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Sustainable Energy and Climate Action Plan 2021-2030

Ivano-Frankivsk National Technical University of Oil and Gas

IFNTUOG

1 Executive summary

The Sustainable Energy and Climate Action Plan (SECAP) is a roadmap of the Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUOG) to achieve its own institutional commitments on climate change mitigation, taking into account the sustainable development policy of IFNTUOG, the European initiatives to reduce greenhouse gas emissions, as well as the university's goals to improve energy efficiency. These commitments include reducing greenhouse gas emissions by at least 40% by 2030 and developing an approach to address climate change mitigation and adaptation (the Covenant of Mayors).

Since 2009, IFNTUOG has been developing a strategy and plans to reduce the consumption of fuel and energy resources (FER). During the period 2009-2020, significant energy savings were achieved and, accordingly, CO2 emissions were reduced. However, in the future it will be necessary to significantly increase the rate of reduction of greenhouse gas emissions, taking into account the goals and objectives by 2030.

The SECAP strategy for IFNTUOG aims to:
1 - balance the use of financial resources and environmental management by investing in those actions that provide long-term value and reduce CO2 emissions;
2 - focus on those actions that support and do not contradict the mission and values of IFNTUOG;
3 - involve all sectors of the IFNTUOG community in order to achieve the university’s energy efficiency and climate change mitigation goals.

Priority actions for the implementation of SECAP in IFNTUOG are actions related to energy efficiency by energy modernization of university buildings and their engineering networks to reduce the use of energy resources, the introduction of alternative renewable energy sources in the field, as well as purchasing energy from renewable sources from abroad. in order to replace existing energy sources from fossil fuels, reduce greenhouse gas emissions into the atmosphere and, accordingly, reduce the impact on the environment in general.

The SECAP provides a framework for IFNTUOG to track annual greenhouse gas emissions, define strategies and effective actions to avoid or reduce CO2 emissions, and monitor the implementation of the plan and explore new opportunities. Successful implementation of the SECAP requires the support of the university itself, cooperation with relevant institutions, as well as attracting significant investment.

2 Introduction

Society faces the huge and urgent challenge of finding the best way to stabilize the climate. The increase in the world's population, as well as dependence on fossil fuel-based energy systems, is already leading to negative environmental consequences, ranging from rising sea levels and increased risk of drought to higher temperatures and destabilizing weather conditions. In addition to these effects, climate change will exacerbate health problems and, consequently, increase health care costs, which in turn will affect the economic situation as a whole.

SECAP was developed within the framework of the international project "Cross-border Network of Energy Sustainable Universities" NET4SENERGY. Program: 2014 - 2020 Hungary - Slovakia - Romania - Ukraine ENI CBC (HUSKROUA / 1702 / 6.1 / 0075)).

3 Campus setting

The main part of IFNTUOG is located in a separate area on the street. Karpatska, 15 in Ivano-Frankivsk, which includes the main educational, economic, and auxiliary buildings. Part of the educational buildings (2 buildings) is located outside the main campus. Student dormitories are also located outside the area.

Given the fact that the energy supply system of the main part of the university is more autonomous, and buildings located in other locations do not have similar autonomy, in this SECAP we focus on the buildings that are located in the main area.

The following buildings are located on the university's territory:
- main building №0;
- educational building №1;
- educational building №2;
- educational building №4;
- educational building №5;
- educational building №7;
- library (building №8);
- educational building №9;
- dining room;
- laboratory building №11;
- laboratory building №13;
- innovation and exhibition complex;
- garage building;
- athletics arena;
- technical building.

Some of the existing buildings do not fully function as intended and practically do not consume energy resources. Also, some of the buildings have already undergone energy modernization. Due to that fact, it should be better to analyze those buildings which have the highest energy consumption. These include the following buildings:
- main building №0;
- educational building №1;
- educational building №4;
- educational building №5;
- educational building №7;
- educational building №9.

Also, can be analyzed a building of the dormitory №7, which is situated a few meters from the main university territory.

A map of the main territory of IFNTUOG with an indication of the buildings that will be considered in the project is shown in Figure 1.

Figure 1 General map of the university buildings

The general view of IFNTUOG buildings is given below in the next figures.

