APPROVAL DOCUMENTATION OF INTERVENTION WORKS IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE FROM SIBIU

Beneficiary: SIBIU MUNICIPALITY
Drafter: ALLBIZZ S.R.L.

COVER SHEET

PROJECT NO.: 312/ 2025

CONTRACT NO.: 34 / 21.03.2025

PROJECT NAME : IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE

LOCATION: Str. Electricienilor, Nr. 1, Sibiu Mun, Sibiu county

STAGE: DOCUMENTATION FOR APPROVAL OF INTERVENTION WORKS

BENEFICIARY: SIBIU MUNICIPALITY

GENERAL DESIGNER: ALLBIZZ S.R.L. SIBIU

LIST OF SIGNATURES

SPECIALIZATIONS:
ARCHITECTURE:
Head of project: Arch. Laposi-Oana Argentina
Arch. Budrala Ovidiu Nicolae
Eng. Munteanu Adrian
INSTALLATIONS: Eng. Laposi-Oana Leonard

Illegible signatures, Official stamps

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R0 18161000, J32/1728/2005, SIBIU, str. Călugăreni, nr. 23, office@allbizz.ro

d) information regarding possible interference with historical/architectural monuments or archaeological sites on the site or in the immediately surrounding area; the existence of specific conditions in case of existence

A. WRITTEN PARTS:

1. GENERAL INFORMATION REGARDING THE INVESTMENT SITE

1.1. Name of the investment site: IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE

1.2. Main credit authorizing officer/investor: SIBIU CITY HALL

1.3. Credit authorizing officer (secondary/tertiary): PUBLIC SERVICE FOR ADMINISTRATION OF STATE PRE-UNIVERSITY EDUCATIONAL INSTITUTIONS SIBIU

1.4. Investment beneficiary: SIBIU MUNICIPALITY

1.5. Developer of the documentation for the approval of the intervention works: Allbizz S.R.L. Sibiu

2. CURRENT SITUATION AND THE NEED TO CARRY OUT THE INTERVENTION WORKS

2.1. Context presentation: policies, strategies, legislation, relevant agreements, institutional and financial structures

Given the current national context, the educational infrastructure must be the first priority of a community. Human education is the function that must be fulfilled both by the type of the human being and by the community present in his life. The educational process, with effective rules in actions, through the evolutionary movement reforms and changes the behavior of the individual and society, thus forming the hierarchy of values in relation to the existing requirements and needs. Gradually, both man and society become dependent on each other in the process of changes, correlated with the educational and training environment, thus creating the common system of activity.

The general goal of the investment "IN-DEPTH REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE" fits perfectly into the following strategies and policies:

- EU Cohesion Policy between 2021-2027

In the 2021-2027 programming period, the European Commission proposed a new vision for the cohesion policy, by focusing on the following set of goals:

- OP 1. 0 A more competitive and smarter Europe, by promoting an innovative and smart economic transformation and regional ICT connectivity
- OP 2. 0 A greener, resilient, low-carbon Europe moving towards a zero-carbon economy, by promoting the transition to clean and fair energy, green and blue investments, the circular economy, climate change mitigation and adaptation, risk prevention and management, as well as a sustainable urban mobility
- OP3. 0 A more connected Europe by increasing mobility
- OP 4.0 A more social and inclusive Europe
- OP 5.0 A Europe closer to citizens, by promoting the sustainable and integrated development of all types of territories and local initiatives by:

- promoting the integrated and inclusive development in the social, economic and environmental fields, as well as culture, natural heritage, sustainable tourism and security in urban areas;
- promoting integrated and inclusive local development in the social, economic and environmental fields, in the fields of culture, natural heritage, sustainable tourism and security in other areas than urban areas.

- 2030 Agenda for Sustainable Development

  Romania joined the leaders of the 193 UN Member States at the Development Summit in September 2015 by implementing the 2030 Agenda for Sustainable Development, a program of global action in the field of development with a universal character and which promotes the balance between the three dimensions of sustainable development – economic, social and environmental. For the first time, the actions equally target developed and developing countries.

  The 2030 Agenda includes the 17 Sustainable Development Goals (SDGs), informally united under the name of Global Goals. Through the Global Goals, an ambitious action agenda is established for the next 15 years with a view to eradicating extreme poverty, combating inequalities and injustice and protecting the planet by 2030.

  1. No poverty - Eradicating poverty in all its forms and in any context.
  2. Zero Hunger – Eradicate hunger, achieve food security, improve nutrition and promote sustainable agriculture.
  3. Health and Well-being – Ensure healthy lives and promote well-being for all at all ages.
  4. Quality Education – Ensure quality education and promote lifelong learning opportunities for all.
  5. Gender Equality – Achieve gender equality and empower all women and girls.
  6. Clean Water and Sanitation – Ensure availability and sustainable management of water and sanitation for all.
  7. Affordable and Clean Energy – Ensure access to affordable, reliable, sustainable and modern energy for all.
  8. Decent work and economic growth –Promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
  9. Industry, innovation and infrastructure – Building resilient infrastructure, promoting sustainable industrialization and fostering innovation.
  10. Reduced inequalities – Reducing inequalities within and between countries.
  11. Sustainable cities and communities – Developing cities and human settlements that are inclusive, safe, resilient and sustainable.
  12. Responsible consumption and production – Ensuring sustainable consumption and production patterns.
  13. Climate action – Taking urgent action to combat climate change and its impacts.
  14. Aquatic life – Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
  15. Terrestrial life – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradati on and halt biodiversity loss.
  16. Peace, justice and effective institutions — Promote peaceful and inclusive societies for sustainable development, access to justice for all and build effective, accountable and inclusive institutions at all levels.
  17. Partnerships for the Goals – Strengthen the means of implementation and revitalize the global partnership for sustainable development.

  Goal 4 Quality education, target 4.7. refers explicitly to EDD, namely "by 2030, ensuring that all learners acquire the knowledge and skills necessary to promote sustainable development, including, inter alia, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promoting a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and the contribution of culture to sustainable development".

- Romania's National Strategy for Sustainable Development 2030

  Romania needs a change given the current development paradigm to face the challenges

of the 21st century. We are living in a period marked by the process of globalization, the accentuation of inequalities and the aggravation of environmental problems. The National Strategy for the Sustainable Development of Romania 2030 addresses these challenges, proposing the transition towards sustainable development based on the principles and in the spirit of the 2030 Agenda for Sustainable Development, as a member of a prosperous and reinvigorated European Union.

Among the sustainable development objectives are also the guarantee of quality education and the promotion of lifelong learning opportunities for all.

Access to and participation in quality education are essential for the proper functioning of a sustainable society. Education is not just a preliminary process to entering the labor market. Education must be treated as a process that prepares young generations for the challenges of the future and takes place throughout life, encouraging innovation, meritocracy, constructive critical thinking, curiosity, conduct and emancipation.

- Development Plan for the Central Region 2021-2027

The Regional Strategy within the Development Plan for the Central Region 2021-2027 pursues throughout its thematic focus around the major goals set at European level within the framework of the New Cohesion Policy for the period 2021-2027: innovation, digitalization, economic transformation, reducing carbon emissions and combating climate change, increasing the connectivity level through the development of transport and internet networks, social inclusion through increasing access to education, employment and quality health services and, last but not least, approaching the effective needs of communities.

The vision underlying the regional development is the ambition that, for medium term, "the Central Region should become a clean region, attractive to its inhabitants and tourism, with a competitive economy based on knowledge and innovation, where care for the exploitation and sustainable use of resources is the focus of every citizen".

The Development Strategy of the Central Region brings together 6 strategic development areas, each of which groups a number of priorities and specific measures:

• Territorial development, sustainable urban development
• Economic competitiveness, research and development and innovation
• Human resources, social inclusion, employment and health
• Environment, energy efficiency and climate change
• Tourism and cultural heritage
• Rural development, agriculture and forestry

- Economic and social development strategy of Sibiu County 2021-2030

The strategic goals regarding the development of Sibiu County transposed within the Economic and social development strategy of Sibiu County 2021-2030 consist of .

• Improving the population's accessibility to quality public services such as education, health, social assistance, public safety, utilities (water supply, sewage, energy, telecommunications, etc.), culture and leisure, contributing to reducing the divide between urban communities, which are more developed in this regard, compared to the rural population;
• Preserving and protecting the environment, by creating or expanding green spaces and opportunities to spend time outdoors, protecting landscapes, flora and fauna with local specificity, reducing pollution, maintaining an attractive environment for living and practicing tourism;
• A cultural and tourist destination acknowledged at European level, which capitalizes on the architectural heritage, cultural-artistic events, local crafts and traditions, gastronomy, the authentic character, uniqueness and diversity of landscapes;
• Increasing connectivity and mobility for citizens, tourists and business people, by developing a fast, safe and sustainable transport infrastructure, connected to the main flows of people, goods and information at national and European level;
• Dynamic, performing and diversified economy, characterized by its attractiveness for foreign direct investments, support for innovative initiatives and the entrepreneurial environment, capable of creating opportunities for

well-paid jobs and contribute to increasing the quality of life for citizens;

• Debereaucratization, improving efficiency and increasing transparency at the level of public administration, through digitalization and adapting the services provided according to the real needs of citizens and the business environment, improving communication with them and ensuring the participatory principle in implementing strategic decisions regarding the county development.

Aspects regarding the school population at national level

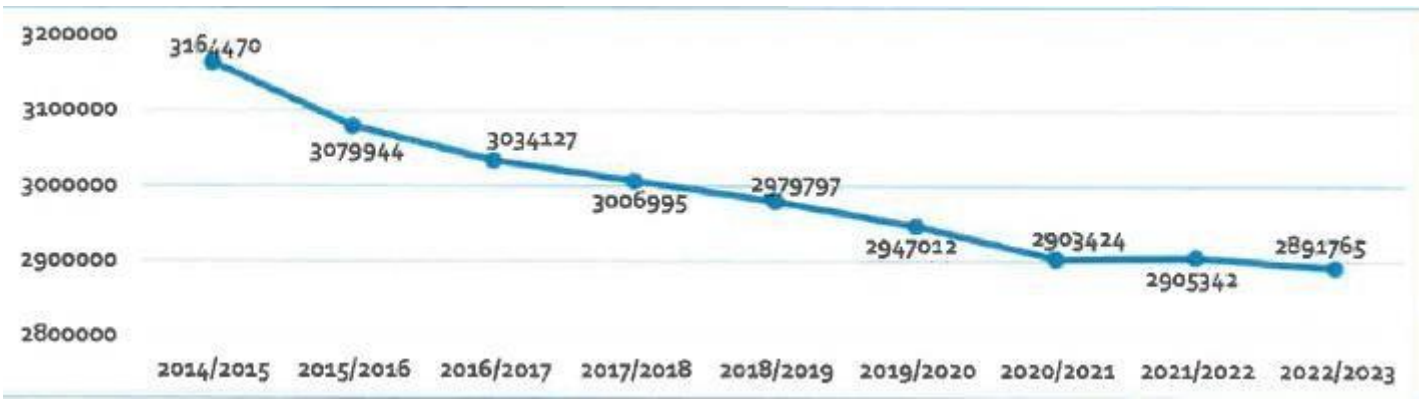
In recent years, the number of students included in the Romanian pre-university education system has been decreasing from one year to the next. This state of affairs is a direct result of demographic developments. The number of students decreased from one school year to the next by 9 thousand to 32 thousand students/year. In the 2022-2023 school year, the Romanian pre-university education system included 2,891,765 students, down by about 13 thousand compared to the previous year.

Table – Total number of pupils registered in the national pre-university education between 2015-2022

Number of pupils registered in the pre-university education	Year 2014 2015	Year 2015 2016	Year	Year	Year	Year	Year	Year	Year
	3.164.470	3.079.944	3.034.127	3.006.995	2.979.397	2.947.012	2.903.424	2.905.342	2.891.765

Source: National Institute of Statistics

Chart - Total number of students enrolled in pre-university education at the national level between 2014—2023



Source: National Institute of Statistics

In recent years, the number of students enrolled in the Romanian pre-university education system has been decreasing from one year to the next, the only exception being the 2021/2022 school year.

In the 2022-2023 school year, the number of students in pre-university education was 2,891.7 thousand, a slight decrease compared to the previous school year. The gross school enrollment rate in all levels of education (from preschool to higher education), as a ratio of the population aged 3-23, was 76%, a lower value compared to the previous school year.

In the 2022-2023 school year, almost half of the school population was in primary and secondary education (46.3%), and about a third in high school and pre-school and preschool education (17.1%, respectively 15.8%).

Compared to the previous school year, pre-school and preschool education are the levels that recorded increases in the school population (+9.2 thousand children).

Pre-school education included 27 thousand children. The number of children enrolled in nurseries in rural areas is considerably lower than the number of children enrolled in nurseries in urban areas.

Pre-school education included, in the 2022-2023 school year, 521.8 thousand children, an increase of 3.9 thousand children compared to the previous school year. The gross enrollment rate in preschool education decreased slightly compared to the previous year, registering a value of 84.4%. The enrollment rate in preschool education in rural areas continues to remain significantly lower than in urban areas.

The number of students in primary and secondary education included 1,596.5 thousand students (3 thousand less than in the previous school year). In the 2022-2023 school year, the enrollment rate in primary and secondary school decreased (83.5%).

The rural environment continues to remain disadvantaged in terms of gross enrolment rates, especially at the level of lower secondary education, where the differences between rural and urban areas reach values of over 27 p.p. (68.6% rural and 96.0% urban). In the 2021/2022 school year, the school dropout rate was constant compared to the previous school year. Overall, 1.2% of primary and lower secondary school students (18.5 thousand students) dropped out of school.

From the perspective of the 2022 European indicators, the early leaving rate from the education and vocational training system registered a slow but constant downward trend. The gap between Romania and the EU 27 average had a general downward trend, but the target assumed by Romania for this indicator, in 2020 (11.30/), was not reached. The early school leaving rate in 2022 in Romania was 15.6% .

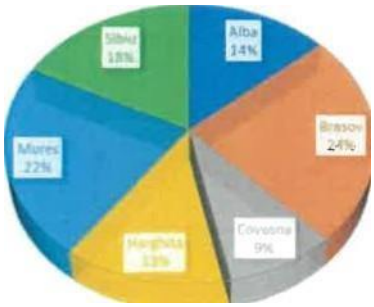
Participation to pre-school education of children aged between 4 and the official age of compulsory education is a European indicator that had a target value of 95% for 2020. In 2021, the EU-27 average for this indicator was 94.9%. In Romania, there were significant increases in the value of the indicator, but the proposed target was not reached, the value of the indicator in 2021 being 81.5%, down from the previous year.

In the last decade, Romania has failed to make consistent progress in the participation of adults (25-64 years old) to lifelong learning. The indicator values ranged from 1-2% between 2011-2020; for 2022, an increase in the indicator value is observed up to 5.4% but the value is lower than the European target (15%), as well as the EU-27 average (11.9%).

Aspects regarding the school population in the Central Region

In the Central Region, in 2022, the school population was 428,817, of which the population in pre-university education was 295,235, the largest number being in the counties of Brașov, Mureș and Sibiu, these counties being at the same time the most important from a demographic point of view.

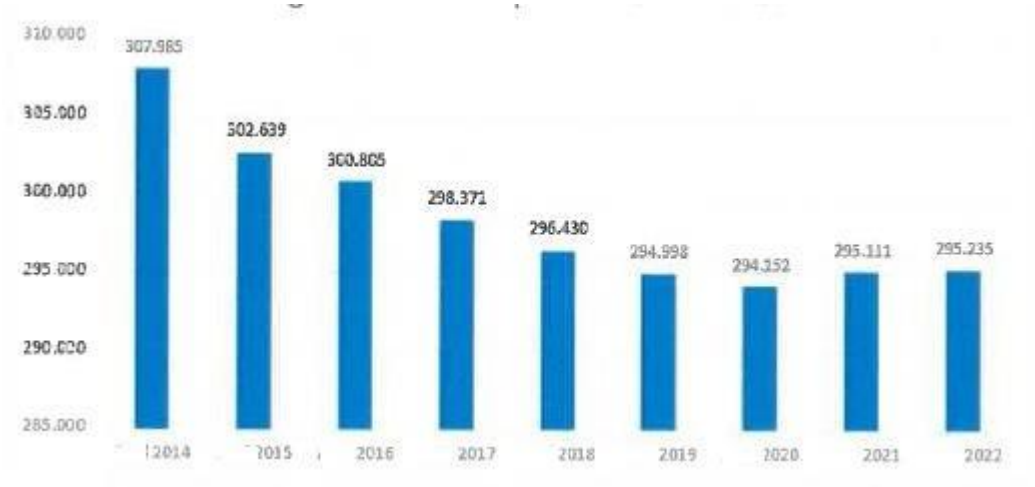
STUDENTS ENROLLED IN PRE-UNIVERSITY EDUCATION – YEAR 2022



Source: NIS

At regional level, the highest shares of the school population were registered in primary and secondary education (approx. 70%), followed by high school (approx. 22%). At county level, almost half of the school population is included in primary and secondary education.

Evolution of the population in pre-university education in the Central Region between 2014-2022



During the analyzed period, the number of students enrolled in pre-university education in the Central Region decreased from one year to the next, the only exception being the 2021/2022 school year.

Aspects regarding the school population in Sibiu Municipality

According to SIDU 2021-2030 of the Municipality of Sibiu, the dynamics of school enrollment in the municipality of Sibiu and the peri-urban area do not show significant changes, during the 2014-2019 school years there was a slight increase (2.2%) in the number of students enrolled in pre-university education. Separately, at the level of the peri-urban area, a negative average rate of students enrolled is recorded, with 3.8% fewer students registered in 2019 compared to 2014, but at the level of the municipality of Sibiu the number of young people enrolled in education experienced an average increase of 4.8%. Regarding pre-university education, the municipality of Sibiu and its peri-urban area account for approximately two-thirds of the number of students registered at the county level.

According to the data available on the Government's open data portal, in 2020, 0,263 people were enrolled in pre-university education in the municipality of Sibiu. Looking at the overall comparative situation at the level of the county seat municipality between 2014 and 2019, an increase in the share of students in primary, secondary and vocational education is observed (according to INS data), in value terms, this is approximately 2,400 more people. It is worth noting, however, that in 2019, there is approximately the same difference between the school enrollments in primary education and those in middle school, so the question of the availability of existing spaces for the transition of students to middle school over 4 years arises.

Chart - Evolution of the distribution of pupils in the municipality of Sibiu by education levels, 2014 vs. 2019, %

Source.' SIDU 2021-2030 *of Sibiu municipality*

According to data available at the National Institute of Statistics, for Sibiu municipality, the number of educational institutions (with legal status) increased by 9% from 2010 to 2019. Between 2014-2019, however, no major changes were observed in this perspective, with 74 educational institutions with legal status being registered in the county seat municipality and 27 in the peri-urban area. As for the distribution by education levels, between 2014 and 2019 there were only small changes due to the assignation of certain institutions in order to reduce the administrative burden. On the other hand, according to data from Sibiu County School Inspectorate, within the municipality of Sibiu there are 72 educational units with legal status operating during the 2020-2021 school year and 8 affiliated institutions.

Overall, taking into account the affiliated educational establishments, the pre-university educational infrastructure at the level of Sibiu municipality has the following structure:

- educational establishments (80);
- School Sports Clubs (2);
- Teaching Staff House (1);
- County Center of Excellence (1);
- County Center for Educational Resources and Assistance (1);
- County School Inspectorate (1);
- Children's Palace (1).

Taking into account all study cycles, at the level of Sibiu municipality there is a concentration of educational institutions in the central area, especially those accredited for high school classes, but which also offer the possibility of schooling in other study cycles. From the perspective of educational units that educate students in primary and secondary school grades, a higher level of service is observed at the territorial level, these being distributed in almost all areas of the municipality, except for the western one, where there is an industrial concentration.

The COVID-19 pandemic has increased the need for spaces for educational institutions, especially the need to ensure physical distancing, which currently overlaps with the annual need to ensure places for students who commute daily to the county seat. For example, for the neighborhoods on the border between Sibiu and the localities of Şelimbăr and Cisnădie (Dedeman area), the school infrastructure is in excessive demand, on the one hand correlated with commuting and on the other hand correlated with real estate development in recent years, within which the provision of educational facilities for children has not been considered as a priority.

Last but not least, regarding local high school education, a series of situations are observed that affect the physical number of places available in classrooms for students, such as: the lack or delays in the refurbishment and expansion of spaces, the operation of some educational institutions based on the payment of rent for the operating spaces and the unavailability of other spaces within the perimeter of educational institutions for the activity expansion. These translate into a priority need to refurbish and expand spaces within high schools, so that the quality of educational services can be increased.

Summarizing the information presented above, we can conclude that this project fits perfectly into the context of the region, as well as the national and European one, its goals aligning with the goals of the strategies, plans and development policies for this period.

2.2. **Analysis of the current situation and identification of needs and deficiencies**

Vocational and technical education in Romania is regulated by the National Education Law and comprises: vocational education, technological high school education and post-secondary education.

The target of reaching at least 40% participation in vocational and technical education cannot be achieved without a proper/corresponding infrastructure. Educational infrastructure is essential for building social skills, developing professional competencies and the capacity for socio-professional integration. Socio-economic analyses highlight the causal relationship between the level of development of workforce capabilities and the state of the infrastructure (existence of proper spaces and facilities) where the vocational education and training process takes place.

The goal studied mainly aims at in-depth energy refurbishment works of the four studied building blocks within the Technical Energy College: Building C3 – Workshops, Building C4 – Gym Hall, Building C5 – High School and Building C6 - Dormitory, as well as local modifications to adapt the current spaces to the regulations in force, in accordance with the design topic.

The Technical Energy College was established by Ministerial Decision no. 80340 of 02.08.1966, being the first educational unit with energy profile from Sibiu. The school is located in Electricienilor Street, no. 1 and the destination of all the buildings within the school unit as educational space has been maintained until now.

The school is relatively new, but it has gained prestige in training specialists in the electrical field, becoming a school of tradition. Equally, the daily work of the students and teachers of this school determines its identity and further evolution.

The main goal of Sibiu Technical Energy College was to train students in the fields of energy, electricity, automation and electronics. Currently, the school also provides other specializations, such as electrical engineering, telecommunications, intensive mathematics-computer science, electromechanics. The educational profiles of the school have been constantly adapted to the needs of the students, as well as to the needs and evolution of the labor market. Some students come from disadvantaged areas of Sibiu County.

Through equipment, staff and performance, the school is the most important educational institution in the electrical and electronic field in the county, at the same time being able of competing in the field of informatics, as a result of a continuous process of development and updating of equipment and training of teaching staff. At the date of its establishment, on 01.09.1966, the unit educated students in day and evening education forms,specializing in electrical-energetic engineering.

In addition to the educational units, since its establishment the school has had: a dormitory, laundry, medical office, laboratories, workshops, gym hall, sports field (*source: official website of the Technical Energy College).

As such, the interventions will aim to increase participation to vocational and technical education (goal undertaken at national, regional and local levels) both by investing in creating more attractive learning environments, with modern technologies and equipment, but also by facilitating access for students from rural areas to educational institutions.

In order to support the teaching infrastructure, it is necessary to adapt the infrastructure of the buildings where the educational act will take place, to the regulations in force for the functions housed, by identifying modern, innovative solutions, with state-of-the-art finishes and equipment.

From the point of view of the legal status, the facility studied is located within the built-up area of Sibiu municipality, Str. Electricienilor, No. 1, SIBIU County and is owned by the Public Domain of the Municipality of Sibiu according to Decree No. 3192/23.03.2001 of the Sibiu Municipal Code no. 135611. The total area of the land in the documents is 18,880.00 sqm.

On the site, 6 building blocks are identified as follows:

Building C1, identified with cad.no. 135611-C1 Thermal Power Plant Building, with a height regime of Gf+Ep, built-up area on the ground 388.00 sq m

Building C2, identified with cad.no. 135611-C2 Gate Cabin Building, with a height regime of Gf, built-up area on the ground 25.00 sq m

Building C3, identified with cad.no. 135611-C3 Workshop Building, with a height regime of Gf, 2F, built-up area on the ground 747.00 sq m

Building C4, identified with cad. no. 135611-C4 Gym Hall Building, with height regime Gf, built area on the ground 624.00 sqm

Building C5, identified with cad.no. 135611-C5 High School Building, with height regime B the.+Gf+2F, built area on the ground 1,482.00 sqm

Building C6, identified with cad.no. 135611-C6 Dormitory Building, with height regime B the.+Gf+3F built area on the ground 833.00 sqm

The property is free of encumbrances.

The land is connected to the existing utilities in the area, namely: water, sewage, natural gas, electricity, telecommunications.

According to the Urbanism Certificate no. 485/10.03.2025, the location is located in the IsP area - Public institutions and services area (S+P+6+M/ S+P+6+R/ S+D+P+5+M/ S+D+P+5+R) established by PUG Sibiu, approved by Local Council Decision no. 165/28.04.2011, extended with Local Council Decision No. 72/25.03.2021 and amended with Local Council Decision No. 258/27.06.2019 and Local Council Decision No. 368/26.09.2019.

According to the information from the technical expert report made available to the designer by the beneficiary, related to the 4 building blocks within Sibiu Technical Energy College, namely Building C3 – Workshops, Building C4 – Gym Hall, Building C5 – High School and Building C6 – Dormitory, on which this study is focused, we show below the structural part of each building block in particular:

Building C3 - Workshops:

The Workshops building within the Technical Energy College consists into three sections with a height regime of Gf and Gf+2F. The building was designed by Energomontaj Trust according to a standard project in 1970 and was built in the immediate following period.

The Workshop building has a complex shape in plan, approaching the shape of the letter L with two blocks, which have a ground floor height regime parallel to Vasile Aaron Street and the main block with a height regime of Gf+2F perpendicular to the aforementioned street.

The Ground Floor Block is divided into two main functions, garage and electrical workshop. The Garage Block is divided into an opening of approximately 7.5 m and 4 bays (2.25+2x2.5+3.85 m). The garage is made in the first 3 bays while the last bay is organized with sinks. The Electric Workshop building is divided into two openings of approximately 5 m and 5 bays (2.2 m + 4x3.4 m). In the first bay, material warehouses are organized, while the workshop is made in the 4 bays of 3.4 m.

The garage building and the Electric Workshop building communicate through a hall, which also provides access to the Ground Floor + 2F building.

The Ground Floor + 2F building has an irregular shape in plan that can be inscribed into a rectangle with dimensions 32.70x 16.8 m. The building is narrower towards Vasile Aaron Street, approximately 11 m, where the sanitary groups were organized in a bay of 3.40 m. Continuing the sanitary groups, a generous hall area was created with approximate dimensions of 11x 6.90 m. In this area, the staircase and the distribution hall are provided with a floor with dense ribs. From the lobby area, access is made to the workshops on each level. The workshops are each organized in a 7.20 m opening and are separated by a median wall. The workshop located towards the courtyard is provided with 6 spans of 3.40 m. The workshop in the area on the north side is made in 4 spans of 3.40 m and one span of 1.40 m. The workshop continues with a span of 6.80 m in which the low voltage room, the transformer station, the distribution room and various warehouses were organized on the ground floor. On the 1st floor, the laboratory facing the courtyard was divided into two laboratories by introducing two dividing walls according to the survey.

The building is provided with a technical channel where the installations are housed. In front of the classrooms, technical channels are provided through which the pipes serving each classroom are passed.

The Gf+2F building has the first level at +4.50 m and the 2nd level at +9.00 m. The natural ground level is approximately 50 cm below the +0.00 level, which represents the finished floor level on the ground floor. The ground floor building has a free height of 3.35 m. A wooden frame and a ceramic tile covering were built over both building bodies.

The strength structure of the ground floor buildings is similar, above the +0.00 level and consists of

- Vertical elements: reinforced concrete columns generally with a section of 30x30 cm. There are also columns with sections of 25x30 cm or 30x40 cm.
- Reinforced concrete walls with a thickness of 20 cm. These are provided on the perimeter of the 2.20 m span provided at the end of the building.
- Horizontal elements: Floor made of reinforced concrete beams generally 30x50cm The strength structure on the Gf+2F block area, above the +0.00 elevation consists of:
- Vertical elements: reinforced concrete columns with a section of 30x40 cm, 25x 25 cm, 25x30 cm, 30x30 cm
- Horizontal elements: transverse beams in the main frames 25 x 70 cm. Longitudinal beams 40x30 cm, belts provided over the masonry walls. In the hall area, the floor is made in a solution of dense ribs with a rib height of 12x45 cm at a step of 70 cm.

The infrastructure of the building is made as follows:

- Isolated foundations with dimensions of 1.5x1.9 m under the main pillars, connected with balancing beams
- Isolated foundations of different sizes connected with foundation beams.
- The foundations are common for the 3 building blocks.

Building C4 – Gym Hall:

The Gym Hall building within the Technical Energy College consists into a single section with height regime Gf. The building was designed based on a standard project drawn up in 1967 by I.P.C.T., adapted

on the ground in 1971 by Electromontaj Trust and was built in the immediate following period.
The gym hall is functionally divided into two areas, namely the actual area of the gym hall and an annex area with the function of changing rooms, sports equipment storage and heating plant. The gym hall is located between the B-E axes and is made with an opening of 15.30 m and 8 spans of 3.60 m. The height regime of this area is a high ground floor with a height at the ridge of +8.83m and a useful height under the prefabricated beams from the basement of 6.50m.
The annex area is made with an opening of 4.10 m and 8 spans of 3.60 m to which is added at the ends a span of 2.625 m over which a terrace was initially made. Currently, on the left side, a closure of this terrace has been made, transforming the space into a thermal power plant. The annex area has a ridge height of 3.85 m, and a maximum usable height of approximately 2.90 m.
The strength structure of the gym hall area, above the elevation, consists into:
- Vertical elements: reinforced concrete columns with a section of 35x70 cm on the longitudinal facades provided with a high masonry parapet with glazed surfaces and 30x30 cm columns in the masonry gables;
- Horizontal elements: Floor made of prefabricated reinforced concrete beams with a width of 30 cm, variable height between 80-120 cm and an opening of 15.30 m that give the roof slope. Narrow strips with round openings of 360x60x14 cm were provided over the beams.
The supporting structure in the annex area consists into:
- Vertical elements: reinforced concrete columns with a section of 30x40 cm, 30x 30 cm and perimeter masonry walls;
- Horizontal elements: longitudinal beams of various sizes and a prefabricated floor made of narrow strips with round openings 400x60x14 cm. The floor is partially made in a monolithic version.
- The construction infrastructure consists into:
- Insulated foundations with dimensions of 1.5x1.8 m under the main columns, connected with a balancing beam.
- Insulated foundations 1.3x1.3 m under the columns 30x30 foundation footings provided under the walls in the A axis provided with bearings in front of the columns.

