economic include are the following:

- Creation of an innovative dialogue partner network;
- Community Digitization;
- Support for startups and creative business ideas;

- Development of modern space-planning documentation;
- Preparation of high-quality investment products;
- Active investment and exhibition activities of community.

These objectives implementation will help to unite efforts and mobilization the available resources of all stakeholders for the development and implementation of a new energy policy, the introduction of modern technical and financial approaches aimed at improving energy conservation, energy efficiency and energy security, to connect with stakeholders to better meet the needs of citizens.

### 3.2.2 PED action by the strategic axe B

Strategic axes B: Comfort of human life as safety, environmental sustainability and smart energy was discussed by a working group at meetings and during online thematic events.

The objectives of the city in the strategic axes B: Comfort of human life as safety, environmental sustainability and smart energy are following:

- Creation of condominiums supporting of energy efficient solutions;
- Implementation an effective community energy policy;
- Improving the energy efficiency of public and residential buildings;
- Energy efficient modernization of outdoor lighting;
- Modernization of the heat supply system and boiler plants, including the use of alternative energy sources;
- Green energy, implementation of alternative energy sources.

To achieve these objectives the action to carry out in the city and in the PED are: creating an effective system of energy resources management, development of the Action Plan for Sustainable Energy Development and Climate of the Severodonetsk City Community until 2030, implementation of energy monitoring and accounting system for energy consumption, modernization of boiler plant, replacement of boilers with energy efficient ones using alternative energy sources, construction of two cogeneration gas turbine generators UGT 15000, with a total capacity of 35 MW, renovation and thermal modernization of buildings of educational institutions and modernization of the heating system by installing individual heating points. Concerning the renovation and thermal modernization of buildings of educational institutions and modernization of the heating system by installing individual heating points, particularly conventional retrofitting replication objectives are

- Reduce energy costs, use of green energy;
- Improve the indoor microclimate of buildings;
- Ensure more efficient energy management;

- Efficient maintenance of the building and engineering installations.

### 3.2.2.1 *Standards and rules of housing buildings renovation*

For conventional retrofitting replication purposes national legislation considered using of National Standard of Ukraine (NSU), National Building Standard, Building Code (NBS), and Construction Norms and Regulations (CNaR) for planed buildings renovation. Defined standards and rules are:

- NBS B.2.6-31:2016 Thermal insulation of buildings;
- CNaR 2.04.01-85 Internal water supply and sewerage of buildings;
- CNaR 2.04.14-88 Thermal insulation of equipment and pipelines;
- NBS B.2.5-67:2013 Heating, ventilation and air conditioning;
- NBS B.2-2-4-97 Buildings and structures. Buildings and structures of children's preschool institutions
- NSU 4065-2001 Energy saving. Energy audit. General technical requirements (ANSI/IEEE 739-1995,NEQ);
- NSU 4472-2005. Energy saving. Energy management systems. General requirements;
- NSU Б B.2.6-36:2008. Constructions of external walls with facade thermal insulation and finishing with plasters. General technical conditions;
- Standards and guidelines for standardization of fuel and heat energy consumption for heating residential and public buildings, as well as for household needs in Ukraine. KTM 204 Ukraine 244–94. – K.: JSC„VIPOL”. - 2001. – 376 p.;
- Constructions of external walls with front thermal insulation. Classification and general technical requirements: DSTU Б B.2.6-34:2008. – [Acting since 01.06.2009].- Kyiv: Ministry of Regional Development of Ukraine, 2009. – 12 p. – (National Standard of Ukraine);
- Constructions of houses and buildings. Constructions of external walls with front thermal insulation. Requirements for design, installation and operation: DBN B.2.6- 33:2008. – [Acting since 01.07.2009] – Kyiv: Ministry of Regional Development of Ukraine, 2009. – 24 p. – (State building norms of Ukraine);
- Housing stock of Ukraine in 2010. Statistical bulletin. - State Statistics Service of Ukraine. - Kyiv, 2011.

### 3.2.2.2 *Budlings requirements*

Using national standards and rules budlings requirements for conventional retrofitting have been defined as following:

- Internal temperature in rooms and rooms  $t_{вн} = 18-22$  C0;

- Minimum heat transfer resistance of external walls  $R_{q \text{ min}} \geq 3,3 \text{ m}^2 \cdot \text{K} / \text{W}$ ;
- Minimum heat transfer resistance of windows  $R_{q \text{ min}} \geq 0.75 \text{ m}^2 \cdot \text{K} / \text{W}$ ;
- Minimum heat transfer resistance of entrance doors  $R_{q \text{ min}} \geq 0,6 \text{ m}^2 \cdot \text{K} / \text{W}$ ;
- The minimum heat transfer resistance of the floor over the unheated basement  $R_{q \text{ min}} \geq 3.75 \text{ m}^2 \cdot \text{K} / \text{W}$ ;
- The minimum heat transfer resistance of the attic  $R_{q \text{ min}} \geq 4.95 \text{ m}^2 \cdot \text{K} / \text{W}$ ;
- The difference between the internal temperature and the inner surface,  $\Delta t_{cr}$ , walls - 5C0, attic - 4C0, floor - 2,5C0;
- Normative maximum heat consumption of the building (I temperature zone),  $E_{max} = 38 \text{ kW} \cdot \text{h} / \text{m}^2$ ;
- Ensuring air exchange of premises;
- Providing local regulation of heat flow to ensure comfortable conditions;
- Providing the required amount of hot water of the appropriate temperature;
- Ensuring the operation of supply and exhaust ventilation;
- Ensuring an adequate level of illumination;
- Thermal insulation of pipelines, taps, fittings.

### 3.2.3 PED action by the strategic axe C

The action plan for the strategic direction "Human development through innovation and trust in the authorities" was discussed during working group meetings and during the online thematic events, which were held for the apparatus and structural units of the Severodonetsk City Military - Civil Administration of the Severodonetsk, Civil-Military Administration of Luhansk Region, for public leaders and managers of public associations "Public space of gender mainstreaming and inclusion", for youth "Youth space as a dialogue platform for the development of youth initiatives".