Figure 2 General view of the university building №0

SECAP must include analysis of the general conditions of buildings' envelope, engineering systems, and calculations of heat loses and main energy efficient measures.

Figure 3 General view of the university building №1

Figure 4 General view of the university building №4

Figure 5 General view of the university building №5

Figure 6 General view of the university building №7

Figure 7 General view of the university building №9

Figure 8 General view of the university dormitory №7

4 Objective and Background

General information about the buildings has been presented in table 1.

Table 1 General information about university buildings

#	Building	Address	Year of construction	Number of floors	Heating area, m^2	Heating volume, m^3
1	Building 0	15, Karpatska str.	1973	5	17 037	68 899
2	Building 1	15, Karpatska str.	1985	5	10 233	44 319
3	Building 4	15, Karpatska str.	1976	5	7 260	22 819
4	Building 5	15, Karpatska str.	1976	5	7 084	30 668
5	Building 7	15, Karpatska str.	1973	2	2 396	13 898
6	Building 9	15, Karpatska str.	1976	2	2 908	14 250
7	Dorm 7	30, Naberezhna str.	1979	9	7 339	30 999

4.1 Connection to the utility networks

The buildings are connected to the following utilities: electricity, gas, water, and sewerage.
Electricity meter - model STK3 (three-phase).
Gas meter - RGS.
Water supply meters: 2 units models Innovator LK-15.

4.2 Building envelope
4.2.1 Walls

The general views of the buildings' walls are given below in the next figures.

The walls of the building are in satisfactory condition, but the thermal characteristics of the walls do not meet regulatory requirements. There is a need for thermal modernization of existing wall structures.

Figure 9 General view of the building's №0 walls

Figure 10 General view of the building's №1 walls

Figure 11 General view of the building's №4 walls

Figure 12 General view of the building's №5 walls

Figure 13 General view of the building's №7 walls

Figure 14 General view of the dormitory's №7 walls

Figure 15 General view of the building's №9 walls

4.2.2 Windows

The general views of the buildings' windows are given below in the next figures.

Figure 16 General view of the university buildings' windows

The windows of the building are in satisfactory condition. Most windows are replaced by metal-plastic, but their thermal characteristics do not meet the established requirements. A small number of windows have wooden and metal frames.

4.2.3 Doors

The general views of the buildings' doors are given below in the next figures.

The general condition of the door is satisfactory. Most doors have been replaced with metal-plastic ones, but their thermal characteristics do not meet the normative values. It is necessary to provide a complete replacement of existing entrance doors in accordance with regulatory requirements.

Figure 17 General view of the university buildings' doors

4.2.4 Roofs

The general views of the buildings' roofs are given below in the next figures.

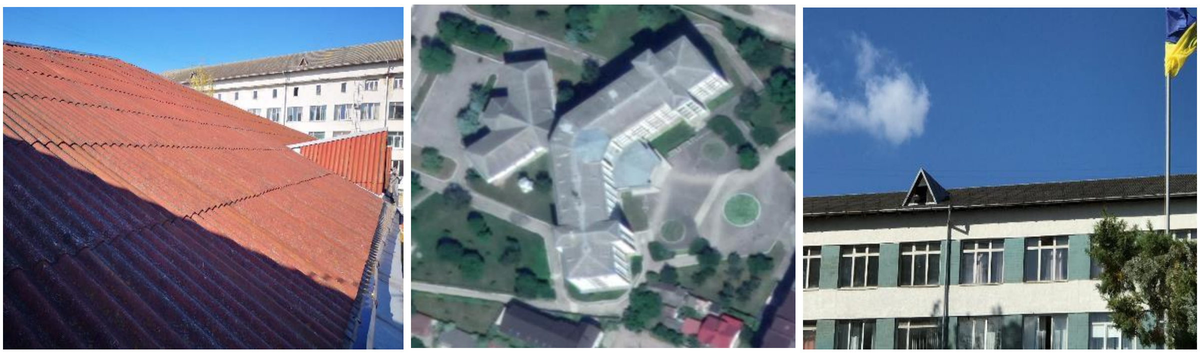

Figure 18 General view of the university buildings' roofs

All buildings have an unheated attic. the floor between the attics and heating rooms is not insulated. The technical condition of the floor is satisfactory. The technical condition of the roof over the attic is not satisfactory, cracks have been identified through which atmospheric moisture enters the attic.