Building C5 - High School:
The High School building within the Technical Energy College is made up of four sections with a height regime of Gf+2F. The building was designed by Electromontaj Trust by adapting the I.P.C.T. High School type project with 20 classes, from 1966 and was built in the immediate following period.
The high school has a complex shape in plan that approaches the shape of the letter L with the long side facing Electricienilor Street and the short side facing Semaforului Street. The structure is divided into 4 sections, as follows: section A, consisting of two building blocks separated by a settlement joint, is a regular section with a rectangular shape in plan with a length of 57 m and a width of approximately 10.9 m. The section is divided into two openings, one in which the 4.27 m hall is organized and one in which the 6.57 m classrooms are organized. The bays are all 3 m wide. Classroom 0 is arranged on three bays of 3 m. Starting from the end facing Vasile Aaron Street, in the first bay there is a sanitary group followed by 4 classrooms each organized in 3 bays. In the following 2 bays there is a reading room and the high school access hall. In the last 4 bays there is the secretariat, archive and principals' offices. Section B also has an almost regular shape that can be inscribed in a rectangle with dimensions of 21.5 m x 13.39 m. The block consists into a 6.57 m opening where classrooms are organized, a 2.75 m opening where a hall is organized and a 3.77 m opening where a stairwell, storage rooms and cabinets are organized. Section B is separated by a seismic joint from section A. Section B is organized in 7 3 m spans.
Section C is arranged towards Vasile Aaron Street and is organized in an L-shape. The block consists into a classroom and a laboratory. A corridor and a stairwell are provided towards the center of the body. The block maintains the organization in 3 m spans of the other blocks from which it is separated by a seismic joint.
The building is provided with a technical channel where the installations are provided. In front of the classrooms are

provided technical channels through which the pipes serving each classroom are passed.
Vertically, the building is provided with two floors. The elevation +0.00 m is the finished elevation of the floor at the parking lot. This is found about 60 cm above the elevation of the landscaped land. The height of the two floors is 3.5 m for all the buildings.
The strength structure of the buildings is similar, above the elevation + 0.00 it consists of:
- Vertical elements: reinforced concrete columns with a section of 25x40 cm, 25x 25 cm, 30x 30 cm. Confined masonry walls with a thickness of 25 cm located between the classrooms and longitudinally along the circulation hall.
- Horizontal elements: Floor made of reinforced concrete beams generally 25x45 cm or 25 x 35 cm. Belts over the masonry walls 25x35 and longitudinal pediment beams 30x30 cm.
The strength structure of the classrooms in building C is different from buildings A and B. They are provided with 25 x40 cm columns at a 3 m pitch similar to the other two buildings. The floors are made of 12x45 cm thick ribs, provided at a 75 cm pitch over which a 7 cm reinforced concrete slab was poured. The construction infrastructure is made as follows:
- Insulated foundations with dimensions 1.4x1.8 m under the main columns, connected with balancing beams
- Insulated foundations of different sizes connected together with foundation beams.
- The foundations are common for the 4 building bodies at the joints.

Building C6 - Dormitory:
The Dormitory building within the Technical Energy College is made of a single section with the height regime B+Gf+3F with partial basement and technical channel located under the median longitudinal corridor. The building was designed by adapting an I.P.C.T. type project from 1965 which was intended as a 300-place non-family dormitory and was built in the immediate following period.
The dormitory is made of a single section, which is part of a rectangle with dimensions in plan 54.3x15.10m. The access area is an exception that protrudes about 1.20 m outside the mentioned rectangle. The dormitory is a regular construction with walls that delimit rooms with a width of 3.6 m between axes. Along the length, the dormitory is provided with 15 modules of 3.6 m in which there is usually a room. In the area of the sanitary group developed on the width of three modules and in the area of the main staircase developed on the width of two modules, a transverse wall lacks its rigidity, being replaced by a reinforced concrete frame. The building is divided into 3 openings 5.40+2+5.40 m, representing 2 rooms and a median hall that is developed along the entire length of the construction. The height regime of the dormitory is +12.37 m from the elevation +0.00 m, represented by the floor elevation. The building is equipped with two stairwells. The main staircase together with the entrance hall occupies two 3.6m modules. In the area of the main staircase, the building is equipped with a balcony/loggia at all levels. The secondary staircase in two ramps has a width of 2.5m, the remaining approx. 1m of the width of a 3.6m module is intended for a balcony/loggia arranged on the side facade of the building. Subsequently, over the terrace roof with membrane waterproofing, an additional wooden gable roof was built, with a slope break, with a ceramic tile covering and a ridge height of 5.2 m. Four rows of braced props placed on the walls of the longitudinal corridor and on the transverse walls at 3.6 m intervals, support wooden wedges with a section of 17x18 cm on which the rafters with a section of 9x11 cm at 60 cm intervals rest. A concrete attic was provided around the perimeter of the terrace roof on which wooden rafter beams were laid to support the rafters. The rafter beams are anchored to the concrete attic. A row of vertical metal props were installed to support the roof slab in the area of the balconies right by the entrance. The elevation +0.00 of the dormitory is about 55 cm above the natural ground elevation. The basement is arranged under the heating plant which is arranged at one end of the building and occupies two modules (rooms) with a width of 3.6m. The technical channel arranged under the longitudinal corridor contains the installation pipes to which the installation columns in the dormitory rooms are connected.
The strength structure of the dormitory, above the elevation +0.00 m, consists into:
- Vertical elements: masonry strength walls with a thickness of 25 cm for the interior walls and 30 cm for the perimeter walls.
- Horizontal elements: Floor made of belts, beams and prefabricated strip floors in the room area, monolithic reinforced concrete slab in the hallway area.

The building infrastructure consists into:

- Continuous plain concrete foundations provided in each axis of the building. For the transverse interior walls, the foundation soles are 80 cm thick, for the longitudinal walls they are 70 cm thick, and for the perimeter walls 50 cm.

According to the information from the field, we show below the types of component installations and their structure:

The water supply is currently made from the city network, through an existing connection with the PE pipe DN=100 mm, from Vasile Aaron Street, metered at the entrance to the premises, all other blocks being supplied from this connection.

The wastewater collection network is made of PVC pipe, type U and G, it discharges into the public collection network through two connections, 1 B150mm connection that discharges into the sewage network on Vasile Aaron Street and 1 B300 connection that evacuates into the existing sewage network on Semaforului Street.

The electrical installations include lighting and power installations. The electricity supply is made from PT135, through the existing 400kVA transformer station. At the entrance to the buildings there are the main panels, with protection fuses. The supply voltage is 40OV. On each level of the buildings there are secondary distribution boards, with main switches and fuses on each consumer.

The heating system used to create thermal comfort in the cold season is of the hot water heating type produced in existing thermal power plants (School 2 boilers of 225kW, Dormitory 2 boilers, Gym Hall 1 boiler, Workshops 2 boilers), which use methane gas as fuel and steel and cast iron radiators, mounted under the windows. Each building has its own heating system.

Hot running water is produced centrally, in each building block, with hot water as the thermal agent, by means of thermal boilers with a coil and electric resistance. The buildings are not provided with a centralized ventilation system, the ventilation of the spaces being achieved by opening the windows.

The information from the energy audit show the following::

Building C3 - Workshop:

The building has all utilities: electricity, water and sewage, gas.

The building is equipped with internal heating installations. In the building there is a special room designated as the heating plant where the heating agent and hot water production system is also installed. The heating agent production system consists of two Viessmann Vitoplex 100 heating plants. The heating agent distribution system consists of a network of pipes located in the technical channel and which connects the heating plant and steel radiators located in the building. The radiators in the rooms are equipped with classic taps.

The building is not equipped with organized ventilation systems. The building is not equipped with installations to ensure air conditioning.

Artificial lighting is made with fluorescent lighting fixtures.

Building C4 – Gym Hall:

The building has all utilities: electricity, water and sewage, gas.

The building is equipped with internal heating installations. In the building there is a special room for the central heating system between axes A and B and axis 1 where the heating and hot water production system is also installed. The heating system consists of two Viessmann Vitodens 200-W heating systems. The same heating systems are used to produce hot water, which is stored in a Vissmann Vitocell 100 boiler. The heating system consists of fan coils in the gym and static bodies in the locker rooms. The radiators in the rooms are equipped with classic taps.

The building is not equipped with organized ventilation systems. The building is not equipped with installations to ensure air conditioning.

Artificial lighting is made with fluorescent lighting fixtures.

Building C5 - Highschool:

The building has all utilities provided: electricity, water and sewage, gas.

The building is equipped with internal heating installations. In the building there is a special room for the heating plant between axes 23 and 24 and axes N-M where the heating and hot water production system is installed. The heating plant consists of two Viessmann Vitoplex 100 heating plants. The heating distribution system consists of a network of pipes located in the technical channel and which connects the heating plant and steel radiators located in the building. The radiators in the rooms are equipped with classic taps.

The building is not equipped with organized ventilation systems. The building is not equipped with installations to ensure air conditioning. Artificial lighting is made with fluorescent lighting fixtures.

Building C6 - Dormitory:

The building has all utilities provided: electricity, water and sewage, gas.

The building is equipped with internal heating installations. In the building there is a special room for the central heating system between axes A and B and axes 14-16 where the heating and hot water production system is installed. The heating system is composed of two Riello RS34 MZ central heating systems. The same central heating systems are used to produce hot water, which is stored in a Vissmann Vitocell 100 boiler.

The building is not equipped with organized ventilation systems. The building is not equipped with installations to ensure air conditioning. Artificial lighting is made with fluorescent lighting fixtures.

Regarding the architectural elements and thermal insulation, these were revealed by specialists, resulting into the following existing components and technical indicators:

Building C3 - Workshops:

The building was designed in 1970 and built in the immediate following period. The main access to the building is on the SW side, parallel to Electricienilor Street. The height regime is: ground floor for the garage and electrical workshop and ground floor and two floors for workshops.

The Workshops building is an independent building that does not border other buildings. From an architectural point of view, the envelope is made up of:

- Brick masonry walls with a thickness of 30cm
- PVC windows with thermal insulation glass
- Ground slab composed of screed and reinforced concrete slab
- Floor slab over the 2nd floor made of reinforced concrete
- Floor slab over the technical channel made of reinforced concrete

The exterior walls are thermally insulated with 10cm polystyrene. This is depreciated, and in some areas it was even removed, leaving the original wall exposed. The structural elements that protrude from the plane of the facade attached to the Gf+2F building, according to the specialized plans, are insulated with 2cm polystyrene.

The frames executed after the year of construction are classic, made of wood, in four layers, provided with ceramic tile coverings.

Building C4– Gym Hall:

The building was designed in 1971 and built in the immediate following period. The main access to the building body is made on the SW side, parallel to Electricienilor Street, between axes 4 and 6, axis A. The height regime is ground floor.

The Gym Hall is an independent building that does not border other buildings. From an architectural point of view, the envelope is made up of:

- Brick masonry walls with a thickness of 30cm
- PVC windows with thermal insulation glass
- Ground slab composed of screed and reinforced concrete slab
- Floor slab over the ground floor made of prefabricated reinforced concrete beams over which narrow strips with gaps were provided

The wooden frame of the construction was made subsequently, with the role of protecting the non-trafficable terrace over the ground floor of the sports hall. The frame is made in two parts and provided with a profiled sheet metal covering.

Building C5 - High School:

The building was designed in 1966 and built in the immediate following period. The main access to the building is on the SW side, parallel to Electricienilor Street. The height regime is: parking and two floors for the high school and parking for the heating plant.

The High School building is an independent building that does not border other buildings. From the architectural point of view, the envelope is made up of:

- Brick masonry walls with a thickness of 30cm
- PVC windows with thermal insulation glass
- Ground slab composed of screed and reinforced concrete slab
- Slab over the 2nd floor made of reinforced concrete
- Slab over the technical channel made of reinforced concrete

The high school is covered with a wooden frame in four waters and ceramic tile roofing, and the spaces of the heating plant are covered with a non-circulatory terrace.

Building C6 - Dormitory:

The building was designed in 1965 and built in the immediate following period. The main access to the building body is on the NE side, parallel to Electricienilor Street, between axes 4 and 5, axis A. The height regime is: ground floor and three floors.

From the architectural point of view, the envelope is made up of:

- Brick masonry walls with a thickness of 30cm
- PVC windows with thermal insulation glass
- Ground slab composed of screed and reinforced concrete slab
- Floor slab over the 3rd floor made of narrow strips with gaps
- Floor slab over the technical basement made of monolithic concrete

The dormitory is covered with a wooden frame in four layers and a ceramic tile covering.

Dimensional elements, occupied areas (areas):

Function: pre-university education

Land area in documents = 18,880.00 sq m

Building C3 - Workshops (Technical building + Gf+2F):

Existing built area of building C3 studied (Workshops) = 747.00 sq m

Existing developed area of building C3 studied (Workshops) = 1,657.00 sq m

Maximum height: +18.30m from the elevation +0.00m

Building C4 – Gym hall (Gf):

Existing built area of building C4 studied (Gym hall) - 624.00 sq m

Existing developed area of building C4 studied (Gym hall) = 624.00 sq m

Maximum height: +9.05m from the elevation +0.00m

Building C5 - High school (Technical building + Gf+2F):

Existing built area of building C5 studied (High school) = 1,482.00 sq m

Existing developed area of building C5 studied (High School) = 4,002.00 sq m

maximum H: +15,60m towards elevation +0,00m

Building C6 - Dormitory (technical B+Gf+F):

Existing built area of the studied building C6 (Dormitory) = 833.00 sqm
Existing developed area of the studied building C6 (Dormitory) = 3,398.00 sqm
Maximum height: +17.80m from the elevation +0.00m
Existing total built area (building C1+C2+C3+C4+C5+C6) = 4,099.00 sqm
Existing total developed area (building C1+C2+C3+C4+C5+C6) = 10,094.00 sqm
Existing POT = 21.71 %
Existing CUT = 0.53
Importance category: C

Territorial balance:
Land area in documents: 18,880.00 sqm
Constructions: 4,099.00 sqm (21.71 %)
Landscaped green spaces: 7,683.00 sqm (40.69 %)
Pedestrian alleys/paved platforms/equipped sports fields: 7,098.00 sqm (37.60%)
From functional point of view, the existing buildings include the following spaces described by levels:

Building C3 - WORKSHOPS:
Functions at the groundfloor:

Nr. crt.	Room name	Useful area
P.01	ACCESS	13.92 sqm
P.02	ACCESS HALL	76.11 sqm
P.03	ELECTROMECHANICAL WORKSHOP	138.06 sqm
P.04	ELECTROMECHANICAL WORKSHOP	101.60sqm
P.05	HALL	5.44 sqm
P.06	FOREMAN OFFICE	9.14 sqm
P.07	DISTRIBUTION ROOM	9.99 sqm
P.08	TRANSFORMER STATION	10.97 sqm
P.09	LOW VOLTAGE ROOM	10.05 sqm
P.10	ACCESS	8.00sqm
P.11	WAREHOUSE	8.98 sqm
P.12	WAREHOUSE	4.42 sqm
P.13	SAS	4.61 sqm
P.14	ELECTRICAL WORKSHOP	142.37 sqm
P.15	HALL	33.58 sqm
P.16	THERMAL PLANT	21.20 sqm
P.17	SAS	3.03 sqm
P.18	WAREHOUSE	3.61 sqm
P.19	SANITARY GROUP	17.31 sqm

P.20	GARAGE	48.49 SQM
	Total GROUNDFLOOR useful area	648.96 sqm.

Functions at 1st floor:

No. crt.	Room name	Useful area
E1.01	HALL AND STAIRCASE	49,52sqm
E1.02	SANITARY GROUP	21.76 sqm
E1.03	CHANCELLOR'S OFFICE / TECHNICAL DEPARTMENT	25.36 sqm
E1.04	OFFICE	11.76 sqm
E1.05	HALL	14.51 sqm
E1.06	MEASUREMENT LABORATORY	51.36 sqm
E1.07	AUTOMATICS LABORATORY	68.36 sqm
E1.08	AUTOMATICS CABINET	16.12 sqm
E1.09	WAREHOUSE	4.75 sqm
E1.10	ELECTROMECHANICAL LABORATORY	101.60 sqm
E1.11	ELECTROMECHANICAL CABINET	27.21 sqm
	Total 1st FLOOR useful area	392.31 sqm

Functions at 2nd FLOOR:

No. crt.	Room name	Useful area
E2.01	HALLWAY AND STAIRCASE	49.69 sqm
E2.02	WAREHOUSE	33.93 sqm
E2.03	WAREHOUSE	25.32 sqm
E2.04	TELECOMMUNICATIONS LABORATORY	138.18 sqm
E2.05	SSM-SU CABINET	21.17 sqm
E2.06	ELECTRONICS WORKSHOP	101.60 sqm
E2.07	ELECTRONICS CABINET	27.21 sqm
	Total 2nd floor useful area	397.10 sqm
	Total WORKSHOPS useful area =	1,438.37 sqm

Building C4 - GYM HALL

Functions at the GROUNDFLOOR:

No. crt.	Room name	Useful area
P.01	ACCESS HALL	6.10 sqm
P.02	HALL	7.51 sqm
P.03	SANITARY GROUP	2.66 sqm
P.04	GIRLS LOCKER ROOM	20.90 sqm
P.05	SHOWERS	4.95 sqm
P.06	TEACHER'S LOCKER ROOM	12.43 sqm
P.07	SPORT HALL	429.40 sqm

P.08	HALL	7.73 sqm
P.09	SANITARY GROUP	2.66 sqm
P.10	BOYS' LOCKER ROOM	20.91 sqm
P.11	SHOWERS	4.95 sqm
P.12	SPORTS MATERIALS WAREHOUSE	12.63 sqm
P.13	HEATING PLANT	8.33 sqm

Building C5 - HIGHSCHOOL

Functions at the technical basement:

St.01	STAIRCASE	8.91 sqm
St.02	TECHNICAL BASEMENT	23.89 sqm
St.03	TECHNICAL BASEMENT	16.51 sqm
St.04	TECHNICAL BASEMENT	18.35 sqm
St.05	TECHNICAL BASEMENT	302.84 sqm
St.06	TECHNICAL BASEMENT	16.94 sqm
St.07	TECHNICAL BASEMENT	22.79 sqm
St.08	TECHNICAL BASEMENT	22.06 sqm

Functions at the GROUNDFLOOR:

P.01	TEACHER ACCESS	39.20 sqm
P.02	HALLWAY ACCESS	17.52 sqm
P.03	HALLWAY	19.61 sqm
P.04	DEPUTY PRINCIPAL	22.78 sqm
P.05	PRINCIPAL	22.69 sqm
P.06	ARCHIVE	18.77 sqm
P.07	SANITARY GROUP	10.44 sqm
P.08	SECRETARIAT	23.18 sqm
P.09	STAIRCASE	19.26 sqm
P.10	CELLAR	3.48 sqm
P.11	HALLWAY ACCESS	7.36 sqm
P.12	HALLWAY	48.02 sqm
P.13	HALLWAY	15.72 sqm
P.14	STORAGE	9.73 sqm
P.15	STORAGE	20.10 sqm
P.16	PSYCHOLOGY OFFICE	54.92 sqm
P.17	CLASSROOM	54.92 sqm

P.18	SANITARY GROUP	17.47 sqm
P.19	HALL	174.36 sqm
P.20	READING ROOM	18.08 sqm
P.21	CLASS ROOM	55.25 sqm
P.22	CLASS ROOM	55.12 sqm
P.23	CLASS ROOM	55.12 sqm
P.24	SANITARY GROUP + DISABILITIES	55.12 sqm
P.25	HALL	19.12 sqm
P.26	CHEMISTRY LABORATORY	14.91 sqm
P.27	CHEMISTRY LABORATORY	16.98 sqm
P.28	ACCESS HALL	73.98 sqm
P.29	STAIRCASE	7.18 sqm
P.30	CLASS ROOM	18.07 sqm
P.31	ACCESS HALL	78.03 sqm
P.32	STAIRCASE	52.77 sqm
P.33	HALL	27.30 sqm
P.34	PUPILS ACCESS	5.13 sqm
P.35	HALL	57.27 sqm
P.36	STORAGE ROOM	43.22 sqm
P.37	STORAGE ROOM	4.59 sqm
P.38	STORAGE ROOM	13.70 sqm
P.23	HEATING PLANT	16.70 sqm
	Total GROUNDFLOOR useful area	1,250.67 sqm

Functions at the 1st floor:

No crt.	Room name	Useful area
E1.01	STAIRCASE	26.79 sqm
E1.02	HALL	48.62 sqm
E1.03	CHIEF ACCOUNTANT	15.64 sqm
E1.04	CHIEF SECRETARY	10.12 sqm
E1.05	ACCOUNTING + ADMINISTRATIVE	19.98 sqm
E1.06 "	CLASSROOM	54.92 sqm
E1.07	CLASSROOM	54.92 sqm
E1.08	SANITARY GROUP	17.47 sqm
E1.09	TEACHERS' LOCKER ROOM	23.18 sqm
E1.10	SANITARY GROUP	10.44 sqm
E1.11	CHANCERY	86.61 sqm
E1.12	PROJECTS OFFICE	36.74 sqm
E1.13	HALL	193.44 sqm
E1.14	CLASSROOM	55.25 sqm
E1.15	CLASSROOM	55.12 sqm
E1.16	CLASSROOM	55.12 sqm

E1.17	CLASSROOM	55.12 sqm
E1.18	SANITARY GROUP	19.12 sqm
E1.19	HALLWAY	20.79 sqm
E1.20	FOREIGN LANGUAGE CLASSROOM	73.98 sqm
E1.21	FOREIGN LANGUAGE CABINET	17.03 sqm
E1.22	STAIRCASE	27.00 sqm
E1.23	CLASSROOM	78.03 sqm
E1.24	TEACHERS' CABINET	26.59 sqm

Functions at 2nd FLOOR:

No.crt	Room name	Useful area
E2.01	STAIRCASE	26.79 sqm
E2.02	HALLWAY	48.62 sqm
E2.03	COMPUTER LABORATORY	26.18 sqm
E2.04	COMPUTER OFFICE	19.98 sqm
E2.05	COMPUTER LABORATORY	54.92 sqm
E2.06	COMPUTER LABORATORY	54.92 sqm
E2.07	SANITARY GROUP	17.65 sqm
E2.08	LIBRARY AND READING ROOM	45.37 sqm
E2.09 "	SAS	3.55 sqm
E2.10	ELECTRONICS LABORATORY	93.32 sqm
E2.11	ELECTRONICS LABORATORY OFFICE	14.38 sqm
E2.12	HALLWAY	198.18 sqm
E2.13	CLASSROOM	55.25 sqm
E2.14	CLASSROOM	55.12 sqm
E2.15	CLASSROOM	55.12 sqm
E2.16	SANITARY GROUP	55.12 sqm
E2.17	HALLWAY	19.12 sqm
E2.18	PHYSICS LABORATORY	14.91 sqm
E2.19	PHYSICS LABORATORY OFFICE	73.98 sqm
E2.20	STAIRCASE	17.03 sqm
E2.21	CLASSROOM	27.00 M sqm
E2.22	SANITARY GROUP	78.03 sqm
E2.23	HALLWAY	13.47 sqm
E2.24	ISOLATOR	12.55 sqm

Total useful area 2ND FLOOR = 1,080.56 SQM
Total HIGHCHOOL USEFUL AREA = 3,815.56 sqm

Building C6 - DORMITORY

Functions at the GROUNDFLOOR:

No. crt.	Room name	Useful area
P.01	ROOM	20.28 sqm
P.02	ROOM	20.43 sqm
P.03	ROOM	20.43 sqm
P.04	POLICE POINT	20.43 sqm
P.05	ROOM	20.43 sqm
P.06	SHOWERS	21.49 sqm
P.07	SANITARY GROUP	14.24 sqm
P.08	HALL	5.22 sqm
P.09	LAUNDRY	18.96 sqm
P.10	ROOM	20.43 sqm
P.< <	ROOM	20.43 sqm
P.12	ROOM	20.43 sqm
P.13	LIBRARY	20.43 sqm
P.14	LIBRARY	20.43 sqm
P.15	STAIRHOUSE	20.43 sqm
P.16	HALL	15.91 sqm
P.17	HALL	24.57 sqm
P.18	HALL	69.91 sqm
P.19	HEATING PLANT	36.54 sqm
P.20	SANITARY GROUP	2.28 sqm
P.21	HALL	2.07 sqm
P.22	LIBRARY	20.43 sqm
P.23	LIBRARY	20.43 sqm
P.24	ROOM	20.43 sqm
P.25	ROOM	20.43 sqm
P.26	ROOM	20.43 sqm
P.27	ROOM	20.43 sqm
P.28	ROOM	20.43 sqm
P.29	ROOM	20.43 sqm
P.30	ROOM	24.42 sqm
P.31	STAIRHOUSE	5.95 sqm
P.32	JANITOR	4.57 sqm
P.33	SAS	12.77 sqm
P.34	ACCESS HALL	20.52 sqm
P.35	ROOM	20.31 sqm
P.36	ROOM	20.16 sqm
	Total GROUNDFLOOR useful area	707.91 sqm

Functions at 1ST FLOOR:

Nr. crt.	Room name	Useful area
E1.01	ROOM	20,28 sqm

E1.02	ROOM	20,43 sqm
E1.03	ROOM	20,43 sqm
E1.04	ROOM	20,43 sqm
E1.05	ROOM	20,43 sqm
E1.06	SHOWERS	21,49 sqm
E1.07	SANITARY GROUP	14,24 sqm
E1.08	HALL	5,22 sqm
E1.09	LAUNDRY	18,96 sqm
E1.10	ROOM	20,43 sqm
E1.11	ROOM	20,43 sqm
E1.12	ROOM	20,43 sqm
E1.13	ROOM	20,43 sqm
E1.14	ROOM	20,43 sqm
E1.15	ROOM	20,43 sqm
E1.16	ROOM	15,91 sqm
E1.17	STAIRCASE	7,07 sqm
E1.18	LOGGIA	94,34 sqm
E1.19	HALL	10,10 sqm
E1.20	ROOM	10,06 sqm
E1.21	ROOM	15,57 sqm
E1.22	ROOM	2,07 sqm
E1.23	HALL	2,28 sqm
E1.24	SANITARY GROUP	20,43 sqm
E1.25	ROOM	20,43 sqm
E1.26	ROOM	20,43 sqm
E1.27	ROOM	20,43 sqm
E1.28	ROOM	20,43 sqm
E1.29	ROOM	20,43 sqm
E1.30	ROOM	20,43 sqm
E1.31	STORAGE ROOM	10,17 sqm
E1.32	ADMINISTRATIVE	10,13 sqm
E1.33	STAIRCASE	36,86 sqm
E1.34	LOGGIA	14,92 sqm
E1.35	STUDY ROOM	20,52 sqm
E1.36	ROOM	20,31 sqm
E1.37	ROOM	20,16 sqm
Total GROUNDFLOOR useful area		707.91 sqm

Functions at 2nd FLOOR:

No.crt	Room name	
E2.01	ROOM	20,28sqm
E2.02	ROOM	20,43sqm

E2.03	ROOM	20.43 sqm
E2.04	ROOM	20.43 sqm
E2.05	ROOM	20.43 sqm
E2.06	SHOWERS	21.49 sqm
E2.07	SANITARY GROUP	14.24 sqm
E2.08	HALL	5.22 sqm
E2.09 "	LAUNDRY ROOM	18.96 sqm
E2.10	ROOM	20.43 sqm
E2.11	ROOM	20.43 sqm
E2.12	ROOM	20.43 sqm
E2.13	ROOM	20.43 sqm
E2.14	ROOM	20.43 sqm
E2.15	ROOM	20.43 sqm
E2.16	STAIRCASE	15.91 sqm
E2.17	LOGGIA	7.07 sqm
E2.18	HALL	7.96 sqm
E2.19	HALL	86.20 sqm
E2.20	ROOM	20.49 sqm
E2.21	ROOM	15.95 sqm
E2.22	SANITARY GROUP	2.28 sqm
E2.23	HALL	2.07 sqm
E2.24	ROOM	20.43 sqm
E2.25	ROOM	20.43 sqm
E2.26	ROOM	20.43 sqm
E2.27	ROOM	20.43 sqm
E2.28	ROOM	20.43 sqm
E2.29	ROOM	20.43 sqm
E2.30	ROOM	20.43 sqm
E2.31	ROOM	10.17 sqm
E2.32	ROOM	10.13 sqm
E2.33	STAIRCASE	36.86 sqm
E2.34	LOGGIA	14.92 sqm
E2.35	STUDY ROOM	20.52 sqm
E2.36	ROOM	20.31 sqm
E2.37	ROOM	20.16 sqm

Functions at 3RD FLOOR:

Nr. crt.	Room name	Useful area
E3.01	ROOM	20,28 sqm
E3.02	ROOM	20,43 sqm
E3.03	ROOM	20,43 sqm

E3.04	ROOM	20.43 sqm
E3.05	ROOM	20.43 sqm
E3.06	SHOWERS	21.49 sqm
E3.07	SANITARY GROUP	14.24 sqm
E3.08	HALL	5.22 sqm
E3.09	LAUNDRY	18.96 sqm
E3.10	ROOM	20.43 sqm
E3.11	ROOM	20.43 sqm
E3.12	ROOM	20.43 sqm
E3.13	ROOM	20.43 sqm
E3.14	ROOM	20.43 sqm
E3.15	ROOM	20.43 sqm
E3.16	STAIRCASE	15.91 sqm
E3.17	LOGGIA	7.07 sqm
E3.18	HALL	94.34 sqm
E3.19	ROOM	10.10 sqm
E3.20	ROOM	10.06 sqm
E3.21	ROOM	15.57 sqm
E3.22	ROOM	2.28 sqm
E3.23	SANITARY GROUP	2.07 sqm
E3.24	HALL	20.43 sqm
E3.25	ROOM	20.43 sqm
E3.26	ROOM	20.43 sqm
E3.27	ROOM	20.43 sqm
E3.28	ROOM	20.43 sqm
E3.29	ROOM	20.43 sqm
E3.30	ROOM	20.43 sqm
E3.31	ROOM	20.64 sqm
E3.32	ROOM	36.86 sqm
E3.33	ROOM	14.92 sqm
E2.34	STAIRCASE	64.47 sqm
		Total 2nd FLOOR useful area 721.79 sqm
		Total DORMITORY useful area= 2,866.17 sqm

The site inspection, which revealed the state of degradation of the buildings, the properties of the materials, the structural system of the buildings, the wear degree, the mode of use and the initial functionalities, their history and any major repairs, led to the following conclusions:

- the buildings as a whole do not show significant degradation or structural problems (cracks in structural elements, bending or sags in some structural elements, rotations or displacements from the initial positions of the load-bearing elements, failure of load-bearing elements, degradation or other defects). The buildings show several non-conformities related to the current regulations in force, classic issues for structures of this type, built before the 1980s, described below. The buildings do not meet the energy performance parameters required by the current regulations in force, due to the lack of a thermal envelope, the use of high-performance joinery systems and modern high-performance installation systems.