The objectives of the city by strategic axes C: Growth of human potential through management innovation and trust in government are the following:

- Effective management structure and available networks with equal access to services;
- SMART – community (implementation of information management systems, electronic services);
- Community participation and effective community communications;
- Effective partnerships and external communications of the community;
- Sports community;



- Youth self-management, youth involvement in community management;
- Severodonetsk is a cycling city.

These objectives implementation will help to provide consultations, conferences, discussion panels, trainings, practical seminars to study the best practices in Ukraine and EU, and to engage the public in joint actions in response to local energy challenges.

### 3.3 Stakeholders & Ecosystem

Severodonetsk has started to build its ecosystem. The main roles have been defined in WP2 and include the following stakeholders' groups: energy utilities, consumers, technologies and services providers, policy-making bodies and governance, citizens, representative citizen groups.

The first version of stakeholders list provided included:

- Severodonetsk City Military - Civil Administration of the Severodonetsk district of the Luhansk region from the side of Policy / local government;
- Private Joint Stock Company «Severodonetsk Research and Design Institute of Chemical Engineering» from the side of expert inspection of equipment, mechanical tests, metallographic research, and thermal control;
- Independent department «Severodonetsk Applied College of Technology of Volodymyr Dahl East Ukrainian National University» from the side of Education stakeholders;
- Private engineering and production enterprise «VELES M» and AltSolution from the side of Information technology services;
- Private Joint-Stock Company «Severodonetsk Research and Production Association «Impulse» provided design, manufacture, supply, commissioning, support at operation of instrumentation and control systems (I&C systems) for nuclear and heat power engineering facilities, railway transport, and other industries;
- Community organization «The University of Future (UF)» is a society, community organization.

These stakeholders participated in the WP1 – T1.1: Stakeholder questionnaire.

Citizens were involved in WP1 – T1.1: Stakeholder questionnaire also. The total number of answers was 83. Most of citizens who responded (61%) live in the culture and business center of Severodonetsk, which was defined as replication area. Most of citizens who responded are 18–25 years old (see Figure 10).

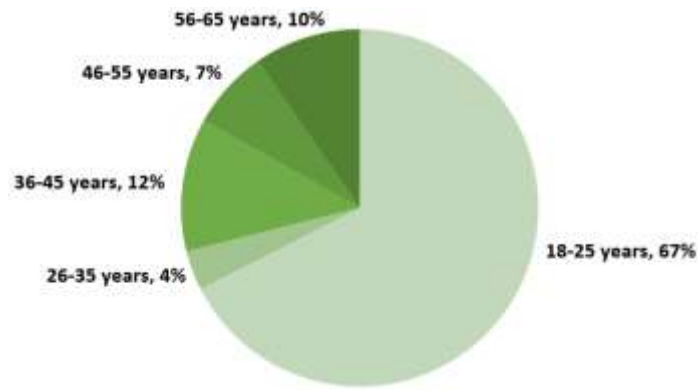


Figure 10 – Demographics of citizens who responded

The majority of citizens who answered are students - 58%. 16% are senior officers (senior servants), 19% are servants, 5% are workers, and 2% are entrepreneurs, see Figure 11 below.

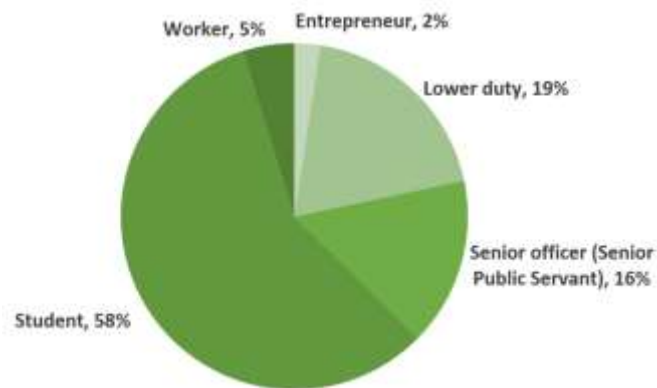


Figure 11 –Demographics of citizens who responded

The education level of responders is for 27% primary and for 14% secondary. Part of citizens who responded with undergraduate, master`s, and postgraduate degrees equal to 25%, 18%, 16% respectively (Figure 12).

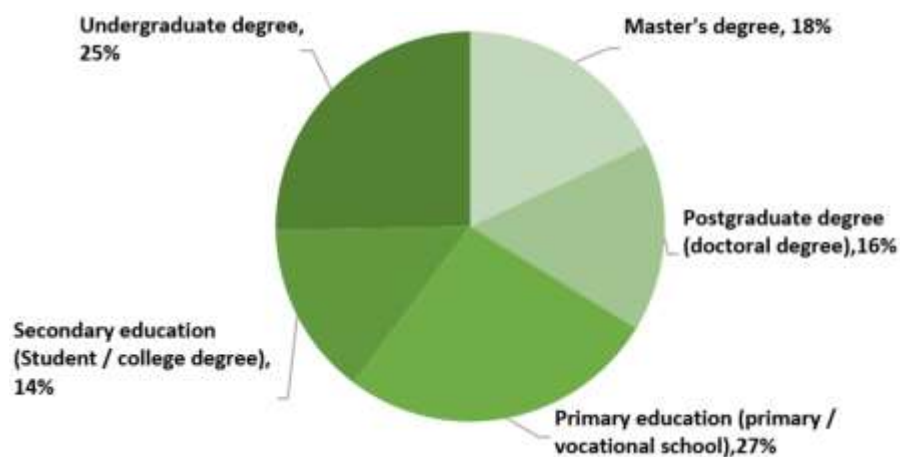
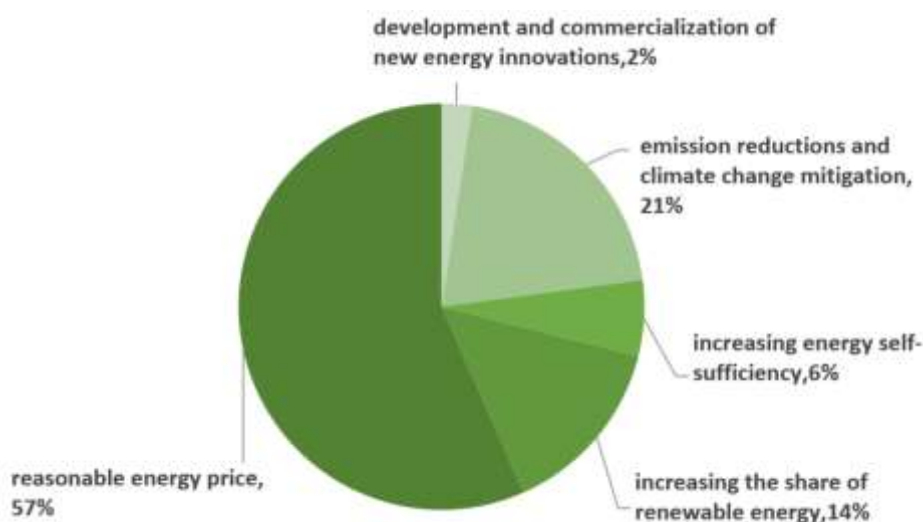