4.3 Heat supply (generation) system

Most IFNTUOG buildings were disconnected from the district heating system in the mid-2000s. At the moment, the buildings are heated by a gas-fired roof boiler. The heat produced by the boiler room is supplied exclusively for the heating of the building.

4.4 Space heating systems

The general condition of the heating system of IFNTUNG buildings is very different. In some cases, there is a two-pipe system, in another part - one-pipe.

The main problems of the heating system include the following:

- pipes and radiators of the heating system have high sludge and corrosion wear, which leads to constant heat loss in accidents and creates an additional load on the circulating pumps;
- radiators do not heat up completely, have a large layer of paint, and in some cases need a complete replacement;
- in buildings there is, in some places, an insufficient number, complete absence or various inefficient types of radiators, which leads to underheating of the premises;
- there is a complete or partial imbalance of heating due to an imperfect single-pipe system, which is already slagged and does not have the ability to balance, so it needs some upgrades. In other types of balancing systems, it is not possible due to the lack of balancing valves on radiators and risers;
- heat-reflecting screens are not provided on the walls behind the radiators, which leads to partial heat loss due to the enclosing structures of the building;
- in some places the radiators are incorrectly closed by protective screens, which prevents their normal convection and reduces their efficiency by 30-70%;
- partial wiring of the heating system pipelines (mains) is made in the unheated rooms of the basement. The pipelines are partially insulated, but the norms on the minimum thickness of thermal insulation are not met. There is a need for pipe insulation in unheated rooms.

The system was partially repaired (with minor replacement of heating devices and piping), but such replacement was not performed well enough, which leads to underheating of the premises. Most of the heating system has been operating since launch.

Space heating systems are presented in the next figures.

Figure 19 General view of the university space heating system

5 Heat losses

Heat losses have been calculated due to the losses in the enclosing structures of buildings (table 2)

Table 2 Heat losses in university buildings

#	Buildings	Year of construction	Number of floors	Heating Area, sq. M	Wall heat transfer coefficient (average value) (W / m²K)	Window heat transfer coefficient (average value) (W / m²K)	Door heat transfer coefficient (average value) (W / m²K)	Roof heat transfer coefficient (average value) (W / m²K)	Floor heat transfer coefficient (average value) (W / m²K)
1	Building №0	1973	5	17 037	1,62	2,43	2,56	1,03	0,20
2	Building №1	1985	5	10 233	1,32	2,38	3,61	2,92	3,52
3	Building №4	1976	5	7 260	1,15	2,44	2,90	0,76	0,86
4	Building №5	1976	5	7 084	1,15	2,48	2,90	0,76	0,86
5	Building №7	1973	2	2 396	1,15	2,48	3,29	0,76	0,86
6	Building №9	1976	2	2 908	2,70	2,47	3,08	0,76	1,13
7	Dormitory №7	1979	9	7 339	0,78	2,53	2,73	0,76	0,24

6 Greenhouse Gas Emissions

The main component of significant emissions of carbon dioxide into the atmosphere in the structure of the university are emissions due to the use of large amounts of energy resources. This is primarily due to a significant discrepancy between the thermal performance of such buildings, significant energy losses in the enclosing structures of the building, and in engineering systems. Therefore, it is important to find optimal approaches to implementing energy efficiency measures.

The following table shows the possible results of reducing CO2 emissions due to the implementation of energy efficiency measures. A more detailed description of the energy efficient measures is given in the next section.