The following non-structural degradations were observed during the site visit::

- There is deterioration in eaves and attic elements due to infiltration. We also found deterioration in the base of the buildings due to peeling finishes, detachments of plaster surfaces and exterior finishes.
- The roof trusses are not waterproof, they have deteriorated and rotten elements;
- There are traces of infiltration at the base level due to the lack of waterproofing on the sidewalks and improper rainwater collection systems (sills and downspouts);
- The sidewalks are detached from the wall and have reverse slopes in certain areas, and certain parts are missing;
- The joints between the sections are not properly resolved and show cracks in certain areas;
- The interior and exterior finishes are outdated, worn out;
- The interior floors are worn out.
- The exterior carpentry has poor quality, thermally inefficient carpentry compared to the current requirements for thermal insulation and energy efficiency of buildings both inside and outside;
- The interior carpentry is also worn out, outdated.
- The building does not have a thermal insulation system either on the walls or on the floor above the last level or the floor at the level of +/-0.00.

Thus, following the deficiencies found, the works regarding the implementation of energy efficiency measures, repairs to the damaged elements, the complete modernization of the exterior finishes, the modernization of the interior finishes where the main work categories require it, the introduction of an organized mechanical ventilation system, the replacement/repair of the heating systems, the preparation of hot running water and the existing electrical installations, of the components that make up the entire educational infrastructure within the Technical Energy College, are necessary, timely and justified. However, they require important technical approaches regarding ensuring the strength stability, durability, safety in operation/use and on the requirements/level of comfort and environment of the future spaces of the refurbished and modernized buildings.

1.1. Goals expected to be achieved by carrying out the public investment

The general goal of the project proposed is to increase the participation level to vocational and technical education.

Among the strategic actions to achieve the general goal, there is also the development of the infrastructure, both the modernization of educational spaces and the refurbishment and expansion where appropriate of the buildings in the patrimony/administration of Sibiu Municipality: increasing the comfort level, safety and existing facilities.

The specific goal of the project is to improve the educational infrastructure through the in-depth energy refurbishment of the buildings studied within the premises of the Technical Energy College.

Through the design topic, the beneficiary requests the implementation of energy efficiency measures, repairs to damaged elements, the complete modernization of exterior finishes, the replacement/repair of the heating system, preparation of hot running water and of the current artificial lighting, as well as the compliance of the spaces intended for technological high school education with the regulations in force for buildings C3, C4, C5, C6, within the Technical Energy College, by identifying modern, innovative solutions, with state-of-the-art finishes and equipment.

The main works, as well as the adjacent related ones, will lead to the improvement of operating conditions,by:

- improving interior comfort conditions;
- reducing energy consumption;
- reducing maintenance costs for heating, hot running water, mechanical ventilation and lighting;
- rational use of interior space in accordance with the regulations in force;
- increasing hygrothermal comfort in buildings;
- meeting the specific requirements of the space intended as a pre-university educational establishment

3. DESCRIPTION OF THE CURRENT CONSTRUCTION

3.1 Site particularities:

a) Site description (location - inside/outside built-up areas, land area, dimensions in plan);

Thus, the site studied is located in the built-up area of Sibiu Municipality, Str. Electricienilor, No. 1, SIBIU County and is owned by the Public Domain of Sibiu Municipality according to the Decree No. 3192/23.03.2001 of Sibiu Land Registry No. 135611. The total area of the land in documents is 18,880.00 sq m.

On the site, 6 building blocks are identified as follows:

Building C1, identified with cad. no. 135611-C1 Building Thermal Power Plant, with a height regime of Gf+Ep, built-up area on the ground 388.00 sq m – UNUSED (it is in an advanced state of degradation)

Building C2, identified with cad. no. 135611-C2 Gate Cabin Building, with height regime Gf, built-up area on the ground 25.00 sqm

Building C3, identified with cad.no. 135611-C3 Workshop Building, with height regime GF+2F, built-up area on the ground 747.00 sqm

Building C4, identified with cad no. 135611-C4 Gym Hall Building, with height regime Gf, built-up area on the ground 624.00 sqm

Building C5, identified with cad no. 135611-C5 High School Building, with height regime tech B.+Gf+2F, built-up area on the ground 1,482.00 sqm

Building C6, identified with cad.no. 135611-C6 Dormitory Building, with height regime tech B+Gf+3F, built-up area on the ground 833.00 sqm

Of the six building blocks on the site. this documentation studies and treats four building blocks within the premises of the Technical Energetic College. respectively: Building C3– Workshops, Building C4– Sports Hall, Building C5– High School and Building C6– Dormitory.

b) Relations with neighboring areas, existing accesses and/or possible access routes;

The studied site has an opening to three streets as follows: Str. Electricienilor from where the main access is made, Str. Vasile Aaron, where the Gate House for student access is also positioned and Str. Semaforului, with direct access to the Dormitory building. The buildings in the premises are located as follows:

- Building C3 - Workshops - independent, without other buildings attached to the flat, on the N-E side of the premises
- Building C4– Sports hall – independent, without other buildings attached to the flat, on the N-E side of the premises
- Building C5 - High school – independent, without other buildings attached to the flat, on the N-W side of the premises, with central development
- Building C6– Dormitory - independent, on the S-W side of the premises

Accesses, circulations and circuits:

- for access to the premises, 3 access points are provided as follows: the main car and pedestrian access (intended for teachers) is from Electricienilor Street, access arranged on the S-W facade of the premises, a secondary car and pedestrian access intended for students, arranged on the N-W side, from Vasile Aaron Street and another secondary access from Semaforului Street, pedestrian, arranged on the S-E side;
- all access areas in buildings will be equipped with ramps necessary for easy vertical access for people with disabilities;
- horizontal circulation in the studied buildings is carried out through the median hallways arranged on each level;
- vertical circulation in the studied buildings is carried out through the related stairwells presented in the drawings;

c) Seismic and climatic data;

According to Normative P100-1/2013 – "Seismic Design Code"-part I: "Design Provisions for Buildings", given that the facility is located within the built-up area of the locality, the location is characterized by:

- Position in the seismic hazard zone with horizontal ground acceleration for design ag=0.20g (for earthquakes with an average recurrence interval IMR=225 years) and with a corner period Tc = 0.7 s (according to the Seismic Design Code P100-2013);

- Position in the area of the characteristic value of the snow load on the ground Sk = 1.5 kN/m2, a value that corresponds to an average recurrence interval IMR = 50 years, with a probability of exceeding in one year of 2% (according to the Indicative Design Code CR1-1-3/2012);

- Position in the area of the characteristic value of the dynamic wind pressure of 0.6 kN/m2, determined from the reference speed averaged over 10 min. and having an average recurrence interval of 50 years (according to the Indicative Design Code CR1-1-4/2012);

The climate of the municipality of Sibiu and its surrounding villages corresponds to a submountain climate with moderate temperatures. The average annual cloudiness values are kept around 5.5 and the relative humidity at 70-75%, higher along the river meadows. The clear days themselves oscillate between 55-60, and those with overcast skies reach 100-120. The global radiation reaches average annual values of 115-117 kcal/cm2 (over 80 kcal/cm2/year in the hot season). The average annual temperature is 9 degreesC, the maximum temperature being around+ 30 degreesC –reached in June, July and August, and the minimum temperature sometimes reaches, in January and February, -28 degreesC and -30 degreesC. The number of days with temperatures above 0 degrees C is 160-170 days, and the number of days with temperatures above 10 degrees C reaches 80-100 days. Days with frost are ca. 110-120. The rainfall regime is generally suitable. The most abundant rains fall, especially, in spring and autumn. The average annual precipitation reaches 600-700 mm/year. In the precipitation regime, a process that takes place in ca. 120-130 days, the maximum values occur in the May-July period (June being the month with the richest rainfall around 80 mm), and the lowest in the cold season (February and March with ca. 40-50 mm). Snowfall occurs in ca. 20-30 days, but the snow cover is preserved for 40-50 days. The most frequent winds blow from the northeast and south directions. In addition, the southern winds, through the foehn effect, often contribute to the melting of snow in spring, causing the destruction of the protective layer of insolation during the day and of heat radiation from the soil during the night, which accentuates the degree of continentality of large areas of the municipality. The fog phenomenon occurs frequently in autumn and spring.

a) Field studies:

(i) Geotechnical study for the solution to consolidate the infrastructure according to the regulations in force;

The city of Sibiu is located in the southern part of Transylvania, on the Cibin River (45047 North and 24005' South), relatively close to the geographical center of Romania. The city is located in the vicinity of Fagaras Mountains (approx. 20 km), the Cindrel Mountains (approx. 12 km) and Lotru (approx. 15 km), which border the Cibin Depression to the southwest. The municipality of Sibiu currently covers an area of 12,164 hectares. It is located in the Cibin Depression, in an area of hilly piedmont plain with terraces of the Cibin River, which drains it, near Fagaras Mountains (about 20 km), Cibin (12 km) and Lotru (about 15 km), which border the depression to the southwest. In the north and east, the territory of the municipality of Sibiu is delimited by Târnavelor plateau, which descends to above the Cibin Valley, through Gusteritei Hill. The city is not delimited by strictly outlined relief forms, but it covers and dominates them, almost uniformizing them, by extending the built-up area. The municipality has no geomorphological accidents within its perimeter that would cause slope elements. The altitude above sea level varies between 415 m in the Lower Town and 431 m in the Upper Town. Geographically, the Municipality of Sibiu is located in the Transylvanian Plateau with a hilly relief and being crossed by the waters of the Cibin, Hârtibaciu rivers and the Seviș stream.

1 (one) geotechnical drilling was carried out on the site with the following stratification:

Drilling no. 1 indicates:

• 0.00 - 0.70 m well-compacted filling

• 0.70– 3.50 m brown sandy clay with weak plastic gravel consistency;

• 3.50 –6.00 m clayey sand with gravel of medium compaction.

The groundwater table intercepted at over -5 m above sea level has a variable level depending on the quantities of rainfalls.

During periods of heavy rainfall – the hydrostatic groundwater level is ascending.
5 (five) foundation excavations were carried out on the site, as follows:
Excavation of block no. 6 DORMITORY:
- the continuous foundation has a depth of -1.20 m compared to the ctn and its thickness is 0.50m, being made of concrete
- the bearing has a thickness of m and a depth of 2.85 m, being joined by concrete.
Excavation of block no. 5 HIGH SCHOOL:
- the continuous foundation has a depth of -1.10 m compared to the ctn and its thickness is 0.45m, being made of concrete
- the bearing has a thickness of -1.90x1.50m and a depth of 2.70 m, being joined by concrete.
Excavation of block no. 5 HIGH SCHOOL:
- the continuous foundation has a depth of -1.10 m from the ground level and its thickness is 0.45m being made of concrete
- the bearing has a thickness of -1.80X1.40 m and a depth of 2.70 m being joined together with concrete.
Excavation of block no. 4 GYM HALL:
- the continuous foundation has a depth of -1.10 m from the ground level and its thickness is 0.45m being made up of concrete
- the bearing has a thickness of -1.50X1.30 m and a depth of 2.20 m being joined together with concrete.
Excavation of block no. 3 WORKSHOPS:
- the continuous foundation has a depth of -1.10 m compared to the ctn and its thickness is 0.45m being made of concrete
- the bearing has a thickness of -1.80X1.40 m and a depth of 2.70 m being joined by concrete.

Considering the observations and field works, it is found that the caperimeter presents a homogeneous lithology, and the proposed investment can be carried out in compliance with the following geotechnical recommendations:
- the maximum freezing depth of the area is observed;
- the land on which the foundations are supported is natural soil, sandy brown clay, light gravel, medium compaction;
- the width of the foundation soles complies with the provisions of the P7 norm, regarding the PSU gr. A foundation width (45 cm);
- the current state of the foundations is appropriate, in what regards that the elements are connected to each other with mortar. The time factor and the moisture in the ground did not cause the degradation of the existing mortar;
- waterproofing with a drain system for collecting infiltration water will be carried out
- the execution of the sidewalks will be done with an inclination towards the outside. Rainwater will be removed as far as possible from the construction, through specially arranged downspouts and gutters.
(i) Necessary specialized studies, such as topographic, geological, land stability, hydrogeological, hydrogeotechnical studies, as appropriate;
The topographic studies and the geotechnical study, including the verification report for the Af quality requirement, are attached to this study.
From hydrographic point of view, the Municipality of Sibiu is located in the Cibin basin. The groundwater is at a depth of 1.5–3m in the meadows. The Cibin, the most important hydrological element of the city, springs from the northern slope of Mount Cindrel and flows into Olt River. With a length of 80 km, the average annual flow is 14.7 cubic meters and its river course is north-south. The natural potential is made up of the hilly relief that borders the plain crossed by the Cibin River and its tributaries: Seviș, Pârâul Rece al Cisnădiei, Hârtibaciu, Tocile, Șopa Lakes. The actual terraces of the Cibin can be traced along the Municipality of Sibiu over a length of ca. 15 km. For the most part, they are presented in the form of two levels, namely 425–430 m, respectively 450 m. In rainy years, the annual flows represent 210o/ of the average annual flow, and in dry years as 400/ of the average annual flow, the maximum flows in the period May – July, representing 43% of the annual volume and the minimum ones, in the period November – January, representing 14% of the annual volume. The multiannual average flow of suspended sediments is at

the level of 4.85 kg/s. Specific freezing phenomena are recorded every year and last on average 45 days. The ice bridge has a frequency of 55% of winters and lasts on average 10 days. The main watercourse in the area is Valea Sapunului stream located near the site and which does not influence the perimeter of the researched area. There is no infiltration water from precipitation, the existing formations in the stratification of the land allowing good drainage of these waters towards the Valea Sapunului stream. The groundwater intercepted at over -5 m above sea level has a variable level depending on the hydrodynamic regime of Valea Sapunului stream and the rainfall amounts. In periods rich in rainfalls – the hydrostatic level of the groundwater is ascending.

e) Situation of existing technical and civil utilities;

The water supply is currently made from the city network, through an existing connection with the PE pipe DN=100 mm, from Vasile Aaron Street, metered at the entrance to the premises, all other bodies being supplied from this connection.

The wastewater collection network is made of PVC pipe, type U and G, discharges into the public collection network through two connections, 1 B150mm connection that discharges into the sewage network on Vasile Aaron Street and 1 B30O connection that is discharged into the existing sewage network on Semaforului Street.

The electrical installations include installations for lighting and power. The electricity supply is made from PT135, through the existing 400kVA transformer station. At the entrance to the buildings are located the main panels, with protection fuses. The supply voltage is 400 V. On each level of the buildings there are secondary distribution boards, with main switches and fuses on each consumer.

The heating system used to create thermal comfort in the cold season is of the hot water heating type produced in existing thermal power plants (School 2 boilers of 225kW, Dormitory 2 boilers, Gym Hall 1 boiler, Workshops 2 boilers), which use methane gas as fuel and steel and cast iron radiators, mounted under the windows. Each building has its own heating system.

Hot running water is produced centrally, on each building block, with hot water as the thermal agent, through thermal boilers with a coil and electric resistance. The buildings are not provided with a centralized ventilation system, the ventilation of the spaces being achieved by opening the windows.

f) Analysis of vulnerabilities caused by risk factors, anthropogenic and natural, including climate changes that may affect the investment;

From the point of view of anthropogenic and natural risk factors, we identify the risk of delays in the execution of the works due to sudden climate changes. These changes may affect the implementation of the investment by extending the execution period. In order to reduce this vulnerability in establishing the execution schedule, a rigorous planning of the project activities will be carried out and some time slots will be taken into account. The works will also be permanently monitored in accordance with the climate changes that occur. In the area studied, natural risk factors will not significantly affect the investment, proposing solutions according to the use of materials with increased strength to climatic factors, freeze-thaw, etc.

In order to limit the vulnerabilities caused by anthropogenic risk factors, durable materials have been provided, resistant over time.

g) Information regarding possible interference with historical architectural monuments or archaeological sites on the site or in the immediately surrounding area; the existence of specific conditions in case of existence of protected areas;

According to the Town Planning Certificate no. 485/10.03.2025, the site is located in the IsP area - Public institutions and services area (S+P+6+M/ S+P+6+R/ S+D+P+5+M/ S+D+P+5+R) established by PUG Sibiu, approved by Local Council Decision no. 165/28.04.2011, extended with Local Council Decision No. 72/25.03.2021 and amended with Local Council Decision No. 258/27.06.2019 and Local Council Decision No. 368/26.09.2019.

3.2. Legal status:

a) Type of the property or title over the existing construction, including easements, right of pre-emption:

The site studied is located within the built-up area of Sibiu Municipality, on Str. Electricienilor, No. 1, SIBIU County and is owned by the Public Domain of Sibiu Municipality according to the Decree No. 3192/23.03.2001 of Sibiu Land Registry No. 135611. The total area of the land in documents is 18,880.00 sq m.
6 building blocks are identified on the site as follows:
Building C1, identified with cad.no. 135611-C1 Building Thermal Power Plant, with height regime of Gf+Ep, area built on the ground 388.00 sq m – UNUSED (it is in an advanced state of degradation)
Building C2, identified with cad.no. 135611-C2 Building Cabin Gate, with height regime Gf, area built on the ground 25.00 sqm
Building C3, identified with cad.no. 135611-C3 Building Workshops, with height regime Gf+2F, built area on the ground 747.00 sqm
Building C4, identified with cad.no. 135611-C4 Building Gym Hall, with height regime Gf, built area on the ground 624.00 sqm
Building C5, identified with cad.no. 135611-C5 Building High School, with height regime tech B.+Gf+2F, built area on the ground 1,482.00 sqm
Building C6, identified with cad.no. 135611-C6 Dormitory Building, with a height regime of tech B.+Gf+3F, built area on the ground 833.00 sqm
Of the six building blocks on the site. this documentation studies and treats two building blocks within the premises of the Technical Energy College, respectively: Building C3–Workshops, Building C4–Gym Hall. Building C5–High School and Building C6–Dormitory.
The building is free of encumbrances.
b) The purpose of the existing building;
Currently, the existing buildings house educational functions.
c) The inclusion of the existing building in the lists of historical monuments, archaeological sites, protected natural areas, as well as their protection areas and in protected built areas, as the case may be;
According to the Town Planning Certificate no. 485/10.03.2025, the site is located in the IsP area - Public institutions and services area (S+P+6+M/ S+P+6+R/ S+D+P+5+M/ S+D+P+5+R) established by PUG Sibiu, approved with Local Council Decision no. 165/28.04.2011, extended with Local Council Decision No. 72/25.03.2021 and amended with Local Council Decision No. 258/27.06.2019 and Local Council Decision No. 368/26.09.2019 and is not included in the list of historical monuments, archaeological sites, protected natural areas, as well as their protection areas and in protected built areas.
d) Information/obligations/constraints extracted from the town planning documentation, as appropriate
The specific conditions for the IsP - Public Institutions and Services Area (S+P+6+M/ S+P+6+R/ S+D+P+5+M/ S+D+P+5+R) are found in the annex to the Town Planning Certificate, attached to this study.

3.3. Technical characteristics and specific parameters:
a) Category and level of significance;
The studied constructions are permanent and are included, according to HGR 766/1997, Annex no. 4 and Order 31/N of 03.10.1995 of the MLPTL published in B.C. no. 4/1996 in category "C" of signfiicance.
The buildings fall into the "III and II class of significance", according to the Seismic Design Code P100-1/2013.
b) Code in the List of Historical Monuments, as appropriate;
The studied structures are not historical monuments, the site being located in the IsP area - Public Institutions and Services Area (S+P+6+M/ S+P+6+R/ S+D+P+5+M/ S+D+P+5+R) established by Sibiu Urban Development Plan, approved with Local Council Decision no. 165/28.04.2011, extended with Local Council Decision no. 72/25.03.2021 and amended with Local Council Decision no. 258/27.06.2019 and Local Council Decision no. 368/26.09.2019.
c) Year/years/periods of construction for each building;
According to the data presented in the technical reports provided by the beneficiary, the buildings studied were built between the years -1965-1975, as follows:
-building C3– Workshops: 1970;

- building C4 – Gym hall: 1971;
- building C5– High school: 1966;
- building C6– Dormitory: 1965.

d) Built area;

Total current built area (building C1+C2+C3+C4+C5+C6) = 4,099.00 sq m Current studied built area (building C3+C4+C5+C6) = 3,686.00 sq m

e) Developed built area;

Total current developed area (building C1+C2+C3+C4+C5+C6) = 10,094.00 sq m Current studied developed area (building C3+C4+C5+C6) = 9,681.00 sq m

f} Inventory value of the building;

The inventory value of the Workshops building is 2,369,802.61 lei. The inventory value of the Gym Hall building is 1,798,875.69 lei. The inventory value of the High School building is 2,913,059.47 lei.

The inventory value of the Dormitory building is 1,393,548.21 lei.

g) Other parameters, depending on the specifics and type of the current building;

Land area in documents = 18,880.00 sqm

Current POT = 21.71 %

Current CUT = 0.53 l

Significance category: C

3.4 Analysis of the building condition, based on the conclusions of the technical expert report and/or the energy audit, as well as the architectural-historical study in case of buildings benefiting from the protection regime of historical monuments and of buildings located in the protection zones of historical monuments or in protected built areas. The degradations will be highlighted, as well as their main causes, for example: degradations caused by earthquakes, climatic, technological actions, differentiated settlements, those resulting from the lack of maintenance of the building, incorrect initial structural design or other causes identified by the technical expert report;

The technical expert report of the C3 building – Workshops, completed in 2025, by the certified Technical Expert mr. Eng. Pop Gavril, made available to the designer by the beneficiary, aims to determine the necessary measures for the in-depth energy refurbishment of the building, by improving the load-bearing capacity of some structural elements, as appropriate.

Thus, the Workshops building, with the height regime Gf+2F, is made of 3 independent sections separated by a seismic joint. The building was designed in 1970 and erected in the immediate following period. The building consists of two bodies with the height regime Gf, namely the Garage building and the Electric Workshop building and a building with the height regime Gf+2F. These have independent strength structures.

The Gf+2F building is designed as a building which lateral rigidity is ensured by a masonry system that collaborates with a reinforced concrete frame system. The Gf electric workshop building is made as a frame structure with some walls made of reinforced concrete that separate the workshop warehouses.

The Gf+2F buildings are in good technical condition although they have suffered three significant earthquakes, they are well maintained, they have an ordered structure with sufficient shear surfaces, and following the evaluation the construction was classified acc.to the P100-3/2019 normative, in the RsIII seismic risk class.

The structure of the C3 Building - Workshops is classified into the RsIII seismic risk class, for which no intervention works are necessary for the strength structure.

The technical expert report of the C4 Building - Gym Hall, completed in 2025, by the certified Technical Expert mr. Eng. Pop Gavril, made available to the designer by the beneficiary, aims to determine the necessary measures for the in-depth energy refurbishment of the construction, by improving the load-bearing capacity of some structural elements, as appropriate.

Thus, the Gym Hall building, with its height regime Gf, is made of a single section. This is functionally divided into the sports hall area and locker rooms and storage annexes. The building was designed based on a standard project drawn up in 1967 by I.P.C.T., adapted to the site in 1971 by Electromontaj Trust and was erected in the immediate following period.

Gf building is designed as a building which lateral rigidity is ensured by an orthogonal system of reinforced concrete frames that collaborate with an orthogonal system of masonry diaphragms, being structured with an opening of 15.3 m for the gym and 4.1 m for the annex area. The spans are 3.6 m.

The Gf building is in good technical condition although it has suffered three earthquakes with significant intensity, it is well maintained, has an ordered structure with sufficient shear surfaces, and following the evaluation it was classified acc.to normative P100•3/2019, into seismic risk class RsIII.

The structure of Building C4 - Gym is classified into seismic risk class RsIII, for which no intervention works are required for the strength structure.

The technical expert report of the C5 building – High School, completed in 2025, by the certified Technical Expert mr. Eng. Pop Gavril, made available to the designer by the beneficiary, aims to determine the necessary measures for the in-depth energy refurbishment of the building, by improving the load-bearing capacity of some structural elements, as appropriate.

Thus, the High School building, with the height regime Gf+2F, is made of 3 independent sections separated by a seismic joint. The building was designed in 1966 and erected in the immediate following period.

The Gf+2F building is designed as a building which lateral rigidity is ensured by an orthogonal system of reinforced concrete frames that collaborate with an orthogonal system of masonry diaphragms. Buildings A and B are provided with a hall and classrooms made in 3 3 m spans each. Building C consists of classrooms and a stairwell that ensures vertical circulation.

The Gf+2F building is in good technical condition although it has suffered three earthquakes with significant intensity, it is well maintained, has an ordered structure with sufficient shear surfaces, and following the evaluation it was classified acc.to normative P100•3/2019, into seismic risk class RsIII.

The structure of the C5 - High School Building is classified into seismic risk class RsIII, for which no intervention works are required for the strength structure.

The technical expert report of the C6 Building - Dormitory, completed in 2025, by the certified Technical Expert mr. Eng. Pop Gavril, made available to the designer by the beneficiary, aims to determine the necessary measures for the in-depth energy refurbishment of the construction, by improving the load-bearing capacity of some structural elements, as appropriate.

Thus, the Dormitory Building, with the height regime of B+Gf+3F, is made of a single section. The building was designed in 1965 and built in the immediate following period.

The Gf+3F building is designed as a building which lateral rigidity is ensured by an uncoiled masonry structure that collaborates locally with reinforced concrete frames. The structure is regular, with a central hall and rooms on each side of the corridor. The rooms have a span of 3.6 m. The dormitory is provided with 15 modules of 3.6 m each in the longitudinal direction.

The building has an acceptable technical condition although it has suffered three earthquakes with significant intensity, it is well maintained, has an ordered structure with sufficient shear surfaces, and following the evaluation it was classified according to the P100-3/2019 normative, into the seismic risk class RsIII. There is degradation caused by the lack of maintenance works, for example areas where the plaster has fallen off. There is also water infiltration in the basement. The perimeter sidewalk of the building is degraded and missing in important sections.

The structure of the C6 Building - Dormitory is classified into the seismic risk class RsIII, for which no intervention works are required for the strength structure.

Conclusions:

Since the expertized buildings are classified into seismic risk class III, no consolidation works are required. The buildings have certain deficiencies mainly related to the level of comfort due to the lack of thermal protection, the lack of a thermal envelope, the lack of efficient installation systems and the lack of efficient carpentry. The facades of the structures have surfaces with worn, degraded finishes that require revisions and refurbishment. In the event that during some works, areas with degradation that were not observed and reported in the expert report at the time of the construction analysis will be detected, clear remedial measures will be established by immediate consultation with the expert of the work or with a certified technical expert.

The energy audit report for the building C3 – Workshops, completed in 2025, by the Energy Auditors for Buildings Eng. Andrei Pricopie and Eng. Radu Cruciat, aims to analyze the buildings from the energy point of view for energy certification and to establish the necessary energy refurbishment and modernization measures. Solutions and packages that increase the energy efficiency of the building were studied, as follows:

Based on the calculations of specific consumptions and the penalties granted for the energy rating, the certified building is classified into energy class C (as a whole) with a specific primary energy consumption of 216.0 kWh/m2/year, compared to the reference building which is classified into energy class B with a specific primary energy consumption of 82.70 kWh/m2/year. Regarding the level of equivalent C02 emissions, the existing building falls into class C with 37.4 kgC02/m2/year compared to the reference building which is classified into class B with 13.10 kgC02/m2/year.

The following solutions are proposed for the building investigated:

Solution 1.

- Thermal insulation of the exterior walls with a layer of expanded polystyrene or mineral wool with a thickness of 15 cm and a thermal conductivity of $\gamma<0.038$ W/mK

- Thermal insulation of the floor above the last level with insulating material based on sheep wool with a thickness of 25 cm and a minimum thermal strength of $\gamma<0.038$ W/mK, over which a wooden floor will be built.

- Thermal insulation of the floor above the technical channel with a layer of expanded polystyrene or mineral wool with a thickness of 10 cm and a thermal conductivity of $\gamma<0.038$ W/mK

Solution 2.

- Replacement of external windows with efficient joinery which thermal strength is at least Rmin=0.83 m2 K/ W.

- Replacement of external doors with efficient joinery which thermal strength is at least Rmin=0.77 m2 K/ W.

Solution 3. Modification of the building installations as follows:

Introduction of a new heating system consisting into heat pumps and condensing gas boilers that will serve three building blocks (high school, workshop and gym hall). The gas boilers will take over any consumption peaks.

- A photovoltaic panel system with a capacity of 20 kWh will be installed on the roof of the workshop or high school on the SW or SE orientations

- A heat recovery fan system with an average thermal transfer efficiency of 72%

- The lighting fixtures and lighting sources will be replaced with LED ones. Presence sensors will be used for circulation spaces.