Figure 12 – Education of citizens who responded

Citizens who responded chose as the most important issues that the political decisions should primarily aim for a reasonable energy price (57% of respondents) as it is presented in the Figure 13. 21% of citizens who responded think the emission reduction and climate change mitigation is the most important thing. Increasing the share of renewable energy and increasing energy self-sufficiency is important for 14% and 6% respectively. And only 2% of citizens who responded think the development and commercialization of new energy innovation is the most important thing.



**Figure 13 –Opinion of citizens who responded**

In the beginning of 2022, the meeting of Severodonetsk military administration, Department of Housing and Communal Services, and stakeholders from public sector, public utilities and related enterprises was held. Stakeholders interested in IEs implementation are listed below. Stakeholders can follow several groups as a service provider or/and another service consumer. The first list version list has been updated with the new stakeholders.

**Energy utilities group:** Municipal Enterprise «Severodonetskteplokomunenergo» (MU «STKE»), JSC «Sievierodonetska Teploelektrotsentral».

**Consumers:**

- **Educational consumers:** EUNU, Sergei Prokofiev College of Culture and Arts, Luhansk State University of Internal Affairs named after E.O.Didorenko, PJSC MAUP University, Independent department «Severodonetsk Applied College of Technology of Volodymyr Dahl East Ukrainian National University», Secondary schools 1–20, Severodonetsk City Center for Ecological and Naturalistic Creativity of Students, Severodonetsk City Center for National Patriotic Education, Tourism and Local History for Students, Severodonetsk City Center for Children and Youth Creativity;

- **Health and social consumers:** Municipal non-profit enterprises of Severodonetsk City Council: «Severodonetsk center of primary medical care», «Severodonetsk city multiprofil hospital», Municipal non-profit enterprises of Luhansk regional administration «Luhansk regional clinical hospital», municipal non-profit enterprise «Consultative and diagnostic center», municipal non-profit enterprise "City Dental Clinic", Territorial Center for Social Services, Center for Social Rehabilitation of Children with Disabilities;
- **Commercial consumers:** PJSC «Severodonetsk Association «Azot», Limited Liability Company NWO (LLC NWO) «Skloplastic», private company «Himpostachalnik», state enterprise «Himtehnologia», Limited Liability Company Production and Trade Company (LLC PTC) «TANA», Private Joint-Stock Company «Severodonetsk Research and Production Association «Impulse», Superadded liability company «Severodonetsk plant of non-standardized chemical equipment», Limited Liability Company «KLARIANT Ukraine», Limited Liability Company «ECO-CITY GROUP».

#### Technologies and Services Providers:

- **Local businesses/SMEs:** PJSC «Severodonetsk Association «Azot», LLC NWO «Skloplastic», private company «Himpostachalnik», state enterprise «Himtehnologia», LLC PTC «TANA», Superadded liability company «Severodonetsk plant of non-standardized chemical equipment», Limited Liability Company «KLARIANT Ukraine», Private Joint Stock Company «Severodonetsk Research and Design Institute of Chemical Engineering», Private engineering and production enterprise «VELES M», AltSolution, Private Joint-Stock Company «Severodonetsk Research and Production Association «Impulse»;
- **Construction/Demolition industry providers:** «Luganskbud», Municipal Enterprise «Promhimmontazh», SME «LUMPOS», Open joint-stock company Trust «Severodonetskprombud», CY «Severodonetskspecbud»;
- **Facility management providers:** Municipal Enterprise «Zhytloservice «Svitanok», Housing cooperatives;
- **Communal services providers:** Municipal Enterprise «Severodonetskvodokanal», Municipal Enterprise «Severodonetsklift», Municipal Enterprise «Severodonetskkommunservis»;
- **ESCOs/Utility operators:** LLC «KYIVESCO», Municipal Enterprise «Severodonetskteplokomunenergo», Municipal Enterprise «Severodonetsklift», Municipal Enterprise «Severodonetskkommunservis»;
- **Waste collection and recycling industry:** Municipal enterprise «Severodonetskkommunservis», private company «PAKT», private company «PRESS», LLC «VTORRESOURSE», LLC «ECO-CITY GROUP»;

- **Transport services provider:** Municipal enterprise «Severodonetsk trolleybus management».

**Policy-Making Bodies and Governance:** Severodonetsk City Military - Civil Administration of the Severodonetsk.

**Citizens.**

**Representative citizen groups:** Community organization «The University of Future (UF)», Community organization “Severodonetsk youth council”, Community organization “Severodonetsk agency of community development”, Charitable Foundation “Vostok SOS”, Community organization “Crisis media-center “Siversky Donets”, Community organization business-club “European choice”.