Table 3 Greenhouse gas emissions

#	Buildings	Baseline, kgCO2 / year				After implementation of measures (estimated), kg CO2 / year				Emission reductions (estimated), kgCO2 / year			
		Thermal Energy Consumption - Heating	Thermal Energy Consumption - Hot Water	Electricity Consumption	In general	Thermal Energy Consumption - Heating	Thermal Energy Consumption - Hot Water	Electricity Consumption	In general	Thermal Energy Consumption - Heating	Thermal Energy Consumption - Hot Water	Electricity Consumption	In general
1	Building №0	664 510	0	930 398	**1 594 909**	65 931	0	782 286	**848 218**	598 579	0	148 112	**746 691**
2	Building №1	684 194	0	679 712	**1 363 906**	168 493	0	568 465	**736 959**	515 700	0	111 247	**626 948**
3	Building №4	267 044	0	445 709	**712 753**	69 927	0	348 145	**418 072**	197 117	0	97 564	**294 681**
4	Building №5	342 263	0	392 962	**735 224**	113 373	0	329 173	**442 546**	228 890	0	63 788	**292 679**
5	Building №7	227 045	0	134 283	**361 328**	67 401	0	111 529	**178 930**	159 644	0	22 754	**182 397**
6	Building №9	192 514	0	160 892	**353 406**	62 225	0	133 928	**196 153**	130 289	0	26 964	**157 253**
7	Dormitory №7	413 845	0	531 256	**945 101**	15 419	0	367 322	**382 741**	398 426	0	163 933	**562 359**
TOTAL		**2 791 415**	**0**	**3 275 212**	**6 066 626**	**562 770**	**0**	**2 640 849**	**3 203 619**	**2 228 645**	**0**	**634 362**	**2 863 007**
													47,19274

7 Strategy

This SECAP focuses on the following strategic areas for the identification and implementation of energy and carbon reduction and performance management opportunities:

- Energy Efficiency;
- Energy Monitoring;
- Renewable Energy Sources;
- Energy Administration;
- Environmental Reporting.

7.1 Energy Efficiency

Energy efficiency consists of projects and initiatives to reduce energy consumption by using more efficient equipment and/or improving system controls and performance without compromising service.

Energy efficiency is the most useful part of reducing greenhouse gas emissions, improving environmental performance, and minimizing energy costs.

Energy-efficient measures are given in the next section.

7.2 Energy monitoring

Energy monitoring consists of systems, tools and processes to meter and track energy consumption. Energy monitoring is paramount to measure consumption, understand patterns, assess performance and identify opportunities.

7.3 Renewable Energy Sources

Renewable energy consists of the onsite generation of energy from a renewable source. This clean energy is then fed in to the University’s infrastructure reducing the demand of energy generated from fossil fuels and the associated emission of greenhouse gases.

7.4 Energy Administration

Energy Administration strategies to effectively manage energy supply do not necessarily result in energy savings however they are necessary to minimize energy costs, forecast energy budgets, ensure the competitiveness and reliability of energy supplies and mitigate the risks derived from the exposure to energy markets.

7.5 Environmental Reporting

Environmental reporting initiatives aim to ensure that energy and environmental performance, achievements and opportunities are effectively documented and communicated to provide relevant information and facilitate decision making.

8 Energy efficiency measures

As an example, in the next part, it's given the data for main university building 0.

8.1 Insulation of outer walls

To improve energy performance of the building it is proposed to implement thermal insulation of all outer walls.

Current average U-value of the walls are evaluated as 1,62 W/m2K, while according to the current Ukrainian regulations the U-value of walls should be maximum 0,3 W/m2K.

It is proposed to apply outdoor thermal non-combustible insulation system of Rockwool, Ceresit, Knauf, Capatect or similar types. It is proposed to use mineral wool for insulation of walls above the ground level, 200 mm thick with the thermal conductivity max. 0,0385 W/mK, which will reduce U-value of walls to 0,26 W/m2K.

Socle and the walls below the ground level are to be insulated with the extruded polystyrene with density 38-45 kg/m^3.

The thermal insulation system shall:

- ensure sufficient thermal resistance of the building envelope element and required vapour resistance of the applied layers.
- meet requirements for strength and deformations,
- meet requirement for fire and environmental safety.

Anchoring of the thermal insulation shall be done in accordance with the manufacturer's requirements. During facade insulation it is necessary to foresee also insulation of the external slopes of all openings in the enclosing structures, e.g. windows and doors. The approximate area for slopes insulation is 1452 m2.

Schematic diagrams of wall insulation in different application are given below:

8.2 Insulation of roof

Currently the roof slab is not thermally insulated resulting in U-value of 0,8 W/m2K, while according to the current Ukrainian regulations the U-value should be maximum 0,2 W/m2K.

It is proposed to perform thermal insulation of flat roof slab 270 mm thick with the thermal conductivity max. 0,028 W/mK, which will reduce U-value to 0,2 W/m2K. It is necessary to ensure proper hydro-insulation to prevent water leakages in the thermal insulation layer and into the building structures. Illustration of roof insulation is given on figure 22.