The energy and economic analyses presented in the energy audit report highlight the qualities of the different refurbishment packages. Thus:

Package P1 is a package that includes solutions S1-S2 and is recovered in 22 years. The package of measures leads to an increase in the thermal strength of the dull envelope up to the minimum strengths required by the codes in force. From the point of view of primary energy consumption and C02 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 24.9% (from 324.36 MWh/ year to 243.71 MWh/ year) and CO2 emissions are reduced by 29% (from 56 tons/year to 39.8 tons/year)

Package P2 is a package that includes solution S3 and is recovered in 9 years. The package of measures leads to increased efficiency of installations and the use of renewable energy sources. This package does not fall within the minimum values provided by the methodology in terms of primary energy consumption and C02 emissions. With this package of measures, the annual primary energy saving is 38% (from 324.36 MWh/ year to 201.245 kWh/ year) and CO2 emissions are reduced by 50.4% (from 56 tons/year to 27.8 tons/year)

The package P3 is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 73.6% (from 324.36 MWh/ year to 85.523 kWh/ year) and C02 emissions are reduced by 85.4%(from 56 tons/year to 8.2 tons/year).

The energy audit report for the building block C4–Gym hall, completed in 2025, by the Energy Auditors for Buildings, Eng. Andrei Pricopie and Eng. Radu Cruciat, aims to analyze the energy efficiency of buildings for energy certification and to establish the necessary energy refurbishment and modernization measures. Solutions and packages that increase the energy efficiency of the building were studied, as follows:

Based on the calculations of specific consumption and the penalties granted in the energy rating, the building certified is classified into energy class D (overall) with a specific primary energy consumption of 239.0 kWh/m2/year, compared to the reference building which is classified into energy class B with a specific primary energy consumption of 82.70 kWh/m2/year. Regarding the level of equivalent C02 emissions, the existing building falls into class D with 42.1 kgC02/m2/year compared to the reference building which is classified into class B with 13.10 kgC02/m2/year.

The following solutions are proposed for the building examined:

Solution 1.

- Thermal insulation of the exterior walls with a layer of expanded polystyrene or mineral wool with a thickness of 15 cm and a thermal conductivity γ<0.038 W/mK
- Thermal insulation of the floor above the ground floor with insulating material based on sheep wool with a thickness of 25 cm and a minimum thermal strength of γ<0.038 W/mK.

Solution 2.

- Replacing the exterior windows with efficient joinery which thermal strength is at least Rmin=0.83 m2 K/ W.
- Replacing the exterior doors with efficient joinery which thermal strength is at least Rmin=0.77 m2 K/ W.

Solution 3. Modifying the building's installations as follows:

- Introducing a new heat production system consisting into heat pumps and condensing gas boilers that will serve three building blocks (high school, workshop and gym hall). The gas boilers will take over any consumption peaks.
- A photovoltaic panel system with a capacity of 18 kWh will be installed on the roof of the building on SE or SW orientations
- A heat recovery fan system with an average heat transfer efficiency of 75% will be installed.
- The lighting fixtures and lighting sources will be replaced with LED ones. Presence sensors will be used for circulation spaces.

The energy and economic analyses presented in the energy audit report highlight the qualities of the different refurbishment packages.

Thus:

Package P1 is a package that includes solutions S1-S2 and is recovered in 15 years. The package of measures leads to an increase in the thermal strength of the dull envelope to the minimum strengths required by the codes in force. From the point of view of primary energy consumption and CO2 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 20.2% (from 132 MWh/ year to 105 MWh/ year) and C02 emissions are reduced by 23.1% (from 23.3 tons/year to 17.9 tons/year)

Package P2 is a package that includes solution S3 and is recovered in 8 years. The package of measures leads to an increased efficiency of installations and the use of renewable energy sources. This package does not fall within the minimum values provided by the methodology in terms of primary energy consumption and C02 emissions. With this package of measures, the annual primary energy saving is 56.6% (from 132 MWh/year to 57 MWh/year) and C02 emissions are reduced by 68.3% (from 23.3 tons/year to 7.4 tons/year).

Package P3 is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 78.3% (from 132 MWh/year to 28.6 MWh/year) and CO2 emissions are reduced by 89.1% (from 23.3 tons/year to 2.5 tons/year).

The energy audit report for the C5 building– Highschool, completed in 2025, by the Energy Auditors for Buildings Eng. Andrei Pricopie and Eng. Radu Cruciat, aims to analyze the buildings from the energy point of view for energy certification and to establish the necessary energy refurbishment and modernization measures. Solutions and packages that increase the energy efficiency of the building were studied, as follows:

Based on the calculations of specific consumption and the penalties granted for the energy rating, the certified building is classified into energy class C (overall) with a specific primary energy consumption of 140.3 kWh/m2/year, compared to the reference building which is classified into energy class B with a specific primary energy consumption of 82.70 kWh/m2/year. Regarding the level of equivalent CO2 emissions, the existing building falls into class C with 22.2 kgC02/m2/year compared to the reference building which falls in class B with 13.10 kgC02/m2/year.

The following solutions are proposed for the investigated building: Solution 1.

- Thermal insulation of the exterior walls with a layer of expanded polystyrene or mineral wool with a thickness of 15 cm and a thermal conductivity of $\gamma<0.038$ W/mK

Thermal insulation of the floor above the last level with insulating material based on sheep wool with a thickness of 25 cm and a minimum thermal strength of $\gamma<0.038$ W/mK, over which a wooden floor will be built.

- Thermal insulation of the floor above the technical channel with a layer of expanded polystyrene or mineral wool with a thickness of 10 cm and a minimum thermal strength of $\gamma<0.038$ W/mK, over which a wooden floor will be built.

Solution 2.

- Replacing the exterior windows with efficient joinery which thermal strength is at least Rmin=0.83 m2 K/ W.

- Replacing the exterior doors with efficient joinery which thermal strength is at least Rmin=0.77 m2 K/ W.

Solution 3. Modifying the building installations as follows:

- Introducing a new heat production system consisting of a heat pump and condensing gas boilers that will serve the high school. The gas boilers will take over any consumption peaks.

A photovoltaic panel system with a capacity of 36 kWh (90 panels) will be installed on the roof of the high school on SE or SW orientations

- A heat recovery fan system with an average heat transfer efficiency of 72% will be installed.

- The lighting fixtures and lighting sources will be replaced with LED ones. Presence sensors will be used for circulation spaces.

The energy and economic analyses presented in the energy audit report highlight the qualities of the different refurbishment packages. Thus:

Package P1 is a package that includes solutions S1-S2 and is recovered in 27 years. The package of measures leads to an increase in the thermal strength of the dull envelope up to the minimum strenghts required by the codes in force. From the point of view of primary energy consumption and C02 emissions, the package does not fall within the minimum values provided by the methodology.

With this package of measures, the annual primary energy saving is 21.6% (from 502.865 MWh/year to 394.34 MWh/year) and C02 emissions are reduced by 27.4% (from 79.8 tons/year to 57.9 tons/year). It is noted that the recovery period is long but falls within the construction's lifespan of 30 years.

Package P2 is a package that includes solution S3 and is recovered in 10 years. The package of measures leads to increased efficiency of installations and the use of renewable energy sources. This package does not fall within the minimum values provided by the methodology in terms of primary energy consumption and C02 emissions. With this package of measures, the annual primary energy saving is 29.6% (from 502,865 MWh/year to 353,843 MWh/year) and C02 emissions are reduced by 39.4% (from 79.8 tons/year to 48.4 tons/year).

The P3 package is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 18 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a reduction in consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy savings are 70.5% (from 502,865 MWh/year to 148,524 MWh/year) and C02 emissions are reduced by 83% (from 79.8 tons/year to 13.6 tons/year).

The energy audit report for the building C6–Dormitory, completed in 2025, by the Energy Auditors for Buildings Eng. Andrei Pricopie and Eng. Radu Cruciat, aims to analyze the buildings from the energy point of view for energy certification and establishing the necessary energy refurbishment and modernization measures. Solutions and packages that increase the energy efficiency of the building have been studied, as follows:

Based on the calculations of specific consumption and the penalties granted in the energy rating, the certified building is classified into energy class D (overall) with a specific primary energy consumption of 284.4 kWh/m2/year, compared to the reference building which is classified into energy class B with a specific primary energy consumption of 123.1 kWh/m2/year. ÏIn terms of the level of equivalent CO2 emissions, the existing building falls into class D with 54.3 kgC02/m2/year compared to the reference building which is in class B with 19.9 kgC02//m2/year.

The following solutions are proposed for the building examined:
Solution 1.
- Thermal insulation of the exterior walls with a layer of expanded polystyrene or mineral wool with a thickness of 15 cm and a thermal conductivity of <0.038 W/mK
Thermal insulation of the floor above the last level with insulating material based on sheep wool with a thickness of 25 cm and a minimum thermal strength of <0.038 W/mK, over which a wooden floor will be built.
- Thermal insulation of the floor above the technical basement with a layer of expanded polystyrene or mineral wool with a thickness of 10 cm and a minimum thermal strength of <0.038 W/mK, over which a wooden floor will be built.
Solution 2.
- Replacing the exterior windows with efficient joinery which thermal strength is at least Rmin=0.83 m2 K/ W.
- Replacing the exterior doors with efficient joinery which thermal strength is at least Rmin=0.77 m2 K/ W.

Solution 3. Modifying the building's installations as follows:
- Introducing a new heating system consisting of a heat pump and condensing gas boilers that will serve the home. The gas boilers will take over any peaks in consumption.
A photovoltaic panel system with a capacity of 50 kWh will be installed on the roof on SE or SW orientations
- The lighting fixtures and lighting sources will be replaced with LED ones. One will use presence sensors for circulation spaces.

The energy and economic analyses presented in the energy audit report highlight the qualities of the different refurbishment packages. Thus:

Package P1 is a package that includes solutions S1-S2 and is recovered in 8 years. The package of measures leads to the increase of the thermal strengths of the dull envelope up to the minimum strenghts required by the codes in force. From the point of view of primary energy consumption and CO2 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 64.1% (from 874,559 MWh/ year to 313,629 MWh/ year) and CO2 emissions are reduced by 68.7% (from 164.6 tons/year to 51.4 tons/year).

Package P2 is a package that includes solution S3 and is recovered in 10 years. The package of measures leads to an increase in the efficiency of the installations and the use of renewable energy sources. This package does not fall within the minimum values provided by the methodology in terms of primary energy consumption and C02 emissions. With this package of measures, the annual primary energy saving is 13.7% (from 874,559 MWh/year to 754,576 MWh/year) and CO2 emissions are reduced by 16.6% (from 164.6 tons/year to 137.3 tons/year).

The P3 package is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 9 years. The package of measures leads to an increase in both the thermal strengths of the envelope to the minimum strengths required by the codes in force and a decrease in consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 77.4% (from 874,559 MWh/ year to 197.877 MWh/ year) and C02 emissions are reduced by 84.4%(from 164.6 tons/year to 25.7 tons/year).

3.5. Technical condition, including the structural system and diagnosis analysis, from the point of view of ensuring the applicable fundamental requirements, according to the law;

PROVISIONS CONCERNING THE ESSENTIAL REQUIREMENTS PROVIDED BY Law 10/1995 on quality in construction, as amended and completed:

"Art. 5. (1) In order to obtain quality constructions, it is mandatory to achieve and maintain, throughout the entire life of the constructions, the following applicable fundamental requirements:

a) mechanical strength and stability;
b) fire safety;
c) hygiene, health and environment;
d) safety and accessibility in operation;
e) protection against noise;
f) energy saving and thermal insulation;
g) sustainable use of natural resources.

(2) The application of the fundamental requirements is established by fields/subfields and categories of constructions and by specialties for installations related to constructions, through technical regulations and construction regulations.

“Art. 6. (1) The obligations regarding the assurance of the fundamental requirements provided by art. 5, in all the stages provided by art. 2, shall be borne by the factors involved, according to the responsibilities of each one established under the law.

(2) For the purposes of this law, the factors involved provided by par. (1) are: investors, owners, administrators, users, executors, researchers, designers, certified project verifiers, certified technical experts, certified energy auditors for buildings, authorized technical managers for execution, authorized construction managers, manufacturers of construction products, their authorized representatives, importers, distributors of construction products, bodies for the assessment and verification of the constancy of performance of construction products, European technical assessment bodies in construction, bodies developing technical approvals in construction, laboratories for analysis and testing in construction, technical universities and research institutes in the field of construction and professional associations in the field.”

QUALITY REQUIREMENT "A" - MECHANICAL STRENGTH AND STABILITY

The expertized constructions were evaluated in accordance with the regulations in force, in order to substantiate the decision to classify in a seismic risk class. Thus, the buildings fall into the seismic risk class RS III, which includes buildings that may show minor structural degradation, without significantly affecting their safety. In-depth energy refurbishment works of buildings are necessary, timely and justified; however, they require important technical approaches to ensure strength, stability, durability, safety in operation/use and on the requirements/level of comfort and environment of the future spaces of the refurbished and modernized building.

QUALITY REQUIREMENT "B" - SAFETY IN OPERATION

The project covers works that will positively influence the safety in operation.

QUALITY REQUIREMENT "C" - FIRE SAFETY

The buildings on which the aforementioned interventions are proposed do not have a Fire Safety Permit. A series of measures are proposed to comply with the fire safety requirements for constructions.

QUALITY REQUIREMENT "D" - HYGIENE, HUMAN HEALTH, ENVIRONMENTAL PROTECTION AND RESTORATION

The project does not cover works that may negatively influence the human hygiene and health.

An optimal ratio between the natural environment/site/building is ensured, considering the positioning in the area: POT— (Land Occupancy Percentage).

The green space is presented in planted form with low and medium vegetation.

The location is aerated and sunny.

QUALITY REQUIREMENT "E" — THERMAL PROTECTION, WATERPROOFING AND ENERGY SAVING

Thermal protection is poor due to the lack of thermal insulation and worn-out exterior joinery; the heating system is outdated.

Measures are therefore required to make the building envelope more efficient (tiles and floors, glazed surfaces) in order to increase the building's energy performance.

QUALITY REQUIREMENT "F" - NOISE PROTECTION

The activities carried out on site upon completion of the works do not cause noise pollution or vibrations.

No increase in noise and vibration levels in the area is forecast.

QUALITY REQUIREMENT "G" - SUSTAINABLE USE OF NATURAL RESOURCES

The energy audit proposes solutions for the sustainable use of natural resources, namely interventions that will lead to energy savings, reduction of noxious emissions and use of alternative energies.

3.6. Proof of force majeure, as applicable; Not applicable.

4. TECHNICAL EXPERT CONCLUSIONS AFTER THE ENERGY AUDIT, CONCLUSIONS OF THE DIAGNOSIS STUDIES

a) Seismic risk class;

The existing buildings fall into seismic risk class RsIII.

b) Presentation of at least two intervention solutions;

Since the buildings surveyed fall into seismic risk class III, no consolidation works are necessary.

Analyzing the situation on site, a medium to high degree of wear was found, corresponding to the lifespan of the buildings, in non-structural elements, finishes and installations, but a significant deficiency was found in terms of thermal comfort compared to the current norms and requirements in force. The buildings show certain deficiencies mainly related to the level of comfort due to the lack of thermal protection, the lack of thermal envelopes, lack of efficient installation systems and lack of efficient joinery. The facades of the buildings have surfaces with worn, degraded finishes that require revisions and refurbishment. Considering the existing situation of the buildings and the beneficiary's desire to rehabilitate the buildings and increase their comfort level, the following options are proposed:

OPTION 1 - In-depth energy renfurbishment applying the maximal package:

This package involves the construction of building envelopes (walls, floors, glass surfaces), as well as the implementation of high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.

Based on the technical and economic analyses carried out by the energy auditor, it is recommended to implement the maximal P3 package - this being the efficient solution and compliant with the regulations in force. Following the application of thermal refurbishment measures for buildings, the buildings become energy efficient, falling into energy performance class A.

WORKSHOP BLOCK (C3):

The P3 package is a maximal package in terms of investment that includes solutions S1-S3 and which is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of the consumptions within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 73.6% (from 324.36 MWh/ year to 85.523 kWh/ year) and CO2 emissions are reduced by 85.4% (from 56 tons/year to 8.2 tons/year).

GYM HALL BLOCK (C4):

Package P3 is a maximum package in terms of investment that includes solutions S1-S3 and which is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of consumptions within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 73.6% (from 324.36 MWh/year to 85,523 kWh/year) and C02 emissions are reduced by 85.4%(from 56 tons/year to 8.2 tons/year).

HIGH SCHOOL BUILDING (C5):

Package P3 is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy savings are 73.6% (from 324.36 MWh/ year to 85.523 kWh/ year) and C02 emissions are reduced by 85.4% (from 56 tons/year to 8.2 tons/year).

DORMITORY BLOCK (C6):

The P3 package is a maximum package in terms of investment that includes solutions S1-S3 and is recovered in 15 years. The package of measures leads to an increase in both the thermal strength of the envelope to the minimum strengths required by the codes in force and a classification of consumption within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 73.6% (from 324.36 MWh/year to 85,523 kWh/year) and C02 emissions are reduced by 85.4% (from 56 tons/year to 8.2 tons/year).

OPTION 2 - In-depth energy refurbishment applying the minimal package:

This package involves the implementation of building envelopes (walls, floors, glass surfaces). without implementing high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.

Based on the technical and economic analyses carried out by the energy auditor, the implementation of the minimal P1 package does not fall within the minimum values provided by the methodology in terms of primary energy consumption and CO2 emissions - this being an inefficient solution and not recommended by the energy auditor.

WORKSHOP (C3):

Package P1 is a package that includes solutions S1-S2 and is recovered in 22 years. The package of measures leads to an increase in the thermal strength of the dull envelope up to the minimum strengths required by the codes in force. From the point of view of primary energy consumption and C02 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual saving of primary energy is 24.9% (from 324.36 MWh/ year to 243.71 MWh/ year) and CO2 emissions are reduced by 29% (from 56 tons/year to 39.8 tons/year).

GYM BUILDING (C4):

Package P1 is a package that includes solutions S1-S2 and is recovered in 15 years. The package of measures leads to an increase in the thermal strength of the dull envelope to the minimum strengths required by the codes in force. From the point of view of primary energy consumption and CO2 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 20.2% (from 132 MWh/ year to 105 MWh/ year) and C02 emissions are reduced by 23.1% (from 23.3 tons/year to 17.9 tons/year)

HIGH SCHOOL BUILDING (C5):

Package P1 is a package that includes solutions S1-S2 and is recovered in 27 years. The package of measures leads to an increase in the thermal strength of the dull envelope up to the minimum strenghts required by the codes in force. From the point of view of primary energy consumption and CO2 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy saving is 21.6% (from 502.865 MWh/year to 394.34 MWh/year) and C02 emissions are reduced by 27.4% (from 79.8 tons/year to 57.9 tons/year). It is noted that the recovery period is long but falls within the construction's lifespan of 30 years.

DORMITORY BUILDING (C6):

Package P1 is a package that includes solutions S1-S2 and is recovered in 8 years. The package of measures leads to an increase in the thermal strength of the dull envelope up to the minimum strengths required by the codes in force. In terms of primary energy consumption and C02 emissions, the package does not fall within the minimum values provided by the methodology. With this package of measures, the annual primary energy savings are 64.1% (from 874,559 MWh/ year to 313,629 MWh/ year) and CO2 emissions are reduced by 68.7% (from 164.6 tons/year to 51.4 tons/year).

c) The technical solutions and measures proposed by the technical expert and, where applicable, the energy auditor to be developed within the documentation for approving the intervention works;

Since the expertized buildings fall into seismic risk class III, no consolidation works are necessary.

All interventions on the expertized buildings will be carried out based on a technical project drawn up by an authorized, experienced designer, verified and authorized according to the legislation in force. The mentioned project (architecture + strength + installations), prepared based on the Expert Report, the current norms and standards of construction design, will include the solutions and execution details appropriate to the conservation and increase (where necessary) of the structural load-bearing capacities of the buildings. To this end, all the recommendations of the technical expert will be observed and will be presented in detail within the documentation for the approval of the intervention works.

The technical solution proposed by the energy auditor to be developed within the doc umentation to approve the intervention works represents the implementation of the maximal P3 package – this being the efficient solution and compliant with the regulations in force. Following the application of thermal refurbishment measures of constructio ns, the buildings become energetically efficient being classified into the energy performance class A.

d) Recommendation of the necessary interventions to ensure the functioning according to the requirements and quality standards;

By implementing the thermal-energetic refurbishment measures at the buildings of the Energy High School from Str. Electricienilor, no. 1, the aim was to increase the level of thermal protection of buildings, the energy efficiency of interior heating installations, preparation of hot running water, lighting and ventilation, the creation of a microclimate suitable for carrying out educational activities by achieving the minimum performance values of the component elements of the envelope, the reduction of the amount of primary energy from non-renewable sources and carbon dioxide emissions, the inclusion in the maximum standardized primary energy consumption stipulated in the "Methodology for calculating the energy performance of buildings" MC 001/2022, chapter 2, Tables 10.b.

The comparative analysis shows that the provisions regarding:
-reduction of heating energy from 1146.249 MWh/year of current buildings to 383.986 MWh/year, for modernized buildings;
-reduction of C02 emissions from the value of 323.70 to/year corresponding to existing buildings to an estimated quantity of 50.03 to/year;
It is recommended to bring the building to an optimal level of energy efficiency by applying the measures from the maximum intervention solution, the optimal solution from the technical point of view.

5. IDENTIFICATION OF TECHNICAL-ECONOMIC SCENARIOS/OPTIONS (MINIMUM TWO) AND THEIR DETAILED ANALYSIS

In order to achieve the general goal of the project, a thorough analysis of the optimal alternatives related to the implementation of the in-depth energy refurbishment and the compliance of the spaces intended for pre-university education with the regulations in force of the buildings C3, C4, C5, C6, within Sibiu Technical Energy College, a technically and economically feasible alternative and with a positive impact, both on the quality of the educational process and on the socio-economic environment. In this regard, the analysis and selection of the alternatives was carried out taking into account aspects such as cost-efficiency, flexibility, opportunity and probability of achieving the goal.
The two scenarios studied comparatively are:
OPTION 1 - In-depth energy refurbishment applying the maximum package:
This package involves the implementation of the building envelope (walls, floors. glazed surfaces), as well as the implementation of high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.
OPTION 2 – In-depth energy refurbishment applying the minimal package:
This package consists of making the building envelope with glazed surfaces, without the implementation of performance systems at the level of the installations: HVAC, sanitary, electrical, with the help of alternative energy.
The recommended feasible scenario is OPTION 1 - In-depth energy refurbishment applying the maximal package used by the energy auditor, to which are added the recommendations of the specialized designers, taking into account the design topic, a scenario that will be detailed by specialties in the following chapters.

5.1. The technical solution, from technological, construction, technical, functional, architectural and economic point of view, comprising:
a) Description of the main intervention works for:
- consolidation of the elements, subassemblies or the structural assembly;
Since the buildings surveyed fall into the seismic risk class RS III, no consolidation works are required.
- protection, repair of non-structural elements and/or restoration of architectural elements and artistic components, as appropriate;

Building C3 - Workshops:
Thermal refurbishment works are described below:
-- replacement of the joinery, including the glazed part and sealing of the penetrations;
-- removal of the current thermal insulation;
-- removal of the decorative elements on the side facade;
-- cladding of the perimeter walls on the outside with 15 cm thick mineral wool boards, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes according to the manufacturers' instructions;
-- application of plasters reinforced with synthetic fiber mesh over the thermal insulation;
-- a 25 cm thick wool thermal insulation will be installed over the reinforced concrete floor on the top level;

Cladding the building with mineral wool boards protected with plaster does not bring significant additional loads and does not affect the integrity of the structural elements, by removing the decorative elements from the side facade the inertial mass load of the building is reduced. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, visible reinforcement, cracks, monolithics) as follows:

-- the concrete surfaces with visible reinforcement will be treated by cleaning the reinforcement from rust and the concrete covering layer of the reinforcement will be restored.

-- the sheet metal and the elements of the roof structure that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded sheet metal sections in the attic will be completed. The load-bearing capacity of the roof structure and its anchoring method to the building will be checked;

-- measures will be taken to remove accidental water losses;

-- the building will be surrounded by new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the base plaster will be repaired where it is detached.

-- if unsafe elements are identified during the works, the builder will notify the designer and the expert in writing.

Regarding the P+2E body, the decorative elements mounted in the facade axes can be removed. Their dismantling will be done by cutting pieces that can be handled by man, without affecting the existing structure that remains. The vertical elements are made of mortar on M100 rabbet mesh and have a thickness of 10 cm with a length in plan of 80 cm. There are vertical elements that are connected to the reinforced concrete pillars of the structure. The horizontal ones are made of B200 concrete reinforced longitudinally with 6 mm bars. On each floor there are 3 horizontal elements, 1 above the masonry parapet and 2 located between the parapet and the slab of the next floor. The dismantling will start from the upper horizontal element. It will be supported, after which the brise-soleils will be cut with a diamond disc in front of the 30x40 cm strength pillars and possibly in smaller segments that can be easily removed. After previously making the support, the second element located immediately below will continue. Once the two horizontal elements have been removed, the horizontal element that is made above the masonry parapet can be cut in front of the masonry wall. The belt located above the masonry with dimensions 30x30 cm or the reinforced concrete pillars 30x40 cm will not be affected. The vertical elements will be supported, after which they will be cut into easy-to-handle pieces. The vertical elements connected to the pillars can also be removed. These can be hung in front of the pillar. When cutting, special attention will be paid to ensuring that the remaining reinforced concrete elements are not affected by the cutting. It is forbidden to dismantle the elements by breaking them, which could introduce vibrations into the remaining structural elements. The resulting rubble will not be stored at the floor level and will be removed as it is produced. The apparent reinforcement will be covered with a passivating agent and epoxy mortar immediately after cutting.

Regarding the garage, there is no technical documentation to attest to the change of destination from
changing room to garage where a door was made in axis I and a pillar was removed. In order to ensure the support of the beam in axis 15 perpendicular to the external wall, a frame will be made. The replacement frame will make up for the lack of the pillar provided for in the initial project and which will border the garage door, inside the garage. 2 30x30 cm pillars and a 30x50 cm beam in reinforced concrete are provided. The pillars will border the garage door. In axis 14, the new pillar will be connected with chemical anchors to the existing pillar. At the other end of the door opening, the masonry will be removed and the pillar will be connected to the existing masonry wall in strips. Under the existing beam in axis 15, a HEA200 steel beam with a length of approximately 1 m will be provided before the concrete beam is poured. The HEA 200 beam will be solidified to the existing concrete beam by means of chemically monolithic bolts. Subsequently, the reinforced concrete beam will be poured in excess so as to ensure intimate contact between the new reinforced concrete beam and the HEA200 profile. The reinforced concrete pillars of the new frame will be provided on a foundation footing that will go between the isolated foundations of the existing pillars.

The architectural proposal provides for the creation of gaps in the reinforced concrete walls of the P Electric Workshop body. It is planned to widen the gap between the technical workshop and the hall from 80 cm to 100 cm. To widen the gap, approximately 40 cm of the concrete wall will be broken along the wall. (20 cm gap provided + 20 cm). At the top of the gap, a 15 cm break is also planned above the current level of the door gap. When breaking, special attention will be paid to ensure that the existing reinforcements in the wall are not affected. The vertical reinforcements in the 20 cm of the door can be cut in front of the plate. In the additional 20 cm, a reinforcement shell will be made consisting of longitudinal reinforcement with 4 bars Θ14 provided with crossbars. The existing horizontal reinforcements will be turned and anchored in the newly created bulb. At the top in the 15 cm of excess split, a stirrup lintel reinforcement will be provided which will be anchored in the newly created column. The existing wall reinforcements will be kept and will be anchored in the newly created bulb. The bulb and lintel reinforcements will be chemically monolithic in the existing concrete wall and at the bottom in the foundation. The new column and lintel are re-concreted by pouring excess concrete

To create the door opening between the Hall and the warehouse, the wall is broken over a length of 100 cm (80 cm door + 20 cm on each side of the door). At the top, a break is made 15 cm above the top of the door. On the sides of the opening, 2 pillar frames similar to the one described for the previous opening will be made. At the top of the opening, a lintel reinforcement is provided that is anchored in the newly provided pillars. The pillar reinforcements will be chemically monolithic at the top in the existing concrete wall and at the bottom in the foundations.

The window openings are closed with masonry. Special attention will be paid to the integration of the new masonry with the existing masonry and where this is not possible, concrete elements will be poured into the joints of the new and existing masonry.

The architectural proposal provides for the replacement of light partitions and the creation of new partitions. The partitions that are being dismantled, for example between the Measurement Laboratory and the hall, do not have a resistance role. These can be dismantled and will be mandatory replaced with lightweight gypsum-cardboard partitions that do not bring significant additional loads to the construction.

In axis I' adjacent to the staircase, along the entire vertical, the architectural proposal provides for the construction of a new wall. This will be made with a lightweight structure without additional measures. If a masonry wall is provided, it will be provided along the entire vertical of the building and at the end from axis 9, a reinforced concrete column with a size of approximately 20x30 cm will be built, cast in strips with the masonry. The column reinforcements will be chemically monolithic at both ends in the concrete beams with which they intersect. Chemical monolithication will be done for 2 bars provided at the end of the column so that the column does not develop a bending moment at the ends.

Building C4 - Gym Hall:

The thermal refurbishment works are described below:

-- replacement of the joinery, including the glazed part and sealing of the penetrations;

-- cladding of the perimeter walls on the outside with 15 cm thick mineral wool boards, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes according to the manufacturers' instructions;

-- application of plasters reinforced with synthetic fiber mesh over the thermal insulation;

-- over the floor made of hollow strips at the last level, the existing thermal and waterproofing assembly will be removed and a 25 cm thick wool thermal insulation will be installed;

- Cladding the building with mineral wool and plaster does not bring significant additional loads and does not affect the integrity of the structural elements. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, visible reinforcement, cracks, monolithics) as follows:

-- the concrete surfaces with visible reinforcement will be treated by cleaning the reinforcement from rust and the concrete covering layer of the reinforcement will be restored;

-- the sheet metal and the elements of the roof structure that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded attic sheet metal sections will be completed. The load-bearing capacity of the roof structure and its anchoring method to the building will be checked;

-- measures will be taken to eliminate accidental water losses;

-- the building will be surrounded by new sidewalks with appropriate slopes, sealed to the walls with bitumen plugs and the plaster of the bases will be repaired where it is detached;

-- if unsafe elements are identified during the works, the builder will notify the designer and the expert in writing;

-- for the air conditioning of the gym hall, it is requested to mount an aggregate on the roof with a weight of approx. 1.2 tons. 0 the pipe on the footprint of the aggregate will pierce the roof. We propose that the location of the aggregate be in an area towards the longitudinal wall where 6 strips with gaps with a width of 0.60m will be carefully removed. In the middle of the area, the aggregate will be mounted resting on a yoke of metal beams supported and anchored on the reinforced concrete transversal beams.