### 3.4 First overview of ISs/IEs

The key ISs & IEs are defined for replication as:

- IE 1.2.12 Conventional Retrofitting (incl. insulation, replacement of radiators, repairs, LED lighting, polyurethane sealing, sensors and tracking systems etc., traditional PV)
- IE 1.2.5 Indoor air quality management system using smart probes
- IE 1.1.2 Pergola with bifacial PVs with albedo boos
- IE 1.2.4 Predictive home thermostats
- IE 2.1.8 Cloud-based Smart Energy Management System
- IE 2.2.6 Two-way consumer
- IE 3.1.2 2nd life battery storage
- IS-4.1: City Information Platform-enabled innovations (4.1.7–4.1.9)
- IS-5.1: Enhanced Citizen Participation, Empowerment and Awareness-Rising.

The specific limitations for IS 1.1, IS 1.2 - Positive Energy Building Systems were defined in WP1 – RESPONSE Smart City Framework on energy-transition innovations. They are:

- Building infrastructures are deteriorated and need for renovation;
- Poor mobile internet connection;
- Renovation of the building electrical infrastructure;
- Obsolete buildings, communal infrastructure, engineering networks;
- Absence of national regulatory documents on Green Certificates.

The IEs IE 1.2.12 Conventional Retrofitting replication area identified in Severodonetsk is the business, education, and cultural city center extending over 1.7 km<sup>2</sup> with 15,702 inhabitants. In particular, three buildings of Volodymyr Dahl East Ukraine National University have been identified: 1) Educational Building, V. Dahl East Ukrainian National University: extending over 4 floors for a total area of 6591 m<sup>2</sup>; 2) Laboratory

Building, V. Dahl East Ukrainian National University: extending over 4 floors for a total area of 4863 m<sup>2</sup>; 3) Student residence building of V. Dahl EUNU extending over 5 floors for a total area of 6245 m<sup>2</sup>, while the area under the building is 1249 m<sup>2</sup>. The first two buildings are very close to each other.

For those buildings concerning the IE 1.2.12 Conventional Retrofitting checklist of buildings energy audit was defined and includes the following information.

- General buildings information: buildings spatial climate data, meters (electricity, heat supply, water), internal environment, working schedule, heating schedule;
- Consumption: energy, water;
- Building structures: external walls, windows, doors, roof, floor;
- Systems and equipment: heat supply system, heating system, ventilation system, water supply system lighting, internal equipment, external equipment.

Considering building energy audit the following objectives for positive energy building insulation were defined.

Educational Building, Volodymyr Dahl East Ukrainian National University:

- Exterior wall insulation - using the «ventilated facade» technology of insulation with the use of modern thermal insulation and finishing materials. The insulation material will be mineral wool plates with a thickness of 150 mm with a density of 90 kg / m<sup>3</sup> and a coefficient of thermal conductivity of 0.037 W / (m·°C) will be used;
- Insulation of opening structures (windows, window frames, doors). Door heat transfer resistance  $R = 0.6 \text{ m}^2 \cdot \text{K} / \text{W}$  ( $U = 1.67 \text{ W} / \text{m}^2 \cdot \text{K}$ ). Resistance of heat transfer of windows 0,75 m<sup>2</sup>·K/W;
- Roof insulation will be made of mineral wool, having previously dismantled the existing carpet. Mineral wool slabs 250 mm thick, with a thermal conductivity of 0.042 W/(m·°C) and a density of 220 kg / m<sup>3</sup> will be used to insulate the roof. Put a steam barrier under the layer of insulation. On top of mineral plates arrange a screed and a waterproofing layer;
- Insulation of the plinth by Foamular Extruded Polystyrene with a thickness of 100 mm, thermal conductivity  $\lambda = 0,034 \text{ W} / (\text{m} \cdot \text{°C})$ ;
- Installation of thermal units with automatic local regulation of temperature depending on the weather, time, days, weeks;
- Replacement of the distribution pipelines of the heating system, replacement of heating appliances with the mandatory use of thermostats on each of them
- Using of elements of automatic hydraulic balancing of the system;

- Conducting of thermal insulation of pipelines and fittings of the heating system laid both in the premises of thermal points and within their open laying in non-heated cellars and attics. Basalt fiber cylinders are recommended as insulation materials;
- Installation of a decentralized energy-saving ventilation system with heat recovery using ventilators.

Laboratory Building, Volodymyr Dahl East Ukrainian National University:

- Conducting of thermal insulation of pipelines and fittings of the heating system laid both in the premises of thermal points and within their open laying in non-heated cellars and attics. Basalt fiber cylinders are recommended as insulation materials;
- Installation of a decentralized energy-saving ventilation system with heat recovery using ventilators;
- Thermal insulation of external building walls ;
- Exterior walls - by the technology of «ventilated facade» of insulation with the use of modern thermal insulation and finishing materials. The insulation material will be mineral wool plates with a thickness of 150 mm with a density of 90 kg / m<sup>3</sup> and a coefficient of thermal conductivity of 0.037 W / (m · ° C);
- Insulation of opening structures (windows, window frames, doors). Door heat transfer resistance  $R = 0.6 \text{ m}^2 \cdot \text{K} / \text{W}$  ( $U = 1.67 \text{ W} / \text{m}^2 \cdot \text{K}$ ). Resistance of heat transfer of windows 0,75  $\text{m}^2 \cdot \text{K} / \text{W}$ ;
- Roof insulation is made of mineral wool, having previously dismantled the existing carpet. Mineral wool slabs 250 mm thick, with a thermal conductivity of 0.042 W / (m · ° C) and a density of 220 kg / m<sup>3</sup> will be used to insulate the roof. Put a steam barrier under the layer of insulation. On top of mineral plates arrange a screed and a waterproofing layer;
- Installation of thermal units with automatic regulation of temperature depending on the weather, time, days, weeks;
- Replacement of the distribution pipelines of the heating system, replacement of heating appliances with the mandatory use of thermostats on each of them;
- Using of elements of automatic hydraulic balancing of the system.
- Student Residence Building of Volodymyr Dahl East Ukrainian National University:
- Insulation of the plinth with extruded expanded polystyrene (XPS) 100 mm thick, with thermal conductivity  $\lambda = 0.034 \text{ W} / (\text{m} \cdot \text{° C})$ ;