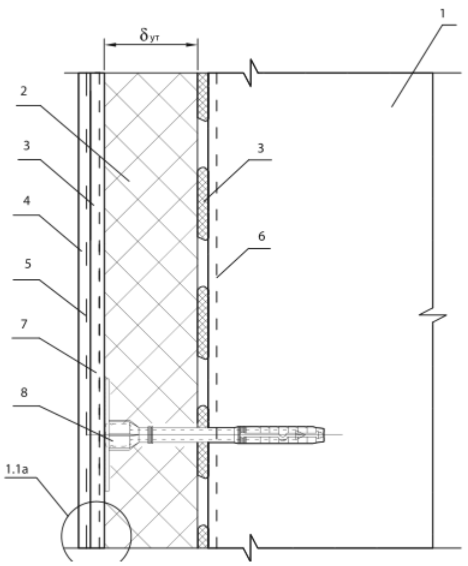

Figure 20. Schematic diagram of wall insulation with dowels
1. Wall. 2. Insulation mineral wool plate. 3. Adhesive solution for gluing the mineral wool plates and composition of protective layer. 4. Decorative plastering. 5. Primer paint. 6. Deep penetration primer for exterior walls. 7. Fiberglass Mesh. 8. Dowel

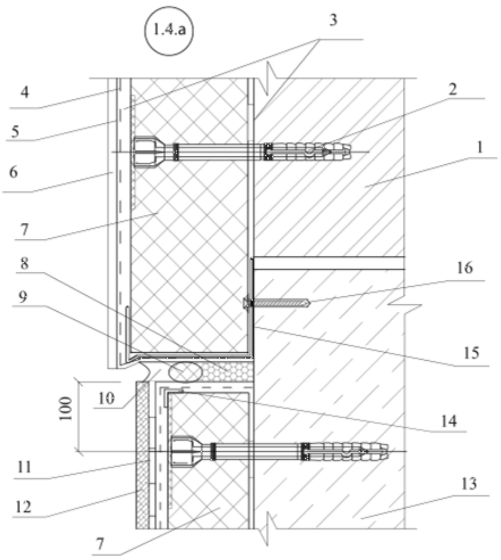

Figure 21. Schematic diagram of thermal insulation of the socle. Adjacent to the thermal insulation system of the facade
1. Wall. 2. Dowel. 3. Adhesive mortar solution for gluing the insulation plates and for arrangement of protective layer. 4. Strengthening fiberglass mesh. 5. Primer. 6. Decorative plastering. 7. Thermal insulation plate. 8. Polyurethane foam. 9. Foam polyethylene gasket. 10. Acrylic sealant. 11. Paint waterproofing in 2 layers or water proofing membrane. 12. Decorative plaster. 13. Socle wall. 14. Strengthening profile. 15. Supporting profile. 16. Profile dowel.

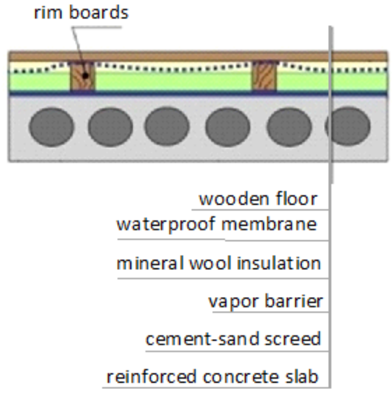

Figure 22. Schematic diagram of attic floor insulation technology with walkways (passage floor)

8.3 Replacement of windows and doors

The existing windows and doors are in satisfactory condition with low energy performance; therefore, it is proposed to replace them.

Current average U-value of existing windows are evaluated as 2,38-2,56 W/m2K, while according to the current Ukrainian regulations the U-value of windows should be maximum 1,33 W/m2K.
In total there are approximately 3167 m2 of windows, all of them are proposed to be replaced with the windows of max. U-value – 1,33 W/m2K.

Current average U-value of existing outer doors are evaluated as 2,56 W/m2K, while according to the current Ukrainian regulations the U-value of outer doors should be maximum 1,66 W/m2K.
In total there are approximately 27 m2 of outer doors, all of them are proposed to be replaced with the windows of max. U-value – 1,54 W/m2K.