Around the penetration, the exposed area will be braced to achieve the continuity of the roof sheathing and then it will be hydrothermally insulated using a sheet metal support.

-- The windows of the sports hall located towards the end tympanums between the elevation +3.90 and +9.05m can be closed. The closure of these windows is done with masonry with vertical gaps that will be reinforced in the horizontal joint at 2 seats with two Θ8 bars anchored in the pillars adjacent to the window.

-- The masonry wall in axis 1, between the thermal power plant and the sports hall warehouse, will be rebuilt. This will be built in strips with the existing wall or a reinforced concrete core will be provided to ensure the cooperation of the new wall with the existing one. The exterior walls of the thermal power plant that were built after the initial construction will be dismantled, according to the architectural proposal. The demolition will be carried out by breaking the walls, taking care not to affect the remaining strength structure.

Building C5 - High School:

Thermal refurbishment works are described below:

-- replacement of the joinery, including the glazed part and sealing of the penetrations;

-- cladding of the perimeter walls on the outside with 15 cm thick mineral wool boards, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes according to the manufacturers' instructions;

-- application of plasters reinforced with synthetic fiber mesh over the thermal insulation;

-- a 25 cm thick wool thermal insulation will be arranged over the reinforced concrete floor on the last level; Cladding the building with mineral wool boards protected by plaster does not bring significant additional loads and does not affect the integrity of the structural elements. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, visible reinforcement, cracks, monolithics) as follows:

-- the concrete surfaces with visible reinforcement will be treated by cleaning the reinforcement from rust and the concrete covering layer of the reinforcement will be restored;

-- the sheet metal and the elements of the frame that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded attic sheet metal sections will be completed;

-- measures will be taken to eliminate accidental water losses;

-- the building will be surrounded by new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the base plaster will be repaired where it is detached;

-- if unsafe elements are identified during the works, the builder will notify in writing the designer and the expert.

Regarding the Gf+2F block, the decorative elements mounted in the facade axes can be removed. Their dismantling will be done by cutting pieces that can be manipulated by man, without affecting the existing structure that remains. The vertical elements are made of masonry and are approximately 30 cm thick and are connected to the reinforced concrete columns. There are horizontal elements that are connected to the reinforced concrete belts of the structure. The dismantling will begin with the vertical elements. These are cut at the edge of the reinforced concrete column without affecting its integrity. The cutting will be done in easily manipulated pieces that will not be stored on the floor or on the horizontal elements. The cut reinforcements that ensured cooperation with the column will be covered with paint immediately after cutting. No stirrups or longitudinal bars of the column will be cut.

After removing the vertical elements, the horizontal ones will be removed. A temporary support will be made for the decorative elements and they will be cut with a diamond disc at the face of the beam in which they are anchored. The cutting will be done in small, easily manageable pieces. Special attention will be paid so that the reinforced concrete section or the remaining belt or beam reinforcements are not affected during cutting. The apparent reinforcements will be covered with a passivating agent and epoxy mortar immediately after cutting. The decorative elements will be dismantled by breaking, which could introduce vibrations into the remaining structural elements. The rubble will not be stored at the floor level and will be removed as the work progresses.

The following steps will be taken to create new openings and to build existing door openings. For one of the classes, the position of the access door in the class will be changed. In front of the new opening, the plaster from the masonry wall will be removed over the entire surface of the opening. If reinforced concrete strength elements are identified, they will be reported to the expert and designer in order to find a new solution or a new position of the gaps. The masonry will be dismantled along the entire height of the floor over a length equal to the provided gap, to which is added 25 cm to the left and right of the new door.

The excavation will leave the existing masonry beams exposed. Two 25x25 cm reinforced concrete pillars will be built on each side of the door with a lintel at its top. The pillars will be anchored with chemically monolithic bars in the belt at the top and bottom of the pillar. The existing door opening will be closed with solid pressed masonry built in beams to achieve the continuity of the masonry wall. Alternatively, 15 cm reinforced concrete pillars can be provided that will be cast in the beams of the new masonry and the existing masonry.

Building C6 - Dormitory:
Thermal refurbishment works are described below:
-- repair of balcony parapets where applicable;
-- replacement of joinery, including the glazed part and sealing of penetrations;
- cladding the perimeter walls on the outside with 15 cm thick mineral wool, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes according to the manufacturers' instructions;
-- application of plasters reinforced with synthetic fiber mesh over the mineral wool;
-- a 25 cm thick wool thermal insulation will be arranged over the reinforced concrete floor on the last level;
Cladding the building with mineral wool boards protected with plaster does not bring significant additional loads and does not affect the integrity of the structural elements. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, visible reinforcement, cracks, monolithics) as follows:
-- concrete surfaces with visible reinforcement will be treated by cleaning the reinforcements of rust and the concrete covering layer of the reinforcements will be restored;
-- the ceramic tiles and the elements of the roof structure that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded attic sheet metal sidings will be completed. The load-bearing capacity of the roof structure and its anchoring method to the building will be checked;
-- measures will be taken to remove accidental water losses. Leaks from the basement level will be repaired;
-- the building will be surrounded by new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the plaster of the bases will be repaired where it is detached;
-- if unsafe elements are identified during the works, the builder will notify the designer and the expert in writing.
Where the architectural proposal proposes the construction of door openings, for example in the dryer, the opening will be built with solid brick, pre-fabricated, woven with the masonry adjacent to the opening. If this is not possible, a 15 cm concrete pillar will be provided that will be poured into the existing wall joists and the new wall joists.
According to the architectural proposal, it is proposed to move the current doors in each room to make room for a new bathroom. To create the gap, a 25x25 cm reinforced concrete pillar will be built. To make the changes, the following operations will be carried out:
1. The positions of the new pillars that border the new door position will be marked.
2. The part of the existing door that is to be closed is built. The masonry is made with solid pressed brick and will be woven with the existing masonry. If weaving is not possible, a 15 cm space will be left between the new and existing masonry that will ensure the cooperation between the two masonry.
3. The masonry will be dismantled along the entire height of the floor, up to the reinforced concrete belt at the top of the wall.
4. 4 holes Θ 16 will be drilled in the reinforced concrete belt.
5. Θ 14 reinforcements will be inserted into the drilled holes to ensure the continuity of the pillars. The holes are filled with mortar at the bottom and epoxy resin is injected at the bottom until the excess is visible at the top of the existing belt.
6. The reinforced concrete pillar is poured with excess concrete. Special attention will be paid to the concrete pouring under the existing belt and to ensuring intimate contact between the new concrete in the pillar and the belt. The works will be carried out in stages, starting from the ground floor of the building and with the rooms located on one side of the hall. First, the works on the ground floor will be carried out, following the floors in order.

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When creating the reinforcement passage gaps, special attention will be paid to ensure that they do not affect the existing Ventura reinforcement or the end of the prefabricated strip that forms the floor in the building's hallway. It is prohibited to break the prefabricated strips.
In the areas where the sanitary units are built, the first prefabricated strip will be broken and a monolithic reinforced concrete floor will be poured.
Moving the door gaps in the rooms does not lead to additional loads at the building level. The percentage of walls will not be influenced by the planned works, and by creating the pillars, a confinement of the longitudinal walls will be achieved. After the execution of the works, the level of insurance of the construction will not change, remaining Rs III.
- interventions to protect/preserve current valuable natural and anthropogenic elements, as appropriate;
Not applicable.
- partial demolition of structural/non-structural elements, with/without modifying the existing configuration and/or function of the construction;
Not applicable.
- introduction of structural/non-structural/additional elements; Not applicable.
- introduction of anti-seismic devices to mitigate the seismic response of the current construction;
Not applicable.

b) Description, as appropriate, of other categories of works included in the proposed technical intervention solution, namely waterproofing, thermal insulation, repair/replacement of installations/equipment related to the construction, dismantling/assembly, disconnections/connections, interior/exterior finishes, as appropriate, improvement of the foundation ground, as well as works strictly necessary to ensure the functionality of the construction refurbished;

Considering the results of the technical expert report on the buildings regarding the stability and strength of the constructions, as well as the energy audit report, the following intervention works (in-depth energy refurbishment) are proposed to respond to the design topic and bring the existing spaces to compliance with the regulations in force:
Interior re-compartmentalization works through demolitions or completions of masonry depending on the specific flow of teaching activity and the regulations in force, in particular NP 010/2022 Norm on the design, construction and operation of buildings for schools and high schools
Thermal refurbishment works of the building envelope;
Thermal refurbishment works of the heating system and hot water supply;
Installation of alternative systems for the production of electricity or heat (photovoltaic panels and heat pumps);
- Refurbishment and modernization works of all necessary interior installations: gas, thermal, electrical, water-sewage, weak voice and data currents, fire extinguishing installations;
- Creation of a fire detection, warning and signaling system;
Restoration of interior finishes where specific works require it;
Exterior works to arrange kinetic floors in the premises;
- Specific works necessary to obtain ISU and DSP approvals;
Equipping the buildings with ramps necessary for disabled people as well as lifting platforms for easy vertical movement;
From a functional point of view and to increase the level of compliance, the following interventions were proposed to bring the existing spaces to compliance with the regulations in force, as follows:

Building C3— Workshops:
On the ground floor, considering that space P20 Garage is currently non-functional, it is proposed its partitioning with a light wall of gypsum cardboard type RF 180' into two spaces for storage. Space P14. Electrical workshop and P03. Electromechanical workshop will be partitioned with light walls of gypsum cardboard type RF 60', respectively RF 150' into three classrooms and a workshop. Also, on the ground floor, two sanitary groups separate by gender will be created.

On the 1st floor, in order to ensure fire safety requirements, it is proposed to replace the wall between axes F and I, 6 by 9, with a light wall type RF 150' gypsum cardboard. Also, two sanitary groups separate are created by gender.
On the 2nd floor, space E2.04. Telecommunications laboratory will be divided into two spaces: classroom and laboratory. In order to ensure fire safety requirements, it is proposed to dismantle the wall in the stairwell. Also, two sanitary groups separate by gender are created.

Building C4 – Gym hall:
The external wall of the Thermal Power Plant between axis A and B, built later and not structurally linked to the existing building, is abandoned and the original form of the construction is returned.

Building C5 - High School:
On the ground floor, considering that space P35. Warehouse is currently non-functional, it is proposed to arrange a reading library with separate access from the outside. Spaces P36, P38 and P39 will be arranged in order to expand the current Technical Space.
In order to ensure the fundamental fire safety requirement, certain gaps will be modified and separations will be made on the escape routes according to the specialized plans.
On the 2nd floor, space E2.08. The library and reading room will become a classroom.

Building C6 - Dormitory:
In order to increase the comfort level, it is desired to repurpose the existing accommodation spaces by abolishing the sanitary groups on the level and creating them in each room. Thus, each accommodation unit will consist of: a room with 2 beds, a bathroom (with washbasin, shower and toilet), an access hall, resulting into a number of 80 rooms for 160 students. Each accommodation unit will have a usable area of approximately 16m2 and will consist of: a room, its own sanitary group equipped with washbasin, shower and toilet, an access hall. The accommodation spaces will be equipped with the necessary additional functions: study (reading rooms on each level), offices, laundries, dryers, storage, cleaning booth provided on each level, etc. It will be proposed to completely replace the interior finishes with good quality ones, easily washable and without roughness: washable plasters and paints on the walls and suspended ceilings to mask installation routes, tiles in the hallways and stairwells, triple-layered laminate parquet for heavy traffic in the rooms, reading rooms, porcelain tiles in the bathrooms, offices, laundries and dryers. The interior joinery will be completely replaced with metal ones. On the outside, the dormitory will be thermally insulated and the exterior joinery will be replaced with aluminum ones with triple insulating glass. The thermal, electrical and sanitary installations will be completely replaced.
Thus, the following spaces will result:

	Functional description proposed – BUILDING C3 - WORKSHOPS	
Functions proposed for the GROUNDFLOOR:		
No.crt	Room name	Useful area
P.02	ACCESS HALL AND STAIRCASE	96.00 sqm
P.03	CLASS ROOM	47.88 sqm
P.04	WORKSHOP	68.51 sqm
P.05	WORKSHOP	101.60 sqm
P.06	HALL	5.31 sqm
P.07	OFFICE	9.14 sqm
P.08	DISTRIBUTION ROOM	9.99 sqm

P.09	TRANSFORMER STATION	10.97 sqm
P.10	LOW VOLTAGE ROOM	10.05 sqm
P.11	ACCESS	8.00 sqm
P.12	CABINET	8.98 sqm
P.13	DIDACTIC ANNEX	4.42 sqm
P.14	HALL	4.61 sqm
P.15	CLASS ROOM	64.18 sqm
P.16	CLASS ROOM	77.04 sqm
P.17	HALL	33.58 sqm
P.18	TECHNICAL SPACE	21.20 sqm
P.19	HALL	3.03 sqm
P.20	GIRLS' SANITARY GROUP	8.03 sqm
P.21	BOYS' SANITARY GROUP	12.44 sqm
P.22	STORAGE	31.41 sqm
P.23	STORAGE	16.58 sqm
	Total GROUNDFLOOR useful area	644.95 sqm

Functions proposed for 1st FLOOR:

No. crt.	Room name	Useful area
E1.01	HALLWAY AND STAIRCASE	64.24 sqm
E1.02	HALLWAY	4.58 sqm
E1.03	BOYS' SANITARY GROUP	9.84 sqm
E1.04	GIRLS' SANITARY GROUP	6.64 sqm
E1.05	OFFICE	11.76 sqm
E1.06	TECHNICAL DEPARTMENT	24.87 sqm
E1.07	LABORATORY	51.36 sqm
E1.08	LABORATORY	68.36 sqm
E1.09	CABINET	16.12 sqm
E1.10	STORAGE	4.75 sqm
E1.11	LABORATORY	101.60 sqm
E1.12	CABINET	27.21 sqm
	Total 1ST FLOOR useful area	391.33 sqm

Functions proposed for 2nd FLOOR:

No. crt.	Room name	Useful area
E2.01	HALLWAY AND STAIRCASE	90.34 sqm
E2.02	HALLWAY	4.44 sqm
E2.03	BOYS' SANITARY GROUP	9.84 sqm
E2.04	GIRLS' SANITARY GROUP	6.72 sqm
E2.05	STORAGE	11.60 sqm
E2.06	CLASS ROOM	51.97 sqm
E2.07	LABORATORY	68.63 sqm

E2.08	CABINET	21.17 sqm
E2.09	WORKSHOP	101.60 sqm
E2.10	CABINET	27.21 sqm
	Total 2nd FLOOR useful area	393.52 sqm
	TOTAL BUILDING C3 – WORKSHOPS useful area = 1,429.80 sqm	

Functional description proposed BUILDING C4 – GYM HALL

Functions proposed for the GROUNDFLOOR:

No. crt.	Room name	Useful area
P.01	ACCESS HALL	6.10 sqm
P.02	HALL	7.51 sqm
P.03	SANITARY GROUP	2.66 sqm
P.04	GIRLS' LOCKER ROOM	20.90 sqm
P.05	SHOWERS	4.95 sqm
P.06	TEACHERS' LOCKER ROOM	12.43 sqm
P.07	GYM	429.40 sqm
P.08	HALL	7.73 sqm
P.09	SANITARY GROUP	2.66 sqm
P.10	BOYS' LOCKER ROOM	20.91 sqm
P.11	SHOWERS	4.95 sqm
P.12	SPORTS MATERIALS WAREHOUSE	12.43 sqm
	Total GROUNDFLOOR useful area	532.63 sqm
	TOTAL C4 – GYM HALL USEFUL AREA= 532.63 sqm	

Functional description proposed BUILDING C5 – HIGHSCHOOL

Functions proposed for TECHNICAL BASEMENT:

No. crt.	Room name	Useful area
St.01	STAIRCASE	8.91 sqm
St.02	TECHNICAL BASEMENT	23.89 sqm
St.03	TECHNICAL BASEMENT	16.51 sqm
St.04	TECHNICAL BASEMENT	18.35 sqm
St.05	TECHNICAL BASEMENT	302.84 sqm
St.06	TECHNICAL BASEMENT	16.94 sqm
St.07	TECHNICAL BASEMENT	22.79 sqm
St.08	TECHNICAL BASEMENT	22.06 sqm
	Total TECHNICAL BASEMENT useful area	432.29 sqm

Functions proposed for the GROUNDFOOR:

No. crt.	Room name	Useful area
P.01	TEACHER ACCESS	39.20 sqm
P.02	HALLWAY ACCESS	36.42 sqm
P.03	HALLWAY	19.61 sqm

P.04	DEPUTY PRINCIPAL	22.78 sqm
P.05	PRINCIPAL	22.69 sqm
P.06	ARCHIVE	18.77 sqm
P.07	SANITARY GROUP	10.44 sqm
P.08	SECRETARIAT	23.18 sqm
P.09	STAIRCASE	26.69 sqm
P.10	HALL	72.82 sqm
P.11	STAIRCASE	15.72 sqm
P.12	STAIRCASE	9.73 sqm
P.13	PSYCHOLOGY OFFICE	20.10 sqm
P.14	CLASSROOM	54.92 sqm
P.15	CLASSROOM	54.92 sqm
P.16	SANITARY GROUP	17.47 sqm
P.17	HALL	149.40 sqm
P.18	CLASS ROOM	55.25 sqm
P.19	CLASSROOM	55.12 sqm
P.20	CLASSROOM	55.12 sqm
P.21	CLASSROOM	55.12 sqm
P.22	SANITARY GROUP + DISABILITIES	19.12 sqm
P.23	HALLWAY	18.50 sqm
P.24	CHEMISTRY LAB	73.98 sqm
P.25	CHEMISTRY LAB CABINET	16.98 sqm
P.26	ACCESS HALLWAY	7.18 sqm
P.27	STAIRCASE	18.07 sqm
P.28	CLASSROOM	78.03 sqm
P.29	ACCESS HALLWAY	48.90 sqm
P.30	STUDENT ACCESS HALLWAY	27.30 sqm
P.31	STORAGE ROOM	5.13 sqm
P.32	LIBRARY AND READING ROOM	4.59 sqm
P.33	TECHNICAL SPACE	57.27 sqm
P.34	TECHNICAL SPACE	43.22 sqm
P.35	TECHNICAL SPACE	16.70 sqm
P.36	CLASSROOM	13.70 sqm
	Total GROUNDFLOOR useful area	1,217.64 sqm

Functions proposed for 1st floor

No. crt.	Room name	Useful area
E1.01	STAIRCASE	26.79 sqm
E1.02	HALLWAY	72.25 sqm
E1.03	CHIEF ACCOUNTANT	15.64 sqm
E1.04	CHIEF SECRETARY	10.12sqm
E1.05	ACCOUNTING + ADMINISTRATIVE	19.98sqm

E1.06	CLASSROOM	54.92 sqm
E1.07	CLASSROOM	54.92 sqm
E1.08	SANITARY GROUP	17.47 sqm
E1.09	TEACHERS' LOCKER ROOM	23.18 sqm
E1.10	SANITARY GROUP	10.44 sqm
E1.11	CHANCERY	86.61 sqm
E1.12	PROJECTS OFFICE	36.74 sqm
E1.13	HALLWAY	149.40 sqm
E1.14	CLASSROOM	55.25 sqm
E1.15	CLASSROOM	55.12 sqm
E1.16	CLASSROOM	55.12 sqm
E1.17	CLASSROOM	55.12 sqm
E1.18	SANITARY GROUP	19.12 sqm
E1.19	HALLWAY	40.83 sqm
E1.20	FOREIGN LANGUAGE CLASSROOM	73.98 sqm
E1.21	FOREIGN LANGUAGE OFFICE	17.03 sqm
E1.22	STAIRCASE	27.00 sqm
E1.23	CLASSROOM	78.03 sqm
E1.24	TEACHERS' OFFICE	26.59 sqm
	Total 1st FLOOR useful area	1,081.65 sqm

Functions proposed for 2nd FLOOR :

No. crt.	Room name	Useful area
E2.01	STAIRCASE	26.79 sqm
E2.02	HALL	72.25 sqm
E2.03	COMPUTER LAB	26.18 sqm
E2.04	IT SCIENTIST'S OFFICE	19.98 sqm
E2.05	IT LAB	54.92 sqm
E2.06	IT LAB	54.92 sqm
E2.07	SANITARY GROUP	17.65 sqm
E2.08	CLASS ROOM	45.37 sqm
E2.09	SAS	3.55 sqm
E2.10	ELECTRICS LAB	93.32 sqm
E2.11	ELECTRICS LABORATORY	14.38 sqm
E2.12	HALL	149.40 sqm
E2.13	CLASS ROOM	55.25 sqm
E2.14	CLASS ROOM	55.12 sqm
E2.15	CLASS ROOM	55.12 sqm
E2.16	CLASSROOM	55.12 sqm
E2.17	SANITARY GROUP	19.12 sqm
E2.18	HALL	41.45 sqm
E2.19	PHYSICS LAB	73.98 sqm

E2.20	PHYSICS LAB CABINET	17.03 sqm
E2.21	STAIRCASE	27.00 sqm
E2.22	CLASSROOM	78.03 sqm
E2.23	MEDICAL OFFICE	13.47 sqm
E2.24	ISOLATOR	12.55 sqm
	Total 2nd FLOOR useful area	1,081.95 sqm

TOTAL **BUILDING C3-HIGHSCHOOL USEFUL AREA** = 3,813.53 sqm

Functional description proposed: BUILDING C6- DORMITORY
Functions proposed at the GROUNDFLOOR

No crt.	Room name	Useful area
P.01	TERRACE ACCESS	16.45 sqm
P.02	SAS	4.82 sqm
P.03	JANITOR	5.92 sqm
P.04	STAIRCASE	36.94 sqm
P.05	READING ROOM	20.52 sqm
P.06	ROOM 01	16.49 sqm
P.07	SANITARY GROUP	3.19 sqm
P.08	ROOM 02	16.49 sqm
P.09	SANITARY GROUP	3.19 sqm
P.10	HALLWAY	94.34 sqm
P.11	ROOM 03	16.46 sqm
P.12	SANITARY GROUP	3.19 sqm
P.13	ROOM 04	16.61 sqm
P.14	SANITARY GROUP	3.19 sqm
P.15	ROOM 05	16.61 sqm
P.16	SANITARY GROUP	3.19 sqm
P.17	ROOM 06	16.61 sqm
P.18	SANITARY GROUP	3.19 sqm
P.19	ROOM 07	16.73 sqm
P.20	SANITARY GROUP	3.19 sqm
P.21	ROOM 08	18.87 sqm
P.22	SANITARY GROUP	3.19 sqm
P.23	LAUNDRY ROOM	14.56 sqm
P.24	HALL	5.22 sqm
P.25	WASHING ROOM	19.72 sqm
P.26	ROOM 09	16.61 sqm
P.27	SANITARY GROUP	3.19 sqm
P.28	ROOM 10	16.61 sqm
P.29	SANITARY GROUP	3.19 sqm
P.30	ROOM 11	16.61 sqm
P.31	SANITARY GROUP	3.19 sqm
P.32	ROOM 12	16.61 sqm

P.33	SANITARY GROUP	3.19 sqm
P.34	ROOM 13	16.61 sqm
P.35	SANITARY GROUP	3.19 sqm
P.36	ROOM 14	16.61 sqm
P.37	SANITARY GROUP	3.19 sqm
P.38	STAIRHOUSE	15.77 sqm
P.39	TECHNICAL SPACE CT	34.70 sqm
P.40	CLEANING MATERIALS CELLAR	5.82 sqm
P.41	OFFICE	20.64 sqm
P.42	ROOM 15	16.73 sqm
P.43	SANITARY GROUP	3.19 sqm
P.44	ROOM 16	16.61 sqm
P.45	SANITARY GROUP	3.19 sqm
P.46	ROOM 17	16.61 sqm
P.47	SANITARY GROUP	3.19 sqm
P.48	ROOM 18	16,61 sqm
P.49	SANITARY GROUP	3.19 sqm
P.50	ROOM 19	16.61 sqm
P.51	SANITARY GROUP	3,19 sqm
P.52	ROOM 20	16.61 sqm
P.53	SANITARY GROUP	3.19 sqm
P.54	LINEN STORAGE	10.09 sqm
P.55	LINEN STORAGE	10.17 sqm
P.56	TERRACE ACCESS	2.95 sqm
P.57	CT ACCESS	4.30 sqm
	Total GROUNDFLOOR useful area	697.34 sqm

Functions proposed for 1ST FLOOR:

No. crt.	Room name	Useful area
E1.01	STAIRCASE	37.25 sqm
E1.02	READING ROOM	20.52 sqm
E1.03	ROOM 01	16.49 sqm
E1.04	SANITARY GROUP	3.19 sqm
E1.05	ROOM 02	16.33 sqm
E1.06	SANITARY GROUP	3.19 sqm
E1.07	HALL	94.70 sqm
E1.08	ROOM 03	16.46 sqm
E1.09	SANITARY GROUP	3.19 sqm
E1.10	ROOM 04	16.61 sqm
E1.11	SANITARY GROUP	3.19 sqm
E1.12	ROOM 05	16.61 sqm
E1.13	SANITARY GROUP	3.19 sqm

E1.14	ROOM 06	16.61 sqm
E1.15	SANITARY GROUP	3.19 sqm
E1.16	ROOM 07	16.73 sqm
E1.17	SANITARY GROUP	3.19 sqm
E1.18	ROOM 08	18.87 sqm
E1.19	SANITARY GROUP	3.19 sqm
E1.20	LAUNDRY ROOM	14.56 sqm
E1.21	HALL	5.22 sqm
E1.22	WASHING ROOM	19.72 sqm
E1.23	ROOM 09	16.61 sqm
E1.24	SANITARY GROUP	3.19 sqm
E1.25	ROOM 10	16.61 sqm
E1.26	SANITARY GROUP	3.19 sqm
E1.27	ROOM 11	16.61 sqm
E1.28	SANITARY GROUP	3.19 sqm
E1.29	ROOM 12	16.61 sqm
E1.30	SANITARY GROUP	3.19 sqm
E1.31	ROOM 13	16.61 sqm
E1.32	SANITARY GROUP	3.19 sqm
E1.33	ROOM 14	16.61 sqm
E1.34	SANITARY GROUP	3.19 sqm
E1.35	STAIRCASE	15.91 sqm
E1.36	LOGGIA	7.07 sqm
E1.37	OFFICE	36.54 sqm
E1.38	CLEANING MATERIALS CELLAR	4.48 sqm
E1.39	SUPERVISOR	16.61 sqm
E1.40	SANITARY GROUP	3.19 sqm
E1.41	ROOM 15	16.73 sqm
E1.42	SANITARY GROUP	3.19 sqm
E1.43	ROOM 16	16.61 sqm
E1.44	SANITARY GROUP	3.19 sqm
E1.45	ROOM 17	16.61 sqm
E1.46	SANITARY GROUP	3.19 sqm
E1.47	ROOM 18	16.61 sqm
E1.48	SANITARY GROUP	3.19 sqm
E1.49	ROOM 19	16.61 sqm
E1.50	SANITARY GROUP	3.19 sqm
E1.51	ROOM 20	16.61 sqm
E1.52	SANITARY GROUP	3.19 sqm
E1.53	LINEN STORAGE	10.17 sqm
E1.54	LINEN STORAGE	10.26 sqm
E1.55	LOGGIA	14.92 sqm
	Total 1st FLOOR useful area	709.07 sqm

Functions proposed for 2nd floor:

No. crt.	Room name	Useful area
E2.01	STAIRCASE	37.25 sqm
E2.02	READING ROOM	20.52 sqm
E2.03	ROOM 01	16.49 sqm
E2.04	SANITARY GROUP	3.19 sqm
E2.05	ROOM 02	16.33 sqm
E2.06	SANITARY GROUP	3.19 sqm
E2.07	HALLWAY	94.70 sqm
E2.08	ROOM 03	16.46 sqm
E2.09	SANITARY GROUP	3.19 sqm
E2.10	ROOM 04	16.61 sqm
E2.11	SANITARY GROUP	3.19 sqm
E2.12	ROOM 05	16.61 sqm
E2.13	SANITARY GROUP	3.19 sqm
E2.14	ROOM 06	16.61 sqm
E2.15	SANITARY GROUP	3.19 sqm
E2.16	ROOM 07	16.73 sqm
E2.17" "	SANITARY GROUP	3.19 sqm
E2.18	ROOM 08	18.87 sqm
E2.19	SANITARY GROUP	3.19 sqm
E2.20	LAUNDRY ROOM	14.56 sqm
E2.21	HALLWAY	5.22 sqm
E2.22	WASHING ROOM	19.72 sqm
E2.23	ROOM 09	16.61 sqm
E2.24	SANITARY GROUP	3.19 sqm
E2.25	ROOM 10	16.61 sqm
E2.26	SANITARY GROUP	3.19 sqm
E2.27	ROOM 11	16.61 sqm
E2.28	SANITARY GROUP	3.19 sqm
E2.29	ROOM 12	16.61 sqm
E2.30	SANITARY GROUP	3.19 sqm
E2.31	ROOM 13	16.61 sqm
E2.32	SANITARY GROUP	3.19 sqm
E2.33	ROOM 14	16.61 sqm
E2.34	SANITARY GROUP	3.19 sqm
E2.35	STAIRCASE	15.91 sqm
E2.36	LOGGIA	7.07 sqm
E2.37	OFFICE	36.54 sqm
E2.38	CLEANING MATERIALS CELLAR	4.48 sqm
E2.39	ROOM 15	16.61 sqm
E2.40	SANITARY GROUP	3.19 sqm