- Insulation of the exterior walls of the facades by «Coroid» technology with modern thermal insulation and finishing materials. It is proposed to use 150 mm thick mineral wool plates with a density of 145 kg / m<sup>3</sup> and a thermal conductivity of 0.045 W / (m · ° C) as a heater;
- It is suggested to insulate the attic floor with mineral wool by first clearing the surface of the floor from debris and levelling it. To insulate the roof, mineral wool slabs 200 mm thick, with a thermal conductivity of 0.048 W / (m · ° C) and a density of 170 kg / m<sup>3</sup> will be used;
- The installation of an automated control unit, which implement local temperature control of the heating medium coolant, depending on weather conditions is also planned.

The specific limitations for IS 4 - Integrated and Interconnected City Ecosystems were defined as

- The low level of digitalization and the lack of automation of the processes of metering energy consumption by the end user: the lack of smart meters in residential and office buildings, the lack of a common urban IT infrastructure;
- Lack of a sufficient number of sensors to monitor climate change indicators, air quality indicators;
- Lack of general platform for ICT solutions;
- ICT structure is scattered, there is no general solution for storing data and access to information;
- Lack of 5G technology, self-driving cars and drones;
- Current legislation does not address V2G operation.

### 3.5 Regulation and legislation

The promotion of renewable energy in Ukraine is carried out by fixing the main incentive mechanisms for renewable energy producers at the legislative level. These are the feed-in «green» tariff and auctions. The feed-in tariff is a guaranteed obligation of the state to purchase electricity produced from renewable energy sources at a special tariff. Each type of renewable energy source has its own tariff, which is fixed at the legislative level in euros until December 31, 2029.

At the national level the regulator is the National Commission for State Regulation of Energy and Utilities (NCRECP)<sup>10</sup>, which carries out state regulation in the fields of energy and utilities, and is a permanent central executive body with a special status, which is formed by the Cabinet of Ministers of Ukraine. State policy towards renewable energy sources (ES) is established at the national level. However, local city planning norms may establish special conditions for construction. In addition, the following issues are addressed at the city level:

<sup>10</sup> <https://www.nerc.gov.ua/>



- conditions for the allocation of energy facilities in the city, taking into account the interests of the local population;
- drawing up plans for the development of electricity distribution systems in the city;
- implementation of measures related to the operation of electric power facilities in the event of an emergency in the United Energy System (UES) of Ukraine.

The list of legislative Acts which are the main principal legal framework regulating electricity market activities, and legislative acts adopted by the NCRECP are presented in Appendix A.

In addition to these, the orders, regulations, and rules adopted by regulatory bodies for each specific area and type of energy facilities are also applicable to regulating activities in the renewable energy area.

The foundation for regulation and legitimation definition was T1.2 Questionnaire to characterize current regulation in LHCs and FCs countries by WP1. The following limitations exist depending on current legitimation, or documents dealing with legal processes are under consideration:

- Smart meter installation is not regulated by the current legislation. At the local level, operators define their own conditions;
- The form of non-firm access is not described or regulated by existing legislation.
- The term non-firm grid access refers to the possibility that, under normal conditions, grid users can make full use of their allocated grid capacity (sometimes referred to as contracted or subscription capacity). However, under certain conditions (e.g. network constraints), grid operator can disconnect grid users or limit the capacity injected to or withdrawn from the network, for those users who have signed such a non-firm access contract, usually in exchange for an economic compensation, faster grid connection, etc.;
- Participation of distributed energy resources into local congestion management or other services to the Distribution System Operator besides voltage control is not described or regulated by existing legislation;
- In fact, there is no regulation of the ownership, construction and operation of energy storage systems in Ukraine;
- There is no regulation of the demand/BESS participation in ancillary services markets in Ukraine energy systems;
- Regulation of relations in an energy cooperative is not considered in Ukrainian legislation;
- The regulation of horizontally integrated enterprise (P2P) activities is not considered in Ukrainian legislation.

### 3.6 Identified barriers, risks and impacts

Through SUD strategy, an analysis of possible risks and weaknesses was carried out. By SUD strategy risks are defined as described below.

The continuation of hostilities in the east of Ukraine will lead to further economic stagnation, deterioration of the social sphere and increased migration.

It is necessary to adapt the economic complex to a possible long stay near the zone of increased external risks.

Failure to take measures to update and modernize the utility engineering infrastructure can lead to an increase in the accident rate of networks and a long-term disconnection of consumers from the necessary services, which is especially dangerous in winter.

Defined barriers, as it is proposed in D8.1 FCs Replication activities planning and Sustainability roadmap creation, for the regional and national levels defined as follow.

At the region level barriers were already defined as:

#### **Region instability**

- often economic, political, war and other crisis;
- often planning and management changes.

#### **Lack of financial resources**

- inability to implement large infrastructure projects;
- region unattractiveness for stakeholders.

#### **Lack of Connectedness**

- lack of cooperation between municipality, private service providers (electricity, gas, heat supply);
- lack of integrated complex platform for city smart solutions.

At the implementation area level, the main barriers defined as follow:

#### **District buildings characteristics**

- Worn-out communal infrastructure, engineering networks;
- Outdated residential housing stock of the city.

#### **Policies and regulations**

- Lack of regulatory legislation regulating the processes of using renewable energy sources.

**Availability of infrastructures**

- Lack of an effective solid waste management system, separate collection of solid waste and a system for their secondary processing;
- Dependence of facilities in half of the city of Severodonetsk on JSC «Sievierodonetska Teploelektrotsentral» heat supply;
- Insufficient internet and mobile connection;
- Low coverage of energy-efficient outdoor lighting systems;
- Inadequate development of infrastructure for electric transport.