8.4 Renovation of heating system

The existing heating units (radiators) are worn out and are in poor condition. They are affected by corrosion and sediments, reducing their thermal efficiency.
The heating system is hydraulically unbalanced causing uneven distribution of the heat in the heating system.
Therefore, it is suggested to perform:

- hydraulic balancing of the heating system (installation of balancing valves),
- replacement of radiators and installation of thermostatic valves, allowing to maintain better the setup indoor temperature in accordance with the actual demand in the building

8.5 Renovation of ventilation system

The building has not functioning ventilation system. After insulation of walls and installation of new windows, the level of the natural air infiltration will decrease and the ventilation of the building will be necessary in order to ensure minimal air exchange rate.

8.5.1 Central ventilation

To achieve needed ventilation rate in the building it is proposed to install central balanced ventilation systems with heat recovery units. Heat recovery units should have seasonal efficiency of min 70%.

To achieve needed air change rate and to meet the correspondent demand in fresh air according operational schedules in different building zones, it is assumed that 4 balanced ventilation systems, in average 380 m^3/h capacity each, will be needed in the building.

Automatic controls in the ventilation system shall maintain required temperature of the supplied air. Operational schedule for fans shall follow the operational pattern in the served premises.

Air ducts will have to be thermally insulated to meet the current Ukrainian requirements for ducts insulation.

8.5.2 Individual ventilation units

To achieve needed ventilation rate in the building it is proposed to install individual ventilation units with heat recovery of PRANA type or similar. Heat recovery units should have seasonal efficiency of min 80%.

To achieve air change rate, it is assumed that about 130 units will be needed in total.

8.6 Energy efficient lighting

The existing lighting system is mainly represented by luminescent lighting fixtures. At that the illumination level, especially in the halls, does not meet the required norms.

It is proposed to replace lamps and lighting fixture with LED one.

Sources of light need to have light efficiency not lower than 70 lm/W and energy consumption not higher than 20 W/m2, taking into consideration the energy consumption of the switch gears and auxiliary lighting control systems.

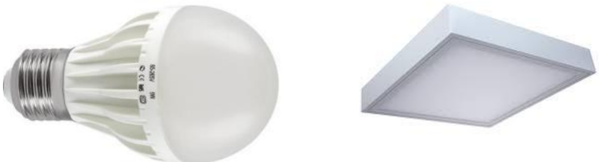

Figure 23 View of LED lamps and lighting fixtures

Dismantled fluorescent and mercury lamps are hazardous waste and shall be disposed by the companies that are duly licensed in treatment with hazardous waste under Ukrainian legislation.
The University or the Contractor performing the replacement should conclude a contract with an appropriate Environmental Services Provider for disposal of mercury lamps, which are to be dismantled within Project. The Environmental Services Provider should have all proper equipment and documentation to perform the contract such as:

- licenses for collection, transportation and storage of hazardous waste;
- availability of special transport;
- availability of special containers for storage of hazardous waste;
- agreement with and the licenses and permits of the Final Performer;
- be able to provide the certificate (act) on disposal of lamps;

The Final Performer is an industrial enterprise which performs disposal/recycling of the hazardous waste possessing necessary plans (usually the equipment used for thermal removal of mercury from fluorescent lamps in the process of destruction in vacuum with subsequent capture of mercury vapours by condensing using liquid nitrogen) and licenses for these works.

In case the University decides to use the dismantled lamps in other buildings, proper dismantling and controlled storage shall be ensured.

8.7 Energy Monitoring

Currently there is no Energy Monitoring system established for the building. The Energy Monitoring is systematic routines for weekly registration and control of the energy consumption and operational conditions in buildings. By comparing the measured consumption with the calculated target each week, the personnel responsible for Operation and Maintenance could ensure optimal operation of the building's technical installations.

The basic tool in an energy monitoring system is the Energy-Temperature (ET) diagram. Every building has its own, unique ET-diagram which can be established with energy calculations. The ET-diagram shows what the weekly energy consumption should be (the target value) at different outdoor temperatures. If the weekly consumption is more than 10 % outside the target value, actions should be taken to identify the cause and make corrections.