E2.41	ROOM 16	16.73 sqm
E2.42	SANITARY GROUP	3.19 sqm
E2.43	ROOM 17	16.61 sqm
E2.44	SANITARY GROUP	3.19 sqm
E2.45	ROOM 18	16.61 sqm
E2.46	SANITARY GROUP	3.19 sqm
E2.47	ROOM 19	16.61 sqm
E2.48	SANITARY GROUP	3.19 sqm
E2.49	ROOM 20	16.61 sqm
E2.50	SANITARY GROUP	3.19 sqm
E2.51	ROOM 21	16.61 sqm
E2.52	SANITARY GROUP	3.19 sqm
E2.53	LINEN DEPARTMENT	10.17 sqm
E2.54	LINEN DEPARTMENT	10.26 sqm
E2.55	LOGGIA	14.92 sqm
	Total 2nd FLOOR useful area	709.07 sqm

Functions proposed for 3rd FLOOR:

No. crt.	Room name	Useful area
E3.01	STAIRCASE	37.25 sqm
E3.02	READING ROOM	64.47 sqm
E3.03	HALL	94.70 sqm
E3.04	ROOM 01	16.46 sqm
E3.05	SANITARY GROUP	3.19 sqm
E3.06	ROOM 02	16.61 sqm
E3.07	SANITARY GROUP	3.19 sqm
E3.08	ROOM 03	16.61 sqm
E3.09	SANITARY GROUP	3.19 sqm
E3.10	ROOM 04	16.61 sqm
E3.11	SANITARY GROUP	3.19 sqm
E3.12	ROOM 05	16.73 sqm
E3.13	SANITARY GROUP	3.19 sqm
E3.14	ROOM 06	18.87 sqm
E3.15	SANITARY GROUP	3.19 sqm
E3.16	LAUNDRY ROOM	14.56 sqm
E3.17	HALL	5.22 sqm
E3.18	WASHING ROOM	19.72 sqm
E3.19	ROOM 07	16.61 sqm
E3.20	SANITARY GROUP	3.19 sqm
E3.21	ROOM 08	16.61 sqm
E3.22	SANITARY GROUP	3.19 sqm
E3.23	ROOM 09	16.61 sqm

E3.24	SANITARY GROUP	3.19 sqm
E3.25	ROOM 10	16.61 sqm
E3.26	SANITARY GROUP	3.19 sqm
E3.27	ROOM 11	16.61 sqm
E3.28	SANITARY GROUP	3.19 sqm
E3.29	ROOM 12	16.61 sqm
E3.30	SANITARY GROUP	3.19 sqm
E3.31	STAIRCASE	15.91 sqm
E3.32	LOGGIA	7.07 sqm
E3.33	OFFICE	36.54 sqm
E3.34	CLEANING MATERIALS CELLAR	4.48 sqm
E3.35	ROOM 13	16.61 sqm
E3.36	SANITARY GROUP	3.19 sqm
E3.37	ROOM 14	16.73 sqm
E3.38	SANITARY GROUP	3.19 sqm
E3.39	ROOM 15	16.61 sqm
E3.40	SANITARY GROUP	3.19 sqm
E3.41	ROOM 16	16.61 sqm
E3.42	SANITARY GROUP	3.19 sqm
E3.43	ROOM 17	16.61 sqm
E3.44	SANITARY GROUP	3.19 sqm
E3.45	ROOM 18	16.61 sqm
E3.46	SANITARY GROUP	3.19 sqm
E3.47	ROOM 19	16.61 sqm
E3.48	SANITARY GROUP	3.19 sqm
E3.49	LINEN DEPARTMENT	10.17 sqm
E3.50	LINEN DEPARTMENT	10.26 sqm
E3.51	LOGGIA	14.92 sqm
	Total 3rd FLOOR useful area	713.81 sqm
	TOTAL C6 BUILDING – DORMITORY useful area = 2,829.29 sqm	

- Access, circulation and circuits:
- - 3 access points are provided for access to the premises as follows: the main car and pedestrian access (intended for teachers) is from Electricienilor Street, access arranged on the SW entrance of the premises, a secondary car and pedestrian access intended for students, arranged on the NW side, from Vasile Aaron Street and another secondary access from Semaforului Street, pedestrian, arranged on the SE side;
- - all access areas in the buildings will be equipped with ramps necessary for easy vertical access for disabled people
- - horizontal circulation in the studied buildings is carried out through the median hallways arranged on each level;
- - vertical circulation in the studied buildings is carried out through the related stairwells presented in the drawings;

Technical indicators resulted:
Function: pre-university education
Land area in documents = 18,880.00 sqm

- Building C3 - Workshops (Technical B+Gf+2F):
- Existing/proposed built area of studied building C3 (Workshops) = 747.00 sq m
- Existing/proposed developed area of studied building C3 (Workshops) = 1,657.00 sq m
- Maximum height: +18.30m from the elevation +0.00m
- Building C4 – Gym Hall (Gf):
- Existing/proposed built area of studied building C4 (Gym Hall) = 624.00 sq m
- Existing/proposed developed area of studied building C4 (Gym Hall) = 624.00 sq m
- Maximum height: +9.05m from the elevation +0.00m
- Building C5 - High School (Technical B+Gf+2F):
- Existing/proposed built area of studied building C5 (High School) -1,482.00 sq m
- Existing/proposed developed area of studied building C5 (High School) = 4,002.00 sqm
- Maximum H: +15.60m from elevation +0.00m
- Building C6 - Dormitory (Technical B+Gf+3F):
- Existing/proposed built area of studied building C6 (Dormitory) = 833.00 sqm
- Existing/proposed developed area of studied building C6 (Dormitory) = 3,398.00 sqm
- Maximum H: +17.80m from elevation +0.00m
- Total existing/proposed built area (building C1+C2+C3+C4+C5+C6) = 4,099.00 sqm
- Total existing/proposed developed area (building C1+C2+C3+C4+C5+C6) = 10,094.00 sqm
- Total existing/proposed built area studied (building C3+C4+C5+C6) = 3,686.00 sqm
- Total area existing/proposed development studied (building C3+C4+C5+C6) = 9,681.00 sq m
- existing/proposed POT = 21.71% unchanged
- existing/proposed CUT = 0.53 • unchanged

- Significance category: C

- Territorial balance:
- Land area in documents: 18,880.00 sq m
- Constructions: 4,099.00 sq m (21.71 %)
- Planned green spaces: 7,683.00 sq m (40.69 %)
- Pedestrian alleys/paved platforms/developed sports fields: 7,098.00 sq m (37.60%)

- Based on HGR no. 766/97, the construction falls within the essential requirements stipulated by article 5 of Law no. 177/2015 in the significance category "C" class III – normal, with common functions where failure to ensure quality levels does not imply major risks for society and the natural environment.
  The following types of works will be carried out regarding the in-depth energy refurbishment of the C3 building - WORKSHOPS, as follows:
- - Refacing works;
- - Local dismantling works on the masonry to create gaps;
- - Local dismantling works on the decorative concrete elements applied to the facades;
- - Dismantling works of all exterior and interior joinery according to the specifications in the drawn part;
- - Installation of new exterior joinery made of thermally insulating aluminum with triple-laminated glass RAL 7016 anthracite gray, according to the specifications in the drawn part and in compliance with the heat transfer indicators from the energy audit;

- Installation of interior metal joinery and fire-proofing, according to the specifications in the drawn part;
- Thermal refurbishment works of the envelope elements, respectively the dull part, by installing the 15cm basalt wool thermal system;
- Thermal refurbishment works of the envelope elements, respectively the dull part, by installing the fireproof extruded polystyrene thermal system on a 10cm base;
- Decorative plaster works on the facades;
- Installation of the 25cm wool board thermal insulation system (including the vapor barrier) over the last floor mounted in a fireproof wooden grid/flooring/OSB;
- Removal of the existing covering and battens;
- Installation of the covering system comprising anthracite grey profiled tiles, battens, underlayment and foils;
- Dismantling and installation of gutters and downpipes;
- Installation of suspended ceilings, flat/coffered, moisture-resistant as appropriate, in all spaces for masking installations;
- Application of interior painting to entire ceilings;
- Repair work to interior plasters in areas affected by the main works, approx. 20% of the surface;
- Complete interior painting work to walls and pillars;
- Pouring self-leveling screed as a support layer for PVC carpet;
- Creating a ramp for disabled people;
- Installation of interior/exterior tiles according to specialized plans;
- Removal of 10cm of degraded polystyrene existing on the facades;
- Thermal insulation of the technical basement with extruded polystyrene on the soffit;
- Reversible interior partitioning work, made of lightweight fire-resistant or moisture-resistant gypsum cardboard walls, as appropriate;
- The interior spaces will be reconfigured according to the design topic and the FPE measures that involve the dismantling of the partition walls indicated in the project, breaking/filling gaps with brick masonry of variable thicknesses, creating new partition walls made of plasterboard;
- Aluminum interior joinery with reinforced glass equipped with a self-closing device will be installed, solid doors equipped with a self-closing device, in areas at risk of fire, according to the fire safety scenario.
- Mobile window protection systems with 90-minute fire-resistant curtains will be installed according to the drawings;
- Repair or arrangement of the perimeter protection sidewalks of the construction in order to remove infiltrations to the building infrastructure;
- Thermal refurbishment works of the heating system/hot water supply system;
- Refurbishment works of the sanitary installations;
- Installation of alternative systems for the production of electricity and/or heat for own consumption;
use of renewable energy sources;
- Refurbishment/modernization works of lighting installations in buildings;

The following types of works will be carried out regarding the in-depth energy renovation of the C4 body - Gym hall, as follows:
- Works to replace or duplicate the wooden elements of the framework;
- Refacing works;
- Repair works to plaster and interior painting on walls and ceilings;
- Works to replace the finishes on floors;
- Thermal refurbishment works of the building envelope elements;
- Thermal refurbishment works of the heating system/hot water supply system;
- Refurbishment works of the sanitary installations;
- Installation of alternative systems for the production of electricity and/or heat for own consumption;
use of renewable energy sources;

- Refurbishment/modernization works of lighting installations in buildings;

Thus:

Framework and covering:

- - The existing sheet metal covering will be completely dismantled;
- - The wooden frame will be inspected and the degraded elements will be replaced or doubled;
- The following layers will be arranged at the level of the new covering: RAL 7016 folded sheet metal – anthracite gray, wide, PVC foil, underlayment mounted on existing rafters (doubled as appropriate)
- - Over the floor, a thermal insulation of 25cm wool panels will be made, a vapor barrier foil mounted in a grid of softwood planks. The thermal insulation will be protected with OSB gr. 2.2cm. All wooden elements of the frame will be fireproofed with special solutions according to the fire safety scenario.
- - RAL 7016 machined metal gutters and downpipes will be installed on all sides;
- - A galvanized steel staircase will be built for access and maintenance of the roof.

Exterior works:

- Dismantling the parasitic space of the heating plant;
- - Complete dismantling of the exterior joinery (doors and windows).
- - Removal of various pipes, cables, etc. from the facades.
- New joinery will be installed, made of anthracite gray aluminum with a thermal break barrier and three-layer thermal insulation glass that will at least satisfy the requirements of the energy auditor.
- Refacing works will be carried out by enclosing the building with a 15 cm basalt mineral wool system and decorative exterior plasters;
- - The base will be insulated with 10 cm fireproof extruded polystyrene and finished with gray water-resistant decorative plasters;
- - Repair or arrangement of the perimeter protection sidewalks of the building in order to remove infiltrations to the building infrastructure.
- Interior works
- - The interior spaces will be reconfigured according to the design topic and the FPE measures that involve the dismantling of the partition walls indicated in the project, breaking/filling gaps with brick masonry of variable thicknesses, creating new partition walls made of gypsum cardboard;
- - Partial removal of the existing finishes on the walls including plaster (approx. 200/) will be carried out in the areas affected by the main works and will be restored with new plaster, plastering and painting with washable paints in three layers;
- - In the gym, the existing finish will be replaced with a PVC sports carpet system; The ceilings will be fully painted;
- - Aluminum interior joinery with reinforced glass equipped with a self-closing device, solid doors equipped with a self-closing device will be installed in areas at risk of fire, according to the fire safety scenario.

The following types of works will be carried out regarding the in-depth energy renovation of the C5 building - HIGHSCHOOL, as follows:

- - Refacing works;
- - Local dismantling works on the masonry to create gaps;
- - Local dismantling works on the decorative concrete elements applied to the facades;
- - Dismantling works on all exterior and interior joinery according to the specifications in the drawn parts;
- - Installation of new exterior joinery made of thermally insulating aluminum with triple-glazed RAL 7016 anthracite gray glass, according to the specifications in the drawn parts and in compliance with the heat transfer indicators from the energy audit;
- Installation of interior metal joinery and for fire compliance, according to the specifications in the drawn parts;

- Thermal refurbishment works of the envelope elements, respectively the opaque part, by installing the 15cm basalt wool thermal system;
- Thermal refurbishment works of the envelope elements, respectively the opaque part, by installing the fireproof extruded polystyrene thermal system on a 10cm base;
- Decorative plaster works on the facades;
- Installation of the 25cm wool board thermal insulation system (including the vapor barrier) over the last floor mounted in a fireproof wooden grid/flooring/OSB;
- Removal of the existing covering and laths;
- Installation of the covering system comprising anthracite grey profiled tiles, laths, underlayment and foils;
- Dismantling and installation of gutters and downpipes;
- Installation of suspended smooth/cassette ceilings, resistant to humidity as appropriate, in all spaces for masking installations;
- Application of interior paint to the entire ceiling;
- Repair works to the interior plaster in the areas affected by the main works, approximately 20% of the surface;
- Complete interior paint works to the walls and pillars;
- Pouring self-leveling screed as a support layer for the PVC carpet;
- Creating a ramp for disabled people;
- Installation of interior/exterior tiles according to specialized plans;
- Removal of the 10cm degraded polystyrene existing on the facades;
- Thermal insulation of the technical basement with extruded polystyrene on the soffit;
- Reversible interior partitioning work, made of lightweight fire-resistant or moisture-resistant gypsum cardboard walls, as appropriate;
- The interior spaces will be reconfigured according to the design topic and the FPE measures that involve the dismantling of the partition walls indicated in the project, breaking/filling gaps with brick masonry of variable thicknesses, creating new partition walls made of plasterboard;
- Aluminum interior joinery with reinforced glass equipped with a self-closing device, solid doors equipped with a self-closing device, will be installed in areas at risk of fire, according to the fire safety scenario.
- Repair or arrangement of the perimeter protection sidewalks of the construction in order to remove infiltrations to the building infrastructure;
- Thermal refurbishment works of the heating system/hot water supply system;
- Refurbishment works of the sanitary installations;
- Installation of alternative systems for the production of electricity and/or heat for own consumption; use of renewable energy sources;
- Refurbishment/modernization works of lighting installations in buildings;

The following types of works regarding the in-depth energy renovation of the C6 building - dormitory will be carried out, as follows:
Framework and covering:
- The existing ceramic tile covering will be completely dismantled;
The wooden frame will be inspected and the degraded elements will be replaced or doubled;
- The following layers will be arranged at the level of the new covering: RAL 7016 folded sheet metal – anthracite gray, wide, PVC foil, underlayment mounted on existing rafters (doubled as appropriate)
- Over the floor, a thermal insulation of 25cm wool panels will be made, a vapor barrier foil mounted in a grid of softwood wooden battens. The thermal insulation will be protected with OSB gr. 2.2cm. All wooden elements of the frame will be fireproofed with special solutions according to the fire safety scenario.
- On all sides, machined metal gutters and downpipes in RAL 7016 will be installed;
Exterior works:

- Complete dismantling of exterior joinery (doors and windows).
Dismantling of air conditioning units on the facades as well as various pipes, cables, etc.
- Dismantling of metal railings with reinforced glass in the balcony area.
- Local breaks at the main and secondary access for positioning the ramp for disabled people and restoring the steps.
- New joinery will be installed, made of anthracite gray aluminum with a thermal break barrier and three-sheet thermal insulation glass that will at least meet the requirements of the energy auditor.
- Refacing works will be carried out by enclosing the building with 15 cm basalt mineral wool systems;
- The base will be insulated with 10 cm extruded polystyrene and finished with gray water-resistant decorative plasters; Repair or arrangement of the perimeter protection sidewalks of the building in order to remove infiltrations to the building infrastructure;
- Decorative plastering works on the facades;
- Creating a ramp for disabled people;

Interior works
- The interior spaces will be reconfigured according to the design topic and the FPE measures that involve the dismantling of the partition walls indicated in the project, breaking/filling gaps with brick masonry of variable thicknesses, creating new partition walls made of gypsum cardboard to create the bathrooms in the rooms;
- The existing finishes on the walls in the intervention areas, including the plaster, will be completely removed and will be restored with new plaster, plastered and painted with washable paints in three layers.
- In the areas intended for horizontal and vertical circulation (corridor and stairwells), the floors will be made with ceramic tile finishes;
Tri-layer laminate flooring for heavy traffic in rooms, reading rooms, and porcelain tiles in bathrooms, offices, laundry rooms, dryers and storage space will be installed on the entire usable area.
- Interior joinery will be metal with adjustable frame.
Suspended ceilings will be installed to hide installations in all spaces.

INSTALLATIONS:

ELECTRIC INSTALLATIONS

TECHNICAL DATA

According to data from the design topic, the total installed/simultaneously absorbed electrical power of the receivers is:

Pi-total = 731.21 kW
Ks = 0.75
Ku = 0.50
Pa-total = 274.20 kW
Un = 400/230 V
cosϴ = 0.92

According to data from the design topic, the installed/simultaneously absorbed electrical power of the receivers in the WORKSHOP building is:

Pi-total = 61.76 kW
Ku = 0.60
Pa-total = 37.06 kW
Un=400/230V
cosϴ = 0.92

According to data from the design topic, the installed/simultaneously absorbed electrical power of the receivers in the DORMITORY building is:

Pi-total = 262.26 kW
Ku = 0.48
Ks = 0.75
Pa-total = 94.41 kW
Un = 400/230 V
cosϴ = 0.92

According to data from the design topic, the installed/simultaneously absorbed electrical power of the receivers in the HIGHSCHOOL building is:

Pi-total = 351.48 kW
Ku = 0.55
Pa-total = 193,31 kW
Un = 400/230 V
cosϴ = 0.92

According to data from the design topic, the installed/simultaneously absorbed electrical power of the receivers in the GYM HALL building is:

Pi-total = 55.71 kW
Ku = 0.70
Pa-total = 39.00 kW
Un = 400/230 V
cosϴ = 0.92

ELECTRICITY SUPPLY SOLUTION

The electricity supply to the studied buildings will be made from the supplier's network (from the PT135 transformer station) and will be carried out according to the technical connection approval issued by S.C. Electrica following the beneficiary's request and according to the solution study prepared by SISE-SD-SC Electrica following the beneficiary's request.

The studied building will be supplied from the existing electrical network in the area through the existing PT135 transformer station. In this study it is proposed to supply electricity to the buildings and newly proposed electrical receivers in the studied buildings.

The electricity supply will be solved based on the technical connection approval issued by the electricity supplier, according to the provisions of GR no. 109/2008 and will be carried out according to the electricity supply project developed by an ANRE certified company.

ELECTRICITY METERING SOLUTION

Electricity metering will be carried out at the level of the existing three-phase metering and protection block (BMPT).

ELECTRICITY DISTRIBUTION SOLUTION

The 4 general electrical panels of the 4 buildings studied will be powered from the low-voltage switchboard of the existing transformer station. The general electrical panel in the TEG Workshops building will be powered with electricity via a N2XH 4x35mmp copper cable. The general electrical panel in the TEG Dormitory building will be powered with electricity via an ACYABY 4x240mmp aluminum cable. The general electrical panel in the TEG Highschool building will be powered with electricity via two ACYABY 4x185mmp aluminum cables. The general electrical panel in the TEG Gym Hall building will be powered with electricity via an ACYABY 4x35mmp aluminum cable.

In addition to the basic supply from the public electricity network, the buildings will be equipped with a system that capitalizes on unconventional energies, more precisely an on-grid system with approx. 171 photovoltaic panels that will be mounted on the roof of the Highschool building, with an installed power of approx. 64.90kW, to supplement the energy consumption.

In order to reduce the consumption of electricity from the supplier's network, it is proposed to install an "on grid" photovoltaic system to produce electricity that can be used for own consumption.
The photovoltaic system proposed in this project will cover part of the power consumption requirements. It is proposed to install 171 photovoltaic panels on the roof of the High School building (according to the requirements of the strength design).
The system for capturing and converting solar radiation into electricity is made with monocrystalline photovoltaic panels with a nominal electrical power of SSOW, a nominal voltage of 24V, placed on the roof.
The installation will consist of the following components:
171 polycrystalline SSOW photovoltaic panels DC fuses
3 three-phase 25kW inverters that convert direct current into alternating current
3 Electrical protection panels – direct current
Electrical protection panel – alternating current
Surge arrester
The photovoltaic panels operate in both direct and diffuse light (with reduced efficiency). The photovoltaic panels will be installed on the roof surfaces that have south exposure (High School Building). The installation will be done on metal supports. The roof support attachments will be made according to the manufacturer's specifications and according to the details in the strength project.
For the connections between the elements of the photovoltaic system, only special solar cables with special, dedicated, IP68 connectors will be used. It is prohibited to use other types of connectors and cables than those indicated by the manufacturers.
The connectors must ensure perfect connections, with minimal contact resistance so as not to affect the efficiency of the installation with additional voltage drops.
The electrical equipment (inverter and TEAC electrical panel) will be installed in the body of the High School building, in the technical space. From TEAC, the connection to the electrical network will be made in the general electrical panel of the facility (TEG).
ELECTRICAL PANEL
The distribution panels will be made starting from standard installation and connection components and will be tested in the laboratory. The system design must be validated through tests according to the SR EN 60439.1 standard. The panel builder will present test reports to certify this compliance.
The electrical panels will be metallic and will be provided with cable compartments. The outgoing circuits from the panels will be from rows of terminals, the cable entry routes into the cabinets will be through the upper part. The electrical panels will be installed buried in the niche in the walls.
NORMAL LIGHTING INSTALLATION
The lighting installation includes:
- general artificial lighting;
- external artificial lighting
- security lighting for intervention/work continuation.
- security lighting for evacuation from the building.
- security lighting against panic
- local security lighting
The lighting installation was dimensioned taking into account the following parameters:
- color rendering index of all lighting sources: minimum 80
- color temperature of the sources: 4000 K
- life span of the sources: minimum 50,000 h.
The lighting levels achieved are in accordance with the EN12464-1/2011 norm and NP061/2002:

Room destination	Lighting level requested, lx
corridors, GS, technical space, hallway	200

Room, Office	300
Warehouse	100
Office, Janitor, Reading Room	500
Classroom	300
Laboratory, Workshop	500

All lighting fixtures will have a minimum power factor of 0.95.

LIGHTING SOLUTION FOR GENERAL ARTIFICIAL LIGHTING

The need for lighting fixtures was determined based on lighting calculations and the lighting levels imposed by the NP-061-02 standard.

The mechanical shock strength of the lighting fixtures was chosen according to the regulations in force, depending on the space where they are located, being indicated on the plans and in the technical specifications.

The lighting technical solution implemented for the buildings studied is with externally mounted lighting fixtures. For the highest possible energy efficiency and a decrease in increased operating costs, the implementation of the lighting technical solution with lighting fixtures equipped with LED lighting sources was implemented. According to European provisions, a lighting solution with the lowest possible energy consumption was implemented. The lighting fixtures in the High School, Workshops and Gym Hall will be equipped with DALI technology and will be incorporated into a BMS system, to reduce electricity consumption. The lighting system controls will be from motion and pressure sensors via wall-mounted controls.

The following types of lighting fixtures will be used depending on the purpose of the room (depending on the installation location):

The general lighting in the corridors, halls, classrooms, laboratories in the Workshops and High School buildings will be made with PANEL LED lighting fixtures, 27.5W, 4150lm, 4000K, IP20, 12O0x300mm, 150lm/W, color rendering index 80, equipped with DALI technology (to reduce light intensity), surface mounted or recessed, or similar.

The general lighting of the rooms, offices, and reading room will be provided with PANEL LED lighting fixtures, 40W, 4000lm, 4000K, IP20, 596x596mm, equipped with DALI technology (to reduce light intensity), surface-mounted or recessed, or similar.

The general lighting in the gym hall will be provided with LED lighting fixtures, 35411lm, 233.3W, IP66, IK08, with DALI interface, suspended at a height of +7.0m from the finished floor level. All lighting fixtures in the sports hall will be mechanically protected by installing a protective metal mesh. For energy saving, a light intensity sensor will be installed that will control the 9 lighting fixtures in the sports hall.

The general lighting in the sanitary groups will be made with LED wall-mounted lighting devices, 25W, 2550lm, 4000K, IP54, and 12.5W, 1375lm, 4000K, IP65, 680x78mm, surface-mounted (mounted above the mirrors), or similar.

The general lighting in the technical space, warehouses, laundries, dryers will be made with PANEL LED lighting devices, 40W, 4400lm, 4000K, IP65 1273x78mm.

The lighting sources are controlled with recessed switches and interrupters. The installation height of the switches and interrupters is 1.05 m from the finished floor level. To operate the lighting fixtures mounted on the building facade, under the entrance canopy and the lighting fixtures mounted on the exterior metal poles, day/night twilight sensors will be installed. To control the lighting fixtures in the High School, Workshop, Gym Hall, common spaces in the Dormitory and reading rooms, KNX presence and brightness sensors will be installed that will control the lighting fixtures with DALI.

The cables used for the lighting circuits will be made of copper with PVC insulation and sheath, type N2XH 3x1.5 mmp, with bundle fire propagation delay and no metal halide emissions, installed buried in the walls in plastic protective tubes type HFPRM and HFX. In the electrical panel for the protection of the lighting circuits, automatic differential switches of the AFDD+, P+N type of 10 A, 6 KA, with protection curve C, according to the single-wire diagram on the side from the drawn part.

The junction boxes will be mounted flush in the wall. No junction boxes will be mounted inside the sanitary units.

The connection of the conductors to the devices and the connections to the boxes will be made with quick clamps or cup-type clamps.

LIGHTING SOLUTION FOR EXTERIOR LIGHTING

The exterior lighting in the entrance areas will be made with square LED lighting fixtures IP54, 2110lm, 19W, surface-mounted.

SECURITY LIGHTING

Ensuring automatic switching to the backup source in no more than 5s for:

- security lighting for intervention/work continuation.
- security lighting for evacuation from the building.
- security lighting for marking hydrants.
- anti-panic security lighting
- local security lighting

The anti-panic security lighting will be in operation for the entire time that people are present in the building.

Emergency lighting for evacuation is intended to ensure the identification and safe use of escape routes. Electrical installations for emergency lighting for evacuation have been provided in: rooms with more than 50 people; rooms with an area of more than 300 m2; toilets with an area of more than 8 m2.

The emergency lighting devices for evacuation are provided with LED lamps, with the possibility of monitoring, with local battery. They must comply with the recommendations in SR EN 60598-2-22:2004 and the types of marking established by GR. no. 971/2006 and SR EN 1838:2003 regarding identification distances, luminance and illumination of emergency signaling panels.

Emergency lighting for evacuation must operate permanently as long as there is staff in the building.

The evacuation lighting devices are placed in such a way as to ensure a proper lighting level (in accordance with the specific regulations regarding the design and execution of artificial lighting systems in buildings) near each exit door and in places where it is necessary to signal a potential danger or the location of a safety equipment, as follows: - at each exit door intended to be used in case of emergency; - at the safety signaling panels/indicators; - at each change of direction; - outside and near each exit from the building.

The safety lighting devices for circulation are devices specially dedicated for this purpose, equipped with LED lamps, with 3 h autonomy batteries.

Along the evacuation routes, the distance between the evacuation lighting devices is maximum 15m.

The commissioning of the safety lighting system for evacuation when the normal lighting is interrupted is done in max. 5 s. and the operating time is at least 3 h.

The devices for emergency lighting for evacuation will be equipped with LEDs and a local battery with a 3 h autonomy.

The emergency lighting for anti-panic security is part of the security lighting designed to avoid panic and to ensure the level of illumination that allows people to reach the place from where the escape route can be identified. The lighting devices are specially used for this purpose, being integrated into the general lighting and specially created for this purpose.

The electrical installations for emergency lighting for anti-panic security are provided in rooms or spaces where panic can occur (for example: rooms with crowds of people).

The anti-panic security lighting is provided with an automatic start-up command after the normal lighting fails, but also from buttons positioned at each exit from the respective space.

The start-up of the anti-panic security lighting system, upon interruption of the normal lighting, is done in max. 5 s, and the operating time will be at least 3 h.

The anti-panic security lighting devices will be of the PANEL LED type, apparently mounted on the ceiling, equipped with an emergency kit with a local battery with an autonomy of 1 h, part of the general lighting.

The security lighting for intervention/work continuation is part of the security lighting provided for the continuation of normal activity without essential changes, according to 17-2011 chapter 7.23.5. It was provided in workplaces equipped with receivers that must be powered without interruption and in workplaces related to the need for the operation of these receivers (technical space, general electrical panel TEG, CSI). The operation of the emergency lighting for these spaces must ensure the work continuation for the entire time necessary to take measures to continue the activity for a period of time, without danger. According to the significance class and the level of fire resistance of the building, the operation time until the end of the risky activity was established as 3 h.

The emergency lighting system for evacuation is put into operation when the normal lighting is interrupted in max. 5 s.

The emergency lighting devices for the work continuation will be integrated into the general lighting, by equipping the lighting fixtures with an emergency kit with a local battery with a 3-h autonomy.

POWER INSTALLATION AND SOCKETS

Socket circuits

All sockets used will have a protective contact and will be installed flushed in the walls. The height of the sockets is mentioned in the drawn part of the project. The descents to the equipment will be made with cables mounted in protective tubes, and the descents from the boxes will be mounted in protective tubes of the HFPRM and HFXF type laid buried in the walls.

The cables used for the socket circuits will be made of copper with PVC insulation and sheath, type N2XH 3x2.5mmp laid buried in the plaster in protective tubes of the HFPRM and HFXF type.