**Citizen's awareness**

- There is no sufficient level of population knowledge on the issues of housing stock management, energy efficiency, ecology;
- Weak implementation of energy efficiency projects in the community;
- Weak level of cooperation between citizens and condominiums with the state program "Energodim";
- Low level of alternative energy using.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## Chapter 4

Next Steps

## Chapter 4 – Next Steps

According to Phase 2 of the methodology of replication planning presented in D8.1 FCs Replication activities planning and Sustainability roadmap creation and D8.2 FCs Ecosystem Replication tools development and capacity building- V1, next steps include activities of Phase 2a - Ecosystem and ISs/IEs and Phase 2b - Fundings and Business Models.

Phase 2a focuses on the stakeholder's engagement and ISs/IEs choice validation and consist of the following actions:

- Updating of Severodonetsk stakeholders' list built in Phase 1;
- Work groups' creation: definition of the hierarchy inside the ecosystem and clear definition of the roles/obligations of each actor;
- Stakeholders' engagement and feedback;
- Leveraging stakeholders' participation into activities and decisions. Understanding their needs and expectations;
- Improving knowledge and understanding of the ISs / IEs;
- Study of the solutions (tools: fact sheets, webinars, workshops etc.);
- Feasibility assessments;
- Considering of highlighted in the Phase 1, barriers, together with regulation framework.

Phase 2b concerns the economic aspects: funding research and BMs elaboration and consist of the following actions:

- Research of external fundings opportunities to implement the solutions;
- Study of BMs for the envisioned solutions;
- Activities towards deeper knowledge and understanding of ISs / IEs.

All actions to be performed in Phase 2 are strongly connected and complementary and very often, activities will have to be performed in a parallel or in a cyclical way.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## Chapter 5

### Bold City Vision

## Chapter 5 – Bold City Vision

### 5.1 The Vision in a nutshell

With respect to RESPONSE project proposal the various funding mechanisms, as element of the 2050 City Bold Vision for both the LH cities and the FCs, which are exploring for the LHCs and FCs, will enable cities to accelerate the development of smart city projects with a focus on:

- Reducing or eliminating the need for upfront capital investment;
- Providing private sector efficiencies and expertise to city service delivery;
- Lowering the financial risk and burden for taxpayers;
- Increasing project focus on measurable outcomes;
- Articulating the necessary governance restructuring that will facilitate the implementation of energy policies.

RESPONSE will undertake a mapping and matching exercise for identifying funding (public) and finance options (private), monetizing value powered by novel business models.

### 5.2 Scope and Methodology

In accordance to the RESPONSE project methodology, the goals are:

- the short-term RESPONSE goals: PEDs, PEBs, raising the capacity of stakeholders to employ IS (throughout project duration) (2022)
- the medium (2025)
- long term vision (2050).

RESPONSE project methodology consists of 6 interrelated and complementary project implementation phases. Phase 5 of these 6 focuses on replication planning for the FCs, one of which is Severodonetsk.

Phase 5 the FCs' replication planning and 2050 bold vision, developed with targeted, measurable and time-bound actions. This phase begins with the development of Severodonetsk replication strategies, the planning of activities and Severodonetsk sustainability roadmap (D8.1) and continuous with the identification and the development of the ecosystem replication tools and actions for capacity building of the local stakeholders (D8.2). Severodonetsk has to identify and evaluate current status in order to form a clear and holistic replication roadmap that include a business and a financing plan for replicating activities and forming their city 2050 City Bold Vision (T8.8).

Taking these into account, analysis of recent relative EU-funded Smart City projects such as +CityxChange, Making City, PoCITYF, Atelier and SPARCs have been provided. Currently, Making City, and PoCITYF projects haven't presented at project websites deliverables with City bold vision methodology. Project +CityxChange presented the final version of D3.1 Framework for Bold City Vision, Guidelines and Incentive Schemes-v3<sup>11</sup> and D5.7: +Trondheim 2050 Bold City Vision and Guidelines (Vision for Sustainable Urban Transition)<sup>12</sup>, The Atelier Project presented the final version of D2.3. Common methodological framework for Vision Development<sup>13</sup> and the SPARCs project s presented a draft version of D1.11 City Vision 2050 - Draft<sup>14</sup>.

In SPARCs project D1.11 City Vision 2050 – Draft the City Vision 2050 methodology described as a processual, participatory framework, a toolbox and a manual to come up with a City Vision 2050, and an accompanying set of actions to transfer the methodology and learnings.

As well as for RESPONSE project, +CityxChange, Atelier and SPARCs projects defined short-term and long-term goals and the fact is it has become increasingly important to consider longer-term possibilities to help anticipate the unexpected whilst trying to achieve ambitious goals in a complex and demanding environment as it is said in SPARCs project D1.11 City Vision 2050 – Draft.

Based on the RESPONSE project goals and planning and on partner projects experience the main aspects of Severodonetsk Bold City Vision methodology are defined as following.

A RESPONSE project long-term goal namely 2050 City Bold Vision have to describe the desired future state in detail in terms of **actions** and the **results** of it. The 2050 City Bold Vision could be deployed through planning, structured under existing initiatives, such as SECAPs or other possible city strategies. Thus, the planning process starts from the creation of the Replication Roadmap that establishes strategic objectives progressively over the years until that long-term goal. And then, objectives and actions are set in the short, medium and long-term within the planning. The Development of the 2050 City Bold Vision is a continuous iterative process, and need to be tested and improved over the project and post-project, see Figure 14.