Appropriate metering equipment is the sole basis for proper energy accounting; therefore, it is proposed to install the following metering equipment:

- Heat meter for heating system
- Temperature data-logger (outdoor temperature)

Within this measure it is proposed to prepare an Energy Monitoring Manual before the commissioning of the implemented measures. The manual will be tailored to this project, and include:

- User instructions with ET-diagram
- Registration and calculation forms/ or Software
- Deviation checklist

The average outdoor temperature will be measured by a new temperature logger (from local meteorological station) that will be installed at the building site.

8.8 Total of Energy Efficient Measures

Next table represent the list of energy efficient measures and their cost for all university buildings.

Table 4 Energy efficient measures

#	measures	Type of measure	The cost	Building №0	Building №1	Building №4	Building №5	Building №7	Building №9	Dormitory №7
1	Insulation of external walls	EE	**1 222 820**	327 208	232 185	146 146	150 423	69 859	56 416	240 583
2	Roof insulation	EE	**788 985**	303 390	108810	84330	68490	76590	95670	51705
3	Replacement of windows and doors	EE	**1 341 390**	447 430	239 410	184 830	191 690	44 070	74 500	159 460
4	Repair / installation of an individual heating station	EE	**32 400**	0	0	0	0	0	0	32 400
5	Thermal insulation of pipes	EE	**1 292**	0	0	0	0	0	0	1 292
6	Replacement / modernization of the heating system	EE	**1 514 317**	482 777	182755	188095	219175	95165	133925	212425
7	Modernization of the ventilation system	EE	**572 730**	212 306	81 884	60 420	55 860	20 140	20 140	121 980
8	Energy efficient lighting	EE	**197 376**	52 192	47 360	34 624	23 776	8 352	9 248	21 824
9	Replacement of kitchen equipment	EE	**1 554**	1 554						
10	Energy consumption monitoring	EE	**36 270**	5 310	5 310	5 310	5 310	5 310	4 410	5 310
11	Installation of hot water system	EE	**2 250**							2 250
	Subtotal EE measures:	EE	**5 711 384**	**1 832 167**	**897 714**	**703 755**	**714 724**	**319 486**	**394 309**	**849 229**
13	Reconstruction of the drainage system	HEE	**16 486**	6285	2170	1439	1419	1904	1983	1286
14	Installation of hot water system	HEE	**13 250**	3000	2750	2750	2750	1000	1000	
	Together for energy inefficient measures:		**29 736**	**9 285**	**4 920**	**4 189**	**4 169**	**2 904**	**2 983**	**1 286**
	Designing		**315 761**	101280	49 645	38 937	39 539	17 731	21 851	46 778
	Author's supervision		**172 235**	55244	27 079	21 238	21 567	9 672	11 919	25 516
	Technical Supervision		**86 117**	27622	13 540	10 619	10 783	4 836	5 959	12 758
	Together on the Project:		**6 315 233**	**2 025 598**	**992 898**	**778 738**	**790 782**	**354 629**	**437 021**	**935 567**

9 Implementation

Key implementation steps include:

1. Procurement of detailed design development.
   This process shall be started from preparation of tender documentation, including instruction to tenderers and Terms of References (ToR) for designing. The ToR shall also include the provision for obtaining approval from the State Expertise, as well as provisions for author supervision services during works implementation. The designer shall also address the environmental, health and safety issues during project implementation.
2. Detailed Design development.
   The Client (University) shall review the Design Documentation before it is submitted to State Expertise. It should also be noted that it can take up to 3 months for the State Expertise to issue the approval.
3. Procurement of implementation works
   This process shall be started from preparation of tender documentation. The ToR of this tender documents will be based on the developed Detailed Design. One shall also pay attention that the ToR include the requirements for development of Operation and Maintenance Routines for the new/reconstructed installations, as well as conducting proper training for the technical personnel in the building.
4. Implementation of works
   During implementation the Client (University) shall engage the designer for Author Supervision and the Technical Supervisor (the independent expert, not connected with designer or with Contractor) in accordance with the Ukrainian regulations.
   The University shall appoint project committee, which will follow up implementation works and participate in acceptance of equipment/materials and works, commencement of the object into operation. It is also advisable for the University to appoint the Project Manager, who will be responsible for day-to-day coordination between the project stakeholders, project reporting and cost control.