In the electrical panels for the protection of the socket circuits, automatic differential switches of the AFDD+, P+N type of 16 A, 6 KA, with protection curve C, will be provided, according to the single-wire diagrams in the drawn part.

The junction boxes will be mounted flushed in the wall.

The connection of the conductors to the devices and the connections in the boxes will be made with quick clamps.

An electrical panel (TE-CT) will be installed in the technical space from which the equipment in the thermal power plant will be powered.

The sockets installed in the technical spaces will be installed buried and will have a minimum protection level of IP 54.

Power columns and circuits

The power columns supply electricity to the following panels:

- general electrical panel of the Workshops building TEG-Workshops
- general electrical panel of the High School building TEG-High School
- general electrical panel of the Gym Hall building TEG-Gym Hall
- general electrical panel of the Dormitory building TEG-Dormitory
- electrical panel of the heating plant in the High School building TE-CT

The internal distribution network in the buildings will start from the general electrical panels on the buildings.

For the distribution on the floors, a metal gutter will be installed on each floor of the buildings, in the common spaces (halls, corridors) from which the electricity supplies of each room will branch off.

OVERVOLTAGE PROTECTION DEVICES

Type 1+2 surge protection devices will be provided in the general switchboards and type 2 in the secondary switchboards.

MAIN TECHNICAL MEASURES FOR FAILURE PROTECTION

To protect users against electric shocks through accidental indirect contact, the main measure is the connection to the protective conductor (PE).

The protective conductor (PE) is different from the neutral conductor (N) and is used separately from it in the entire installation, the earthing system being TN-S.

ADDITIONAL TECHNICAL MEASURES FOR FAILURE PROTECTION

In the electrical panels, the lighting and socket circuits will be provided with automatic circuit breakers, equipped with 30 mA differential protection devices and AFDD type arc flash protection.

In the boiler room, an equipotentialization network will be created with the main equipotentialization conductors 0LZn25x4, connected to the earthing socket through separation parts, and secondary equipotentialization conductors Cu16mmp, to which the metal parts of all installations, equipment and constructions that are normally not under voltage will be connected.

Additional protective equipotentialization connections will be created.

EARTHING SOCKET

The artificial earthing socket will be newly designed and will be created around the perimeter of the buildings, interconnected. The earthing socket will have to have a value of less than 1 ohm. The earthing socket must be checked, and following the verification report, if a strength value more than 1 ohm is found, additional vertical electrodes will be installed until a strength value of less than 1 ohm is reached. To improve artificial earthing, the soil in the immediate vicinity of the electrodes can be replaced with bentonite.

The earthing will be made of a 40x4 mm OIZn flat strip mounted on the perimeter of the buildings.

The 40x4 mm OIZn flat strip will be welded to the vertical 0LZn cross-type electrodes, h=1.5m.

The areas where the flat strip is welded will be protected against corrosion by applying bitumen sealant.

The earthing will be extended until the value of the dispersion resistance is less than 1 ohm.

The down conductors of the lightning protection installation will be protected at a height of 2.5m from the ground level in a protective tube made of cross-linked polyethylene with a wall thickness of at least 3mm.

Within a radius of at least 3m around the down conductors, the ground must be covered with a layer of gravel with a minimum thickness of 15cm or with a layer of asphalt with a minimum thickness of 15cm.

The earthing system in this project will be interconnected with all existing earthing systems in the area located at a distance of less than 20m from it.

The metal parts of all constructions, equipment and installations that are normally not under voltage will be interconnected and connected to the earthing system.

The earthing system and the lightning rod installation will be executed in compliance with the provisions of the normative 17-2011.

THE PROTECTION INSTALLATION AGAINST ATMOSPHERIC DISCHARGE

The protection level of the lightning rod installation is II (Reinforced).

The external lightning protection installation IEPT will consist of a capture device, down conductors and a common earthing socket with the one for the internal electrical installation. The lightning protection installation will consist of a PDA mounted on each building, placed on the ridge at the top of a mast with h-3.00m, connected to the 0IZn 010 down conductors, laid externally. The protection radius of the lightning protection will be Rp=86m.

The PDA will be mounted on the roof of the C1 body (in the center of gravity of the buildings) and will protect both the buildings in the premises and the surface of the parking lot and the playground.

The down conductors will be mounted externally on the facade of the building on the four corners and will be made of galvanized steel with a diameter of 010 mm or Al 010 mm.

The indoor lightning protection installation IIPT consists of equipotentialization bars, mounted in technical spaces and equipotential connections, made between all installation elements made of conductive materials.

The potential equalization bars are made of copper, equipped with terminals for connecting the equipotentialization conductors. These bars are connected to the cold water pipes, hot water pipes, heating pipes (flow, return), gas pipes, low-current installations (through surge protection devices), electrical installations (through surge protection devices mounted in the general electrical panel), as well as all metal parts of the construction through copper conductors with a section of 6/10/16/25 mmp.
The equipotentialization conductors are connected to the pipes through metal bracelets, by direct contact, with the exception of the gas pipe which is connected through a spark gap.
The potential equalization bars will be connected to the grounding socket of the electrical installation through a 25x4 mm galvanized steel strip.

WEAK CURRENT INSTALLATION
Weak current electrical installations treat the following installations
- Fire detection and signaling installations;
- Burglary installations
- Video surveillance installations
- Voice-data installations;

FIRE DETECTION AND SIGNALING INSTALLATIONS
A. CHARACTERISTICS
The studied facility does not require the installation of a fire detection and signaling system, but as a compensatory measure, a fire detection and signaling system was provided in accordance with the requirements of the design standard P118/3-2015, of the "total coverage" type.
No toxic or dangerous substances are handled or stored in the facility.
No automatic extinguishing installations (sprinklers) are provided. Fire extinguishing is carried out with the installation of external and external hydrants.
The fire detection, signaling and warning system (IDSAI) will serve to monitor the building studied in order to detect, signal and warn of the outbreak of a fire, in a timely manner for intervention in terms of location and action against it.
All components used in the IDSAI system must comply with the operational safety tests indicated in EN54-1 to EN54-30. All equipment provided in the system must ensure compatibility in accordance with the recommendations in SR EN 54-13.
Implementation of the fire detection, signaling and warning system.
The fire detection system was designed with addressable equipment, which effectively provides flexible and modern protection of the building against fire.
In this case, the system consists of an addressable signaling, alarming and alerting control panel, to which an addressable signaling, alarming and alerting control panel is connected for each building (C1, C2, C3, Containers), to which addressable fire detectors such as smoke detectors, temperature detectors, control modules, manual fire alarm buttons, indoor and outdoor sirens will be connected. The "GATE" room was chosen to house the main control and signaling equipment, located on the ground floor in building C2. In the remaining buildings, Slave Fire Control Panels will be installed, interconnected with each other and with the Master Control Panel in the Gate building. In these rooms, emergency lighting will be provided for continued work, with a LED and battery-powered lighting fixture, with automatic switching to the backup source when the main power supply voltage disappears. In the room where the main control and signaling equipment (control panel) will be installed (main signaling), a telephone station will be installed to allow the local fire department to be alerted in the event of a fire according to art. 3.9.2.7 of the P118/3 - 2015 regulation.

The detectors intended to be mounted on the ceiling are optical smoke detectors, addressable with a built-in isolator, and those in the false ceiling will be optical smoke detectors, addressable with a built-in isolator and with a light indicator mounted on the false ceiling. The manual alarm triggers are placed on the fire escape routes in the immediate vicinity of each door that connects to the fire escape staircase and at each exit to the outside, so that no person has to travel a distance greater than 30m to reach a manual alarm trigger. The manual fire signaling buttons are addressable with a built-in isolator and are apparently located on the wall at a height of 1.4m.

The indoor and outdoor sirens will be opto-acoustic and will be controlled by addressable control modules (BLM).

Control modules will be installed for:

- Stopping ventilation systems in case of fire

Opening windows for smoke extraction and windows for fresh air intake

- Closing solenoid valves on natural gas supply pipes

Control of pressurization installations on closed horizontal common circulations - ground floor and first floor levels, building C2

The power supply to the fire alarm control panel will be from the basic source (SEN) through circuits connected before the general switch in the main TEG switchboard.

The cables used for the power supply circuits of the power sources (SA) of the IDSAI bodies will be type NHXH 3x1.5mmp with a minimum fire resistance of 30min.

When choosing the routes of the signaling circuit conductors, passages through spaces with a fire hazard, corrosive environments, etc. will be avoided. and the technical annex spaces or other spaces without dangers and possibilities of accumulation of hot gases produced during the fire will be used.

The signaling cable routes will be separated from other electrical installation circuits and will be placed at least 30 cm from them

The cables and conductors used in the signaling circuits will be installed buried in the walls or in the false ceiling, in HFPRM or HFXF type tubes.

The main installation control unit (ECS) will be an addressable central unit, the maximum number of 128 detectors and triggers per loop. The fire signaling central units (CSI) on each building will be addressable central units with 4 loops, with a maximum number of 128 detectors and triggers per loop.

ECS with at least 5 extinguishing zones equipped with microprocessor, event memory that can be downloaded or read from the central panel;

The ECS must have an alphanumeric display with the possibility of displaying messages in Romanian. The event memory must allow the storage of at least 1000 events and can be downloaded or read on the local display;

The reference standards for ECS, as appropriate SR EN 12094-1:2004 or SREN 54- 2:2000+ A1-2007, as well as equivalent technical regulations for the intended use;

The fire detection, signaling and warning system is made up of the following subsystems:

- the automatic fire detection subsystem in the premises, composed of automatic smoke and temperature detectors;
- the manual fire alarm subsystem, composed of manual alarm bolts;
- the internal acoustic alarm subsystem;
- subsystem of modules for operating ventilation installations (shutting down), opening doors used for admission of fresh air for compensation, etc.

Subsystem for automatic detection of fire in closed spaces

Smoke detectors will be addressable with short-circuit isolator included and will be placed according to the drawn parts. They detect smoke when a fire starts and provide a quick signal. They also react very well to smoke, visible or invisible, of smoldering or flaming fire.

Manual fire alarm subsystem

The manual fire buttons will be addressable with short-circuit isolator included and will be mounted according to the installation plans in the area of the building's escape routes.

They are activated by breaking the tempered glass cover (it fragments into small, unsharp elements). Checking this device is very simple and is done with a special key. The main advantage is the extremely simple maneuverability, the strike can be done from any angle and from running.

The alarm signaling/alarm subsystem

This subsystem includes acoustic and optical warning sirens, which will be addressable with short-circuit isolator included, to alert the staff to initiate measures to evacuate the building. The sirens are located above the warning buttons.

These minimum levels will be reached at any point where the alarm sound must be heard. The sound level must not exceed 120 dB at a distance of 1m from the alarm receiver. The sound level is measured with specially designed measuring instruments in accordance with SR EN 61672, type 2, with slow response.

IIO module

Addressable interface of INPUT/OUPUT type, with potential-free relay output, one input monitored with EOL resistor and one unmonitored input, but separated “optically”, addressable with isolator included, supply voltage: 17-28Vdc.

Power supply

The IDSAI installation must have at least two power sources, a main source and a backup source. Both the main source and the backup source must ensure, independently of each other, the operation at the nominal parameters of the IDSAI.

When the main source is available, it must be the exclusive power source of the fire detection and signaling installation.

The backup source must consist of 12Vdc or 24Vdc rechargeable batteries.

All power sources (internal and external) related to the IDSAI (powering detectors from external sources, sirens, etc.) must be SR EN 54-4 certified and be able to allow monitoring of parameters according to chap. 4.3.

The power supply source for the ECS component elements must be the same as that for the ECS or be compatible with it.

BASIC SOURCE

The basic source for the IDSAI power supply is the National Electroenergetic System.

The IDSAI power supply from the basic source will be made in compliance with the provisions of the technical regulations regarding the power supply of fire safety installations.

The components of the IDSAI are supplied with electricity from the main source through appropriately sized electrical circuits, protected with appropriate protective devices, labeled, accessible only to their maintenance personnel.

The power supply of the components of the IDSAI is independent of any general separation device of the building.

BACKUP SOURCE

If the power supply from the main source is no longer possible, the power supply is made from a backup source. For the IDSAI, the backup source will ensure an operating time of 48 hours and, in addition, the power required to signal an alarm for 30 minutes.

The choice and sizing of the accumulator batteries is such as to ensure the power supply of all the components of the IDSAI for the entire duration of the interruption of the power supply from the main source and to allow corrective measures to be taken. The final capacity of the accumulator battery will be evaluated taking into account its decrease with the aging of the equipment, by using the supplier’s recommendations.

The batteries must be recharged within 24 hours at 800/ of their nominal capacity and at 1000/ in 48 hours, with continuous installation operation.
The electrical supply equipment must be able to signal the following faults:
a) loss of the main source in less than 30 min.;
b) loss of the backup source in less than 15 min.;
c) decrease in battery voltage below the value that makes it inoperable and is indicated by the manufacturer;
d) failure of the battery charger in less than 30 min.
For the installation, operation and maintenance of the batteries, the conditions requested by the manufacturer and the technical regulations in force on the date of the technical documentation shall be strictly observed.
The IDSAI system is powered from the main switchboard of the TEG building through a separate circuit, connected before the general switch. For backup power, a battery is provided that ensures normal operation for 48 hours, followed by a 30-minute alarm.
Building the circuits
The fire alarm circuits will be executed with copper cable type JE-H(St)H 2x2x0.8 mm2 E30 and NHXH for high-current circuits. The cables will be protected in HFXP, HFPRM or similar protective tubes laid buried in the plaster or on the cable bed.
The electrical signaling cables used in the signaling circuits will be protected according to the P118/3-2015 standard in plastic or metal tubes or skirting boards. The signaling circuit routes will be – as far as possible – separated from other electrical or telecommunications circuits. The multi-core cable used for signaling circuits cannot be used for other telecommunications circuits. It is forbidden to execute fire alarm circuits with signaling cables mounted apparently and unprotected in the tube. The insulation resistance to earth of the signaling circuits must be at least 500 Kohm measured at SOOV in d.c.
Addressable smoke detectors, temperature detectors and addressable buttons can be connected on a loop, the series connection being made with 4-wire fire-resistant and halogen-free fire cables, with a section of 0.8mm2 (JE-H(St)H Bd E30/FE1802x2x0.8). The length of a loop (from the departure from the control panel and return) is a maximum of 2000m.
The assignment of addresses to all elements on the loop is done automatically based on a transmission protocol upon commissioning.
Each loop can be divided into zones by providing, during the installation and configuration of the system, addresses for a specific zone. This allocation of addresses in zones allows for selective signaling at zone level of the events that occur. All self-addressable elements on the loop have built-in short-circuit isolators. If a short-circuit or a fault occurs, the control panel locates it and isolates the faulty piece of cable.
Events (alarms or faults) are stored in the control panel's memory, the storage capacity being up to 2000 events.

Electrical power supply sources
Main source: the electrical network connected to the national energy system.
The circuit for powering the fire alarm system will be connected before the main switch of the electrical power supply panel.
No other consumers, unrelated to the fire protection system, will be connected to this circuit.
Backup source: battery, with automatic switching when the main power supply voltage disappears. Switching from one source to another should not cause changes in the system state.
Sizing the central heating battery
The preliminary calculation shows that for the supply of electricity from the back-up source under the conditions requested by the P118/3 - 2015 norm (the backup source will ensure standby power for 48 hours and an additional 30 minutes of alarm charging), 2 batteries of at least 40Ah/12 Vdc each, connected in series, are requested.

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The final capacity of the rechargeable battery will be calculated only after choosing the type of equipment with which the designed fire alarm system will be equipped.

In the room where the fire alarm control panel will be installed, a lighting fixture will be installed for safety lighting for continued work.

STRUCTURE OF THE SIGNALLING, ALARMING AND FIRE WARNING SYSTEM

TECHNICAL CHARACTERISTICS OF THE EQUIPMENT

Control and signaling equipment (Fire alarm control panel)

Addressable control panel

- 128 detectors / loop
- one conventional zone of max. 32 detectors
- 2000 events memory, LCD display
-16 programmable open-collector outputs
- 3 programmable NAC outputs
-1 non-programmable NAC output
-1 non-controllable auxiliary alarm output supports up to 8 FC500/REP repeaters

the control panel will interconnect with the access control system to unlock doors in case of fire

Smoke detector with socket

- Addressable optical smoke detector
- 2-wire connection
- 12-24 VDC power supply
- standby consumption: 67 µA
- alarm consumption 45 mA

Temperature detector with socket

- Addressable detector
- 2-wire connection
- 12-24 VDC power supply
- standby consumption: 65 µA
- alarm consumption 50 mA Fire button
- Indoor addressable manual fire button
- 250V AC, 10A

Indoor optical-acoustic buzzer

- Voltage 19-32 V DC
- Sound intensity 100 dB / 3m
- Working temperature 5 - 40°C

Self-protected outdoor buzzer with flash

- Voltage 24 V DC
- Sound intensity 104 dB
- Red housing
- Self-protection when dismantling
- Self-protection when cutting wires
- Power supply: internal battery 12V,7 Ah.

ANTI-BURGLARY SYSTEM

General

The detection and alarm system against burglary is existing and is maintained. The cables used for the anti-burglary system will be dismantled and reassembled flushed in the plaster or in the false ceiling.

- CLOSED-CIRCUIT VIDEO SURVEILLANCE SYSTEM
- General data
- The video surveillance system is in place and will be maintained. The cables used for the video surveillance system will be dismantled and reassembled flushed in plaster or false ceiling.
- DATA AND TV STRUCTURED DISTRIBUTION SYSTEMS
- The data network covers all spaces in the 4 building blocks. The radially distributed data circuits will be made with FTP cat6e 4x2x0.6mmp cable. The intranet/internet network at the level of each building will be made through a fiber optic network, by cabling with a cable with 2 dedicated fiber optics for each classroom / room (secretariat, office, chancellery, etc.). 4 RJ45 data sockets will be installed in each classroom (2 to the left of the board and 2 to the right of the board).
- On each level, 2 dual band access points with wifi 6 technology and wide coverage will be installed, for the wireless internet network. The wifi network will be secured with a password to allow only authorized persons to connect. The access points will be powered by UTP communication cables of type 6e 4x2x0.6mmp, from the POE ports of the switches dedicated to the wireless network, located in the level rack.
- Each level rack will be equipped with an online UPS, to ensure protection against voltage drops.
- The data sockets will be located in common groups with the 230V power sockets, provided in the rooms of the building and will be located according to the drawings.
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- BMS SYSTEM
- The implementation of the building management and control system will be done through the standard KNX automation system. This is regulated by the international standard ISO/IEC 14543-3, the European standard CENELEC EN 50090.
- The communication of KNX equipment will be achieved via the cable with the specification J-Y(ST)Y 2x2x0.8, this representing the KNX communication bus.
- The KNX automation system aims to perform the following functions:
- 1. Monitoring and control of lighting with light sensors in each classroom, bathrooms, hallways, stairwells, warehouses;
- 2. Monitoring energy, power, current, voltage, frequency, temperature of the photovoltaic system;
- 3. Protection against flooding caused by pipe failures in bathrooms and technical space;
- 4. Monitoring and control of temperature in spaces equipped with fan coils;
- 5. Monitoring and control of fresh air in each classroom, laboratory using CO2 sensors;
- 6. Monitoring of thermal point temperatures and start/stop commands for recirculation pumps and heating/cooling sources;
- 7. Monitoring and recording of graphs of temperature, wind speed and light outside
- 8. Monitoring and recording of electrical parameters current, voltage, power, energy consumed from the network on the general switchboard and separately for the thermal point;
- In the construction of the automation system we have standard KNX equipment in panels with the following configuration:
- TEG General electrical and automation panel (for the ground floor):
- • KNX sources + line couplers;
- • KNX DALI 64 interfaces;
- • KNX relay output modules;
- • KNX input module;
- • KNX fan coil control modules;
- • KNX electricity meter;
- • KNX webserver;
- • 24V 2.5A power supply.

TE-CT Electrical and automation panel for heating plant:
• Power supply * KNX line coupler;
• KNX relay output module;
• KNX input module;
• Modbus RTU KNX pump integration module;
• KNX electricity meter;
• KNX analog control module;
• 24V 2.5A power supply
TE-E1 Electrical and automation panel, 1st floor:
• Power supply + KNX line coupler;
• KNX DALI 64 interfaces;
• KNX relay output module;
• KNX input module;
• 24V 2.5A power supply.
TE-E2 Electrical and automation panel, 2nd floor:
• Power supply + KNX line coupler;
• KNX DALI 64 interfaces;
• KNX relay output module;
• KNX input module;
• 24V 2.5A power supply.
The KNX automation system will be controlled and monitored both locally and remotely through the webserver type equipment located in the TEG, which will be connected to the internet network. The webserver is powered by a direct current source at a voltage of U=24V. The webserver takes over the information from the KNX automation system by connecting it to the BUS communication bus.
KNX communication lines will be created, interconnected by means of KNX line couplers, found in the panels. Thus, a connection will be made between all the automation panels using a KNX cable with the specification J-H(ST)H 2x2x0.8.

SANITARY FACILITIES:
Technical characteristics and specific parameters of the site
The water supply is currently made from the city network, through a PE branch of DN=110 mm, from Vasile Aaron Street, metered at the entrance to the premises, all other blocks being supplied from this branch.
The wastewater collection network is made of PVC pipe, type U and G and discharges into the public collection network through two connections, 1 B150mm connection that discharges into the sewage network on Vasile Aaron Street and 1 B300 connection that discharges into the existing sewage network on Semaforului Street.

Constructive solution for the investment
The cold water supply to the sanitary groups in the buildings will be made from the existing Ø110 water pipe.
The hot water supply to the sanitary groups in the studied buildings (Workshops, Gym Hall and High School) will be achieved using 5 air-to-water heat pumps, 2 boilers operating with gas fuel, a domestic hot water accumulator with a volume of 1000l and an instant hot water preparation module.
The hot water supply of the sanitary groups in the studied building (Dormitory) will be achieved using 3 air-to-water heat pumps, 2 boilers operating with gas fuel, a domestic hot water accumulator with a volume of 2000l and an instant hot water preparation module.
The sanitary installations related to the facility designed include:

- provision of sanitary objects, fittings and accessories;
- cold and hot water supply to consumption points;
- sewage disposal of domestic waste water;
- internal and external fire extinguishing installations

From the point of view of utilities, the site has the possibility of connecting to the water networks, sewage management existing in the area. To provide cold water for the studied buildings, the existing PE branch of DN=110 mm, from Vasile Aaron Street, metered at the entrance to the premises, will be used, all other buildings being supplied from this branch. The wastewater collection network is made of PVC pipe, type U and G and discharges into the public collection network through two connections, 1 B150mm connection that discharges into the sewage network on Vasile Aaron Street and 1 B300 connection that discharges into the existing sewage network on Semaforului Street.
Thus, depending on the purpose of the rooms, several areas equipped with sanitary groups were differentiated.

Cold water supply installations for the buildings

The water supply to the buildings studied is made from the existing PE 0110 branch for supplying the buildings studied. Inside, the PE Θ1100 pipe branches and supplies the buildings studied with cold water. Before entering the buildings studied, the water pipe will be installed with a PE-OL transition piece, and then it will enter each building with an OIZn pipe. In the studied building blocks, this pipe will branch into a 2" OIZn pipe, respectively a multilayer pipe.
The cold water pipes subject to modernization (replacement) are the distribution pipes in each studied building block.

Interior cold water supply installations

The provision of sanitary objects, fittings and accessories requested at the consumption points was made in accordance with the provisions of Normative I9/2022 and STAS 1478/1990, depending on the purpose of the building, the number of people, the water supply regime, in order to ensure the hygiene conditions and the comfort level requested by the standards in force. Their type and installation dimensions are in accordance with the purpose of the building and STAS 1504/1985.
Chrome-plated mixer taps mounted on the sanitary objects will be installed. The installation heights and the minimum horizontal distances between them and the finished walls of the sanitary objects, their fittings and accessories will be made in accordance with STAS 1504/1985. A deviation of +5% will be allowed at the mounting height.
The sanitary objects, the related fittings and accessories will be mounted on the construction elements, in accordance with the fixing details provided in the execution technologies.
The sanitary objects will be connected by means of flexible connections from the corner taps to the faucets of each body. Wall-mounted toilets with horizontal outlet made of sanitary porcelain have been provided, the mechanism for the toilet tanks will be recessed, and the tanks will be provided with a push-button actuation system for the water discharge. The washbasins will be mounted on a pedestal made of sanitary porcelain.
The cold water supply to the consumption points will be carried out with an internal distribution installation designed from multilayer pipe pipes, with fittings related to this type of material mounted by crimping.
The cold water supply to the building will be carried out by installing horizontal pipes made of multilayer pipe in the basement of the buildings, from where consumers on the upper floors will be supplied, through vertical columns.
The horizontal pipes will be supported with rod brackets by the elements of the basement structure, or mounted on anchored angles. The cold water source consists of the branch to the existing network in the area. After entering each building body, the external pipe will be branched and the consumers in the building will be supplied.
The necessary accessories will be installed in the building so that the internal distribution network will be made of multilayer pipes. The internal cold water distribution network will be insulated with insulation tubes for sanitary installations in accordance with the diameter of the pipe on the respective section.
The internal cold water distribution installation will be installed flushed in terms of the main horizontal distribution in the technical basement, and the vertical distribution columns will be installed in housings provided with manhole. The connection pipes to each sanitary object will be laid flushed in the walls or in the floor. The washbasins, showers and WC tanks will be connected to the cold water pipe with multilayer pipe Θ16.

Hot water supply installations

For the hot water supply of the consumption points, a distribution installation made of multilayer pipe pipes for the main pipe was designed, supplied from the boiler with a coil with a volume of 1000l and the hot running water preparation module proposed for the High School, Gym Hall and Workshops building blocks. For the hot water supply of the consumption points, a distribution installation made of multilayer pipe pipes for the main pipe was designed, supplied from the boiler with a coil with a volume of 2000l and the hot running water preparation module proposed for the Dormitory building block. Hot running water will be provided by means of the boiler and the hot running water preparation module. Having the common route with the cold water distribution installation, the hot running water supply installation will be installed apparently at the level of the technical basement, in compliance with the provisions of Normative 19/2022. The main horizontal hot water distribution column will be installed in the technical basement. Hot water will be distributed to all building units through the pipes installed in the newly proposed technical channel.

The hot water pipes for consumption will be installed parallel to the cold water pipes at a distance of 2-3 cm from each other, within the plaster walls and will be insulated along the entire route with elastomer or tubolite type pipes. The horizontal parts of the cold and hot water supply pipes for consumption will be installed with a slope of 0.002 in the opposite direction to the flow direction.

In order to reduce the consumption of hot running water preparation and serve consumers with hot water in a relatively short time, the main hot water distribution will also be performed with the hot water recirculation pipe. The hot water supply to consumers will be made from the hot water pipe, not from the recirculation pipe. The recirculation pipe will be distributed to all building units through the pipes installed in the newly proposed technical channel.

Domestic sewage installations

Domestic wastewater will be collected by an internal sewage installation provided with polypropylene (PP) pipes and connecting pieces, which will be connected to the existing external sewage network. Sanitary objects will be connected to the vertical columns that will be connected to the existing external inspection chambers. In the branching areas of the collectors, Dn110 cleaning pieces will be installed horizontally. The sewage columns will have a cleaning piece and natural ventilation will be ensured by extending the columns above the roof of the building with a 75mm PP pipe and installing a ventilation column end set with a protective cap. In case of columns which diameter is 110 mm, a 110-75 mm reduction will be installed. The minimum height from the roof will be 0.6 m to ensure natural ventilation of the column.

The horizontal collectors will be installed with the required slope specific to each diameter. Outside the buildings up to the existing inspection chambers, a PVC KG Dn110 SN8 sewer network will be executed, flushed at a minimum depth of 0.9 m with a cover from the upper generator of the pipeline to avoid freezing. This sewerage network will be executed with a slope specific to each diameter towards the proposed connection chamber.

The connections to the external sewerage will be made of PVC-KG pipes and connecting pieces sealed with elastomer gaskets, resistant to chemicals in wastewater and external influences, resistant to hot water for short periods up to 60°C.

The sinks will be connected to the horizontal or vertical pipes with PP pipes of diameter Ø32. The washing machines will be connected to the horizontal or vertical pipes with PP pipes of diameter Ø40. The WCs will be connected to the horizontal or vertical pipes with PP pipes with a diameter of Ø110.

The water coming from the drains in the technical space in the C3 building will be discharged through two DN100 floor drains.

The internal sewage network will only receive domestic wastewater from the internal sanitary facilities, and it is FORBIDDEN to connect to it any equipment or laboratory device that could modify the parameters of the discharged water and also to discharge the contents of containers containing harmful substances into the internal sewage network.

When the columns pass through the construction elements, protective parts will be provided depending on the diameter of the respective pipe.

Rainwater sewage installations
The following categories of wastewater will be discharged from the proposed facility:
- rainwater from the building's roof;
Rainwater from the building's roof will be captured through gutters and downpipes and will be discharged to the green space.
The external sewage network was created as a unitary system inside the premises, there being no network for taking over domestic water and a separate sewage network for rainwater collected from platforms.

Sanitary facilities
The sanitary groups will be equipped with the following objects, fittings and accessories:
- wall-mounted toilet bowl made of quality I sanitary porcelain with side outlet;
- flushing tank for the toilet bowl, flushed installation;
- washbasin made of sanitary porcelain, quality I, L=500 mm;
- chrome-plated single-lever stand mixer for washbasin; The accessories of the sanitary objects are the following: WC seat made of shatter-resistant white polyethylene, with cover; chrome-plated paper holder;
- WC brush with chrome-plated holder;
- crystal mirror 600 x 800 mm;
- towel rack with 2 plastic hangers, white;
- soap holder
- washbasin shelf
- paper dispenser
- soap dispenser
The floor drains for collecting accidental water at floor level will be made of polypropylene and will be provided with a hydraulic guard and horizontal outlet, Dn 50 mm. The floor drain grate will be made of STAINLESS STEEL.
Fire suppression and extinguishing installations
According to the Norm for the design, execution and operation of fire extinguishing installations
- indicative P118-2/2013, the building studied must be equipped with the following internal fire extinguishing installations with water:
- internal hydrants;
- external hydrants;

Water supply for fires
The water supply for the internal hydrant installations will be ensured from the existing public network in the area of the proposed new building, through the newly designed branch pipe, made with PEHD 090 pipe, ensuring the necessary flow rate for the fire extinguishing installations with internal hydrants, at a required flow rate of 2.11/s.
In accordance with the requirements of the Norm P118-2/2013 as completed, the studied buildings must be equipped with external hydrants. In the vicinity of the newly proposed building, 4 underground external street hydrants DN80 are installed, according to notice no. 15673/20.05.2025 issued by APA-CANAL SA and 4 above-ground external hydrants DN80 installed on the beneficiary's land. The water supply for the external hydrant installations is ensured from the existing public network in the area of the newly proposed building.