<sup>11</sup> <https://cityxchange.eu/wp-content/uploads/2019/08/D3.1-Framework-for-Bold-City-Vision-Guidelines-and-Incentive-Schemes-v3.pdf>

<sup>12</sup> <https://cityxchange.eu/knowledge-base/d5-7-trondheim-2050-bold-city-vision-and-guidelines-vision-for-sustainable-urban-transition/>

<sup>13</sup> <https://smartcity-atelier.eu/app/uploads/D2.3-Common-methodological-framework-for-vision-development.pdf>

<sup>14</sup> [https://www.sparcs.info/sites/default/files/2021-08/SPARCS\\_D1.11%20Draft%20City%20Vision%202050\\_Final.pdf](https://www.sparcs.info/sites/default/files/2021-08/SPARCS_D1.11%20Draft%20City%20Vision%202050_Final.pdf)



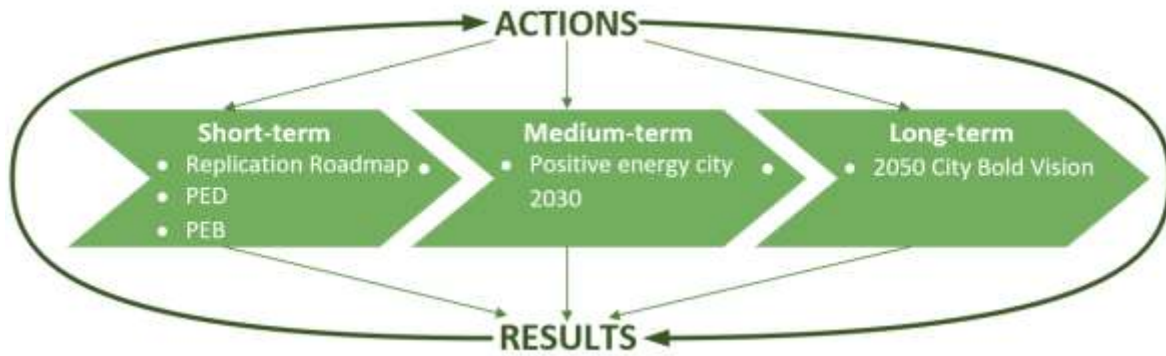


Figure 14 – Continuous process of 2050 City Bold Vision implementation

Actions include RESPONSE project activities and IS / IE. Adapting Bold City Vision Framework for 2050<sup>15</sup> to RESPONSE project goals, actions can be defined into 6 processes: standardization, policy development, innovation partnerships, organizational development, citizen engagement and project development, presented by 5 action types are to: engage, design, activate, accelerate, support, see Figure 15.



Figure 15 – Actions towards 2050 City Bold Vision

Moreover, the 2050 City Bold Vision framework needs to address both the local, national and global contexts, integrate key processes, and demonstrate an ability to mobilize resources across sectors.

<sup>15</sup> D3.1 Framework for Bold City Vision, Guidelines and Incentive Schemes-v3 <https://cityxchange.eu/wp-content/uploads/2019/08/D3.1-Framework-for-Bold-City-Vision-Guidelines-and-Incentive-Schemes-v3.pdf>

The actions performance result through the RESPONSE project actions can be measured using proposed in D2.1 RESPONSE KPI Framework KPIs and proposed methodology D2.2 RESPONSE Performance monitoring framework, and each action result can be iteratively estimated from the sustainability point of view through the sustainability assessment proposed in D5.7 +Trondheim 2050 Bold City Vision and Guidelines<sup>16</sup> of +CityxChange project, see Figure 16.

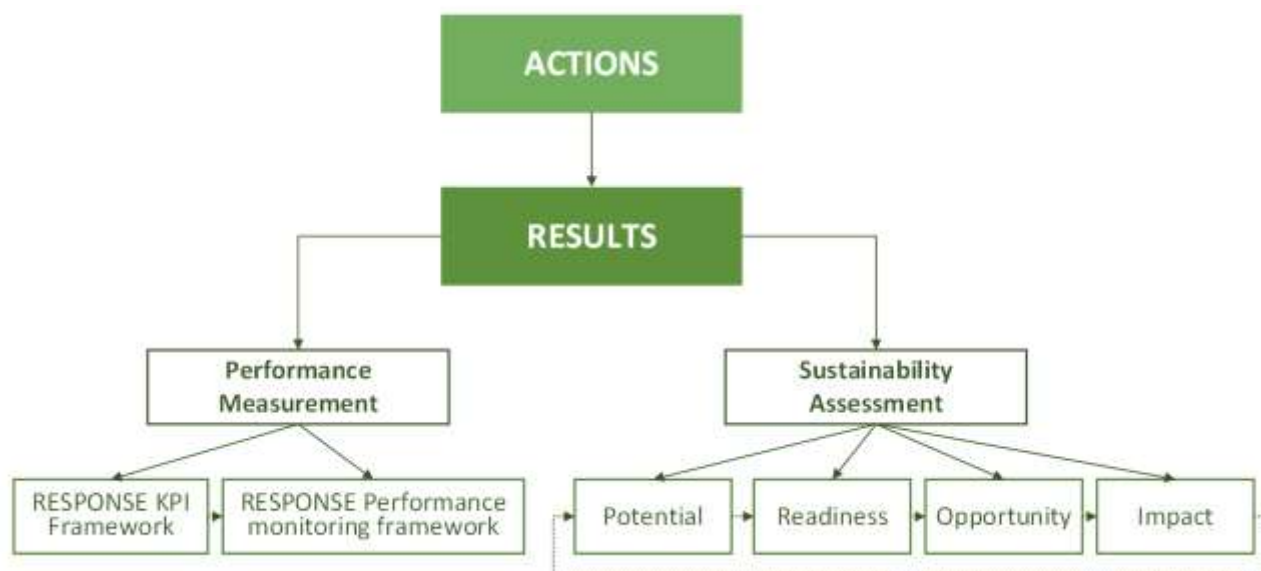


Figure 16 – Results assessment

The City Vision 2050 methodology will enable Severodonetsk to develop a shared bold city vision for 2050 as a co-creation process between cities, industry, innovative SMEs, entrepreneurs, and citizens, tailored for each LH city and FC.

### 5.3 Steps for development and implementation of the vision

The results of short-term and medium-term activities will be a source for 2050 City Bold Vision.

The main sequences of future processes toward a 2050 Bold City Vision development are defined currently as following:

- Analysis of global city trends by 2050;
- Continuous process on replication action (ISs / IEs feasibility studying and implementation, investments attraction, stakeholders and citizen engagement);

<sup>16</sup> <https://cityxchange.eu/knowledge-base/d5-7-trondheim-2050-bold-city-vision-and-guidelines-vision-for-sustainable-urban-transition/>

- Continuous process on dissemination actions: local, national, global levels;
- Severodonetsk Replication Roadmap development, providing a strategic planning framework which enables the Severodonetsk to:
  - stakeholders' ecosystem creation / involvement;
  - analysis of the IEs that best suit the needs of Severodonetsk;
  - fundings research and BMs creation;
  - determination of the implementation of the IEs;
- Review the planning Bold City Vision of the city through the performance measurement and sustainability assessment;
- City strategic plans development (SECAP) to deploy Bold City Vision, identifying the key projects for the city.

#### 5.4 Stakeholders' participatory process – citizens engagement

The RESPONSE project proposal stated carbon neutrality and energy sustainability require a participatory mindset and behavioral change of citizens, along with strong stakeholder engagement.

Towards the 2050 Bold City Vision process, Severodonetsk begins to form a vision of how to integrate the participatory potential of this one in relation to existing participatory actions and strategies. It is important to check how to align the 2050 Bold City Vision with existing strategic processes.

Main efforts by the city have to be made to include stakeholders from different sectors. The most important playing field has been Severodonetsk City Military - Civil Administration of the Severodonetsk. Severodonetsk shows initiatives to include stakeholders of scientific and education institutions, representatives of public utilities, municipal and related enterprises (for the provision of wastewater treatment services, heat supply, garbage disposal), private companies and many more. Citizens and stakeholders could be also involved via surveys, as well as in WP1 – T1.1: Stakeholder questionnaire implementation.

#### 5.5 Output and results

The development of a methodology that will consider the experiences of LH cities, FC, previous and current projects help to improve and reinforce planning coordination and integration to overcome mobility and energy challenges, and also

- Reinforce a better alignment and integration of energy, mobility and urban/spatial initiatives deployed, allowing combined solutions and policies with a wider range of impact thanks to support and cooperation of LH cities and FC.

- Methodology could be a helpful tool to achieve both energy commitments in the medium term (2030) and those oriented to the long term (2050), especially, taking into account planned SECAP development.
- Processes defined as a structured, systematic, participatory process of gathering knowledge and building a long-term 2050 Bold City Vision, aimed at making decisions in the present and planning coordinated and comprehensive actions in the future.
- Methodology could lead to a greater impact on replication and upscaling in other Ukrainian and EU cities
- Methodology could improve Severodonetsk ability to identify and extend local potential for implementation of ISs / IEs, identify risks and barriers, etc.

Impacts will be assessed by comparing the performance measurements and sustainability.



**RESPONSE**

Integrated Solutions for Positive Energy  
and Resilient Cities

## Chapter 6

Conclusion

## Chapter 6 – Conclusion

D8.8 provides the first version of the Severodonetsk Replication Roadmap, Planning & Bold City Vision which includes the Severodonetsk replication strategy, activities planning and sustainability roadmap creation according to the most appropriate integrated solutions and innovative elements at Phase 1. Furthermore, the dual purpose of this document is to present the first version of the strategy planning of the 2050 Bold City Vision. The report combines a variety of different replication activities that are covering technical, financial, economic, regulatory, administrative and social aspects and will be able to contribute to the effective planning towards to be a sustainable positive energy city in Ukraine, cities of EU and non-EU country.

The next version of the D8.2 is D8.9 which will be submitted in M30 of the project. It will cover phases 3 and 4 in the replication roadmap process. Furthermore, a more detailed planning of knowledge-exchange activities between LHCs and FCs will be included, covering the period until the end of the project, based on the latest available information.

The next version, D8.15 Severodonetsk Replication Roadmap, Planning & Bold City Vision – V2 is due in M60. It will describe Phase 2, and identify Severodonetsk stakeholders' ecosystem, replicated IEs, fundings research and business models. Next version will identify details of IEs implementation.



# RESPONSE

Integrated Solutions for Positive Energy  
and Resilient Cities

## Appendixes

## Appendixes

### Appendix A. The main principal legal framework regulating electricity market activities

The Law of Ukraine On Electricity Market No. 2019-VIII dated 13.04.2017 is the principal law that regulated the electricity market

The Law of Ukraine On Alternative Energy Sources No. 555-IV dated 20.02.2003 is a special legislative act that regulated the generation and use of RES

The Transmission System Code (Resolution of the NCRECP No. 309 dated 14.03.2018)

The Distribution Systems Code (Resolution of the NCRECP No. 310 dated 14.03.2018)

The Market Rules (Resolution of the NCRECP No. 307 dated 14.03.2018)

The Code of Commercial Metering of Electricity (Resolution of the NCRECP No. 311 dated 14.03.2018)

The Day-Ahead Market Rules and the Intraday Market Rules (Resolution of the NCRECP No. 308 dated 14.03.2018)

The Retail Electricity Market Rules (Resolution of the NCRECP No. 312 dated 14.03.2018)

The Procedure for the Power Purchase under the Feed-in (Green) Tariff (Resolution of the NCRECP No. 641 dated 26.04.2019)

On Approval of the Procedure for Establishing, Reviewing and Terminating the «Green» Tariff for Electricity for Business Entities, Electricity Consumers, Including Energy Cooperatives, and Private Households Whose Generating Installations Produce Electricity from Alternative Energy Sources (Resolution of the NCRECP No. 1817 dated 30.08.2019)

On Approval of the Licensing Conditions for the Performance of Business Activities on the Generation of Electricity (Resolution of the NCRECP No. 1467 dated 27.12.2017)





# RESPONSE

Integrated Solutions for Positive Energy  
and Resilient Cities



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement n° 957751. The document represents the view of the author only and is his/her sole responsibility: it cannot be considered to reflect the views of the European Commission and/or the European Climate, Infrastructure and Environment Executive Agency (CINEA). The European Commission and the Agency do not accept responsibility for the use that may be made of the information it contains.