Water requirement for fires
Vhi = (1x2.1) l/s x (10 min x 60 sec) = 1260 l = 1.26 mc, where:

Vhi = volume of water required for the internal hydrants in the building;
Vhe = 10 l/s x (180 min x 60 sec) = 108000 l = 162.00 mc, where:
Vhe = volume of water required for the external hydrants;

Indoor hydrants

In accordance with art. 4.1 of the normative P118-2/2013 as completed, it is necessary to equip the buildings with internal fire hydrants. Taking into account the provisions of the normative P118-2/2013, 1 jet in simultaneous operation is required: 1 x 2.1 l/s = 2.1 l/s.

According to Art. 4.47 paragraph c) Installations with indoor hydrants can be supplied from the public network if the water company certifies in writing the operation of the network for an uninterrupted period at the flow rate and pressure necessary for the operation of the fire extinguishing installation.

Inside the building, pipes made of galvanized steel pipe have been provided, to which the indoor hydrants will be connected, according to STAS 1478-90, art. 14.52 and normative P118/2-2013 annex 2 and annex 3, which will correspond to the following requirements:

Specific flow rate of a jet: 2.1 l/s
Minimum length of the compact jet: 5m
Number of jets in simultaneous operation: 1
Minimum operating time according to NP 118/2-2013: 10 minutes

The water supply to the indoor hydrants will be made through the existing water network in the area, directly from the network, ensuring the necessary flow and pressure according to the approval from the water supplier. The water supply to the external hydrants is ensured at the necessary pressures mentioned by SR EN 671-1 or SR EN 671-2.

The indoor fire hydrant installations were designed so that they could be operated promptly upon the outbreak of a fire.

All water supply networks for extinguishing fires with indoor hydrants were designed so that they would be protected from freezing, and that inspections and eventual repairs could be carried out easily.

The indoor hydrants will be placed according to the drawings so that each point of the building would be reached by 1 jet in simultaneous operation.

Indoor hydrants will be equipped according to the requirements of SR EN 671-2, with:
hydrant valve, manual, 12"; foldable drum;
flat hose type C, 6 50 mm, 20 m long, provided at the ends with type C connections.
universal discharge pipe with shut-off valve and compact or spray jet switch.

Indoor hydrant boxes will comply with the SR – EN 671 standard. Dimensions for the box: 650 x 550 x 250 mm. Weight without component: 14.5 kg. Electrostatic field painting, red color with rust protection. Roll support (drum) for (20 m) flat hose with connected connections and protective sleeves. Key lock and button for opening. Glass with a thickness of 4 mm with inscription according to the regulations in force. Heart seal to avoid internal pressures. Flat type C hose (20 m) with connections connected and protective sleeves. Type C discharge pipe (with tap, with water curtain, compact jet, spray jet). Type C hydrant tap with fixed connection. The connections are made of superior aluminum resistant to very high pressures. For the internal fire hydrant equipped with a flat hose, the internal drum must have a diameter of 70mm, with a slot of at least 20mm wide in which the median fold along the length of the hose is placed. The drum must rotate around its axis. If the emergency opening device is protected by a front glass, it must be able to be easily broken, without the risk of leaving pieces or sharp objects that could cause injury to those who operate the emergency opening device. The doors of the boxes must open at least 1700 to allow the hose to be moved freely in all directions.

Hydrants, together with the service equipment (hoses and discharge pipes) will be mounted in metal boxes, placed in niches in the masonry, or will be mounted apparently, directly on walls or pillars, at a height of 1.35 + 1.50 m from the floor according to P118-2 art. 4.12; 4.14; 4.15.

The indoor hydrants will be placed in accordance with the provisions of P118-2/2013, in visible and easily accessible places in case of fire.

External hydrants

In accordance with the requirements of the Normative P118-2/2013 as completed, the studied building must be equipped with external hydrants. Currently, in the studied building area, there are 4 underground DN80 street hydrants and 4 external DN80 above-ground hydrants installed on the beneficiary's land.

According to the provisions of P118-2/2013, the pressure at the tap of an external hydrant ensures direct intervention, so that the discharge pipe with which it is operated towards the highest and most distant points of the roof ensures a flow rate of 5,001/sec and a compact jet of 10m length.

The water supply is ensured through networks that ensure the calculated flow rate and the pressure necessary for direct intervention from the hydrants, pressure ensured from the existing water network in the area, according to the water supplier's opinion.

In the vicinity of the site, there are 4 underground fire hydrants DN80 in operation, each of which can provide a flow rate of 51/s at a pressure of 2.5bar (in total min. 101/s – minimum calculation flow rate).

HEATING INSTALLATIONS:

The documentation was prepared after studying the requirements requested by the beneficiary. The study regarding thermal installations, complies with the norms and standards in force, so as to ensure the comfort conditions of users and the necessary performance levels.

FUNCTIONAL CRITERIA

Indoor thermal installations must ensure thermal comfort, in order to achieve the indoor temperatures provided by SR 1907/2-1997. The following indoor temperatures will be ensured in the rooms: GS 15°C, stairwells 18°C, classrooms 18°C, bathrooms 22°C, offices 20°C, bedroom 20°C, technical space and storage 15°C, hallways and corridors 18°C, drying room 25°C.

EXTERNAL CLIMATE PARAMETERS

- conventional outdoor temperature calculation in winter= -18°C
- v4/3 = 6.35

PRESENTATION OF THE VALUES RESULTING FROM THE CALCULATION

The heat requirement for indoor spaces was determined in accordance with the provisions of the SR1907/1-2014 standard. Thus we have the following data:

- the total heat requirement for the High School building, through transmission and infiltration is: 347320 W.
- the total heat requirement for the Locker Room Gym Hall building, through transmission and infiltration is: 10770 W.
- the total heat requirement for the Gym Hall building, through transmission and infiltration is: 64410 W.
- the total heat requirement for the Workshop building, through transmission and infiltration is: 189222 W.
- the total heat requirement for the Dormitory building, through transmission and infiltration is: 273294 W.

TECHNICAL SOLUTION DESCRIPTION

The system design was made in accordance with the provisions of the Norm for the design and execution of central heating installations, indicative 1.13-2023. This norm will also be respected when implementing this project.

The solution chosen for the thermal installations in the studied buildings is heating with panel radiators. The GS related to the rooms in the Dormitory building will be equipped with 100mc/h wall fans, equipped with a non-return valve and a timer.

In the Laundry rooms and Washing rooms, spaces related to the Dormitory building, a wall heat recovery unit with a flow rate of 600mc/h will be installed.

The heating of the spaces in each building will be done with steel sheet radiators, supplied with 60/50°C thermal agent from the thermal agent distributor located in the Central Heating room. The heating elements were chosen depending on the thermal power requested, according to the calculation brief and depending on the height of the window parapet under which they are mounted.

It is proposed to install a hybrid system, both in the High School, which will serve the High School, the Workshops and the Gym Hall Locker Rooms, and in the Dormitory. Hybrid systems with a heat pump and a gas condensing boiler represent an intelligent and efficient combination for heating and cooling buildings. Using a heat pump and a gas condensing boiler, we benefit from maximum efficiency, affordability and flexibility in meeting thermal requirements.

The operation of air-to-water heat pumps can cover 80% of the annual needs of a building, with a share of only 50% of the total power of the installation.

By coupling the air-to-water heat pump to the gas condensing boiler, you benefit from a affordable installation, at a controlled cost for many years.

With hybrid systems, you will meet the new legal requirements and benefit from the advantages of condensing technology. The combination of the gas condensing boiler and various heat sources, such as the air-to-water heat pump, can be easily achieved. The system regulation through the automation integrated in the boiler ensures the optimal operation of all system components. Thus, the complete system becomes more efficient than the individual equipment.

The air-to-water heat pump operates ecologically and economically. It can be coupled with other equipment (in this case, gas-fired condensing boilers) and makes it possible to build a true decarbonized hybrid system to ensure heating, cooling and domestic hot water production in the studied buildings. Equipped with inverter technology, the air-to-water heat pump can modulate its power in a range between 40 and 1000/o.

With the air-to-water heat pump, it is possible to design efficient heating and cooling that incorporates a high share of renewable energy. When the heat pump provides 50% of the total power required to heat the building, it provides 80% of the annual requirement. This will be coupled to an additional heat generator, such as gas condensing boilers, which will provide the energy necessary to cover peak demand.

The thermal energy (heating agent) for the studied buildings (High School, Locker Rooms, Gym Hall and Workshops) will be provided by five air-to-water heat pumps with a power of 70kW each, installed in the Central Heating Plant within the High School and by the heat produced by the 2 condensing central heating plants with a thermal power of 300kW each, newly proposed to be installed in the Central Heating Plant room in the High School building. These will produce the thermal energy necessary to heat the spaces and prepare domestic hot water.

The thermal energy (heating agent) for the Gym Hall will be provided by a roof ventilation equipment with heat recovery, equipped with a direct expansion heating battery, powered by 2 heat pumps mounted on the roof, Q=8000 m^2/h, Qi=55kW, 1240x1048x2410 (indoor unit), G= 1174kg. This will produce the thermal energy necessary for heating and ventilating the Sports Hall room.

The thermal energy (heating agent) for the studied building (Dormitory) will be provided by three air-to-water heat pumps with a power of 70kW each, mounted in the Central Heating Plant inside the Dormitory and by the thermal agent produced with the 2 condensing central heating plants with a thermal power of 150kW each, newly proposed to be mounted in the Central Heating Plant room in the Dormitory building. These will produce the thermal energy necessary for space heating and hot running water preparation.

Radiators with a height of 600 mm and 300 mm, type 22 and 33, of different lengths, will be installed in the building.

The connection of the heating elements to the heating medium distribution system will be carried out by

an automatic angle valve with flow limitation, equipped with a secured type B thermostatic head

- for the supply pipes and a return angle valve - for the return pipe. The radiators provided will be delivered with mounting brackets. The radiators will be mounted on brackets fixed with dowels in the wall, the entrance at the top and the exit on the same side at the bottom, for radiators with a total length of up to 1000 mm and diagonally for radiators with a longer length, so as to ensure complete circulation of the heating medium in the radiators. A manual air vent valve is mounted on the upper part of each heating element.

The heat agent required for the heat supply of the heating system in the High School, Gym Hall and Workshop buildings will be prepared by 5 air-to-water heat pumps with an installed thermal power Pi= 70kW each and by means of 2 condensing boilers with a thermal power of 300kW each.

The heat agent required for the heat supply of the heating system in the Gym Hall will be prepared by a roof ventilation equipment with heat recovery, equipped with heating battery in direct expansion, powered by 2 heat pumps mounted on the roof, Q=8O00 m3/h, Qi=55kW,1240x1048x2410 (indoor unit), W= 1174kg.

The thermal agent required for the heat supply of the heating system in the Dormitory building will be prepared by 3 air-water heat pumps with an installed thermal power Pi= 70kW each and by means of 2 condensing boilers with a thermal power of 150kW each.

The hydraulic balancing of the heating system will be done by manually presetting the fluid flow rate at each consumer in the system using hydraulic balancing valves. Hydraulic balancing valves will be installed on each main branch.

The ventilation of the heating/cooling system will be done by:

Manual air vents, provided at each consumer in the system Automatic deaerators provided at the highest points of the system

The total emptying of the system will be done centrally, in the basement, through valves with a valve and a hose connection.

EQUIPMENT DESCRIPTION

Radiators: made of steel sheet were provided in the following rooms: rooms, corridors, offices, laundries, washing rooms, warehouses, classrooms, library, dining room.

The heating elements will be chosen depending on the thermal power requested, according to the calculation brief made following the drafting of the technical project. The radiators will be mounted on brackets fixed to the wall or the floor, with dowels and wood screws. The connections of the heating agent pipes will be made with multilayer pipes laid buried at the radiators.

Heat pump: Air-to-water heat pump, with high energy efficiency, with an installed thermal power

Pi= 70kW

Pumps: Circulation pumps will be with variable speed

Hot running water rechargeable battery: Rechargeable battery with a volume of 1000l (High School) Rechargeable battery with a volume of 2000l (Dormitory)

Heating plant: Condensing boiler with a power Pi=2x300kW Heating plant: Condensing boiler with a power Pi=2x150kW

ROOF•VENT device with 2 heat pumps: air flow 8000mc/h, installed heating power 41.7kW, inlet air temperature 27.90C, heat pump COP 3.02, recovery degree 82%, recovered heating power 81.9kW, cooling power 54.1kW, cooling recovery power 8.4kW

DISTRIBUTION

The heat distribution system for the radiators in the buildings studied (High School, Gym Hall Lockers and Workshops) will be made from the distributor installed in the heating plant located in the High School building. From here, the radiators in the High School building will be supplied with heat, with pre-insulated pipes, the Workshops and Gym Hall Lockers with separate pipes, on which independent variable speed circulation pumps will be installed for each circuit. In the Dormitory building, the radiators will be supplied with heat from the new heating plant proposed to be installed on the ground floor of the building. The distribution system in each building will be made with vertical columns. This distribution system is made up of ups and downs, flow and return, made of multilayer pipe, for vertical distribution and radial connections made of the same material, installed flushed for horizontal distribution in the basement and flushed in the screed and walls for connections from columns to radiators. The distribution from the basement will be made with multilayer pipe for installations, according to the drawn part. The route of the distribution system in each building will be made flushed in the outer wall of the rooms or in the screed, from the columns to the radiators. The vertical columns will be masked in niches for installations made of gypsum board closures. The pipes must be installed with a minimum slope of 3%, towards the highest points, where automatic air vents will be installed, both on the supply and return pipes. It will be considered to install the air vents in easily accessible areas.

When crossing construction elements, the pipes will be protected with metal protection tubes.

The hydraulic balancing of the heating installation will be done by manually presetting the fluid flow rate for each consumer in the system using the hydraulic balancing valves mounted on the pipes and using the automatic valves with preset flow rate adjustment mounted on each radiator.

The insulation of the various parts of the installation will be done by ball valves, and the insulation of the heating appliances will be done locally, by their special valves, provided on the connection pipes.
The dimensioning of the pipes is done according to the calculation brief mentioned and in the drawn part. The hydraulic balancing of the heating installation will be done with hydraulic balancing valves mounted on each column (on the return) and valves, with flow limitation, equipped with a secured thermostatic head type B (or similar)
– for the supply pipes.
The compensation of the expansions will be done by natural compensators type L, Z, or U resulting from the configuration of the pipe routes or by axial compensators.
The system is vented by means of automatic vent valves mounted at the highest points of the distribution installation and by manual vent valves mounted on each radiator. The designed installation allows for a constant comfortable interior temperature, as a result of the functions of the thermostatic valves.
After the tightness and expansion test, the pipes and devices in the technical space will be thermally insulated with 20mm thick mineral wool mattresses, and the insulation will be protected on the outside with a PVC jacket.
The distribution pipes will be installed with slopes of 0.1-0.20/ and will be provided with automatic air vents at the highest elevation points as well as drain valves at the lowest elevation points.
The total drain of the installation will be done centrally, in the basement, through valves with a valve and hose connection.
The collection and discharge of the condensate resulting from the operation of the condensing boiler will be centralized, conducted through a specially designed, sealed network of PP sewer pipes, equipped with plugs and gaskets, and will be treated through a condensate neutralizer and then discharged to the sewer.

ENERGY SOURCES

Heating installations

The heating agent - hot water 60-50°C - will be supplied from the 5 proposed air-to-water heat pumps and the 2 condensing boilers with a thermal power of 300kW each, through three circuits (flow/return), one for each building it serves (High School, Workshops and Gym Hall Locker Rooms).
The heating agent – hot water 60–50°C – will be supplied from the 3 proposed air-to-water heat pumps and the 2 condensing boilers with a thermal power of 150kW each, through two circuits (flow/return), one for each part of the building it serves (Dormitory).
The heat pumps and gas boilers will have the same type of automation, so that the communication between the two types of equipment will be via the bus and a unique cascade management. The entire automation of the heating systems will be integrated into a BMS system.
The operation of heat pumps in technical, safety and economic parameters is provided to be ensured according to 113/2023, with measuring devices, metering and automation equipment that mainly control safety and economy, prescribed temperatures and pressures including protection against exceeding them, regulation of thermal agent temperatures correlated with external temperature and consumption demand.
The distribution of the thermal agent in the heating plant will be carried out with hot-rolled steel pipes for installations and constructions, joined by welding for diameters over 2" and by screwing for diameters smaller than 2". The horizontal distribution in the heating plant is apparently carried out on the wall and ceiling. The thermal agent supply pipes of each building will be made with pre-insulated steel pipes, mounted in the newly proposed thermal channel and will enter each building in the basement, and in containers they will enter the Textile Laboratory room.
All pipes in the technical space, including the distributor-collector, will be insulated with mineral wool mattresses, and the insulation will be protected on the outside with a PVC jacket.
The distribution of the thermal agent to consumers will be carried out through the distributor-collector, installed in the heating plant.

Hot running water preparation installations

Considering the large volume of hot running water required and implicitly reducing operating costs, it is proposed to create a hot running water preparation system with renewable energies.

Consequently, it is proposed to create a hot running water preparation system, from heat pumps, through a hot running water rechargeable battery, with a volume of 1000l and a hot running water preparation module in instant mode for the High School, Workshops and gym locker rooms. Consequently, it is proposed to create a hot running water preparation system, from heat pumps, through a hot running water rechargeable battery, with a volume of 2000I and a hot running water preparation module in instant mode for the Dormitory.

- Economy: by using solar energy, the consumption of conventional energy is reduced (natural gas for the heating plant or electricity)

- Autonomy: by using solar energy, the influence given by price increases of conventional energy sources decreases

- Ecological: by using solar energy, the environment is protected, because solar capture systems are totally non-polluting.

- Flexibility: solar installations can be installed in parallel and can operate simultaneously with another heating system that uses conventional energy (natural gas, electricity), the latter will only make up the difference in energy requirements on cloudy days

CONTROL DEVICES

The connection of the heating elements to the heating agent is made by means of an automatic thermostatic shut-off and regulation angle valve with flow pre-setting – for the supply pipes and a return angle valve (the so-called regulator) – for the return pipe. A manual air vent valve is mounted on the upper part of each radiator.

Automatic air vent valves have been provided at the highest points, both on the supply and return.

The columns are provided with drain valves on both the supply and return.

THERMAL INSULATION OF PIPES

Thermal insulation of the heating agent distribution pipes in the technical basement is done with synthetic rubber tubes, 19mm thick.

VENTILATION INSTALLATIONS:

FRESH AIR FLOW RATES:

According to NP010-2022, the fresh air flow rate for different rooms is determined depending on the volume of the room :

Room destination	N [h-1]	D [mc/h
Classrooms	6-8	
Chancelleries, secretariates	4-8	
Laboratories, workshops	8-10	
Libraries	4-5	
Gym halls	2-3	
Locker rooms	8-10	
Canteens, buffets	8-12	
Kitchens	5-8	
Sanitary groups - urinal		25
Sanitary groups - toilet		50

Thus, the flow rate Q results [mc/h] :

$$Q = V \times n$$

V — room volume

n — number of shifts

The fresh air flow rates were determined in accordance with the NP010-2022 Norm, based on the number of hourly shifts.

VENTILATION SYSTEM

To ensure comfort parameters in classrooms, office, secretariat, gym hall, etc., a ventilation system is provided for the introduction of fresh air and the stale air exhaust, respectively, locally for each room. Thus, for each classroom/laboratory, 1-2 heat recovery units with a flow rate of 1000mc/h each are provided, proposed to be mounted outside the classroom, on the corridor in the false ceiling.

For the sanitary groups, the stale air exhaust was provided by means of a duct extraction fan and the related duct networks.

When designing the ventilation systems, it was not provided that they also ensure the regulation of the thermal parameters in the rooms they serve.

Thermal regulation will be carried out by radiators.

The system design was made in accordance with the provisions of the Normative for the design, execution and operation of ventilation and air conditioning installations, indicative 1.5-2022 and the NP010-2022 norm. These norms will also be observed when implementing this project.

The solution chosen for the implementation of the thermal installations in the Gym Hall is heating with ROOF-VENT type ventilation and heating devices mounted in the roof of the gym hall, devices that will also ensure the general ventilation of the gym hall, these being able to operate with up to 100% fresh air (8,000mc/h), thus meeting the conditions imposed by the NP 010 -2022 norm, regarding the implementation of at least 2 shifts per hour.

The air introduced into the classroom/laboratory is heated by 1-2 heat recovery units (with a flow rate of 1000 m3/h each), proposed to be installed in the false ceiling of the corridors (according to the drawn parts). The technical solution for ventilation with heat recovery is based on a copper heat exchanger,which allows the formation of two air flows inside a single cylinder.

The high air flow rate, with a high heat exchange efficiency, allows the removal of accumulated humidity by up to 90%, thus preventing the heat recovery unit from freezing at low temperatures.

The operating cycle consists of the following: when the hot air from the room is evacuated through the heat recovery unit, it gives off heat through the heat recovery unit to the admitted air.

The system allows the use of heat in an aggregated state, which helps to increase the heat recovery coefficient, thus maintaining an optimal humidity level.

Given that the flows are separated by passing through different channels «exhaust»- «intake» it is excluded that the air will mix

The heat recovery unit will be made for indoor installation and will operate with 100% fresh air. The heat recovery unit will be housed and clad in 18mm thick laminated panels, configured for mounting on the unit, in Bardolino oak color. The air is taken from the outside, preheated or pre-cooled in the heat recovery unit to the set parameters. The conditioned air is introduced into the classrooms through the slots with which the recovery unit is equipped. The exhaust air is taken through the slots with which the recovery unit is equipped and exhausted to the outside.

The fresh air is taken from the outside through stainless steel exterior grilles with rainproof blades and insect netting, is heated (or cooled) in the heat recovery unit and then introduced into the classrooms.

The stop/start command of the heat recovery units will be made by 1 differential carbon dioxide sensor integrated in the heat recovery unit.

The exhaust air is taken in by means of a fan mounted on the duct and is led through a system of channels to the outside, to be evacuated to the outside of the building. The exhaust fans operate with a constant air flow. The compensation of the exhausted stale air is achieved naturally through transfer grilles mounted in the doors. A stale air exhaust system will be installed in each bathroom, a total of 6 systems.

The exhaust fan start command will be made by 1 motion sensor mounted in the entrance hall in the WC cubicles. The fans will be turned off on a timed basis 5 minutes after starting.

The fresh air is transported from the unit through a system of channels made of galvanized steel sheet (spiro type or similar) insulated with mineral wool, and is introduced into the spaces served by anemostats, mounted in the false ceiling.
It is necessary that all the exhaust air and fresh air exhaust pipes have a tightness class D.
The air is exhausted using the heat recovery unit through the suction anemostats with fixed inclined louvers, and the sheet metal ducts and exhausted to the outside through the exhaust grilles through the take-off with anti-insect wire mesh.
The stop/start command of the recovery units will be made by 1 differential carbon dioxide sensor.
The distribution will be made with Spiro type sheet metal ducts or similar. Air inlet pipe will be insulated with 25mm thick wadding mattresses and a thermal conductivity of 0.037W/mk, protected with sheet metal

Natural gas supply installations
Approval and execution of natural gas installation works:
According to NTPEE-2018, art. 12, the execution of any works within the natural gas supply system is done after the investor obtains the approval for the execution of the works provided for in the execution projects issued by the licensed operator of the natural gas distribution system and, where applicable, the building permit under the conditions of Law 50/91, as amended.
The designed low-pressure natural gas installation consists of:
- external installation, which is mounted overhead on the walls of the building and is located between the branch valve, respectively PR and the fire valve mounted at the entrance of the installation into the building.
- the internal installation that is installed between the fire hydrant and the appliances, including the firebox and the flue gas exhaust chimney.

Conditions for performing the works:
The dimensioning of the low-pressure appliance was done in compliance with NTPEE-2018, table 6.1. within the limit of the approved flow rate and specific simultaneity factors. For the connections and installations of household consumers, the total simultaneous flow rate of all appliances in the appliance was provided, with a simultaneity coefficient of 1 for the kitchen and for central heating.
The determination of the pipe diameters was done based on the permissible pressure drop. For low-pressure appliances, supplied with low-flow regulators for household appliances or industrial appliances with a nominal pressure of 20 mbar, the permissible pressure drop for dimensioning is 5 mbar. This value was observed.

Conditions for the location and installation of pipes:
The routes of external installations are straight. When establishing the routes, priority was given to ensuring safety conditions. The aerial installation of external installation pipes on the walls of brick or concrete buildings, on stable brick or concrete fences and on metal poles was provided.
According to NTPEE-2018, art. 93 The design of natural gas installations laid underground must provide for sealing measures against natural gas infiltration at the underground passages of installations of any utility (heating, water, sewage, electrical, telephone, catv cables), through the underground walls of buildings connected to the natural gas distribution system. All pipe passages through basement floors must also be sealed to prevent natural gas from penetrating to the upper levels, in case of infiltration into the basement. The gaps will be sealed with asbestos cord and cement mortar. Gas breathers will be installed at the entrance of these pipes inside the building.
It is prohibited to connect buildings to the natural gas distribution system that do not have the specified sealing measures.
In the user installations, each civil or industrial building is supplied with gas from the external installation through a connection. At the end of the connection pipe of the user installation,outside, in an easy accesible place is installed a fire hydrant marked according to standard 297 and art. 220 of NTPEE-2018. If the distance between the outlet valve in the control station or station and the fire hydrant is less than 5 m, the outlet valve can be omitted.

It is prohibited to enter the pipe from the branch or connection bay directly inside the building.
Pipes mounted externally on building elements or overhead on poles are supported, depending on the diameter, on brackets or consoles made according to the standard catalogues of details for the installations.
Internal installations for use:
The pipes of internal installations for use are installed:
-externally in dry, ventilated, lighted and circulated spaces with permanent access, including basements that meet these conditions and are mounted as much as possible on the building's resistance elements, walls, poles, beams, ceilings.
It is prohibited to pass natural gas pipes:
- from one apartment to another apartment, except for existing columns;
- through ventilation chimneys and ducts, elevator shafts and chambers, unventilated or closed spaces, rooms with corrosive environments or with noxious emissions, rooms with high humidity, rooms where flammable materials are stored, closets, pantries if they are not ventilated, technical basements and technical ducts, niches where pipes for other installations are installed, including under their lower openings, unventilated attics of buildings, toilets, except for those provided with utility appliances, in hard-to-reach places where pipe maintenance cannot be ensured.
- through warehouses or storage rooms, in compliance with the provisions of Normative P 118, on fire safety of buildings.
The passage of pipes through walls or floors is done in a protective tube. The pipe will not have any joints in the protective tube. The protective tubes will be fixed with cement or plaster mortar and will exceed the floors by 5 cm and the walls by 1 cm.
The minimum distances between natural gas pipes and the elements of the other installations will be within the provisions of the Norms: 1.7, for the design and execution of electrical installations for consumers with voltages up to 1000 V; 1.9, water and sewage installations; 1.13 heating installations; ISCIR and STAS 800 prescriptions.
It is prohibited to use natural gas pipes for any other purposes, such as grounding other installations, making electrical protection sockets, supporting electrical conductors, regardless of voltage and current.
The thickness of the pipe wall is calculated depending on the demands to which the pipe is subjected and the degree of aggressiveness of the soil.
In natural gas supply systems, the use of longitudinally welded pipes is prohibited. When executing polyethylene pipes, pipes with SDR11 of the PE 100 type are used.
The provisions of NTPEE-2018 Table 7 regarding the maximum distances between the supports of natural gas pipes depending on the diameter of the pipes shall be observed. The external installation shall be fixed on metal brackets on the walls of the building, and the pipes of the internal use installation shall be fixed in brackets.
The gaps in the construction elements through which the pipes of the methane gas installation pass shall be made with percussion machines. It is prohibited to cut the steel reinforcements of the building's resistance structure. It is prohibited to make gaps in the building's resistance elements: concrete beams, pillars, lintels, stairs, etc.
In the use installations, the gas pipes shall be mounted above the water and central heating pipes. A distance of 2-5 cm shall be maintained from the wall depending on the diameter of the pipe. Horizontal pipes will be installed only at the top of the walls, at a convenient distance from the ceiling, above doors and windows.
Shut-off valves have been provided at the points established by NTPEE-2018 art. 172, as follows:
a) before each meter;
b) on each important branch;
c) on each pipe that supplies groups of burners mounted on appliances, workbenches, laboratories, etc.;
d) at the base of each column; if the placement of the valves at the base of the columns cannot be done under proper conditions of security and aesthetics, it is permissible to install a single tap for a group of columns supplying a maximum of 24 consumption points.

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e) before each appliance consuming gaseous fuels.

The type of valves that can be used in the low-pressure installation are ball-closing gas installation valves.

All fittings will be tested before installation at a pressure of 1.5 times the operating pressure, according to STAS 2250.

Ensuring the technical conditions provided by NTPEE-2018, chapter 8 for the safe operation of internal installations using combustible natural gases:

All rooms where natural gas appliances are installed must be equipped with windows facing the outside, which surface must comply with the provision in NTPEE-2018 of:

- 0.05 sq m window / cubic meter of net room volume, in case of brick buildings and

-0.03 sq m window / cubic meter of room volume in ase of concrete buildings. The glazed surface is determined by taking into account the gap in the masonry where the window frame, skylights, etc. are mounted.

In the case where the windows are thicker than 4 mm or are of special construction (secure, thermopan type, etc.), it is mandatory to install automatic gas detectors with a sensitivity limit of at least 2% methane (CH4) in air, which act on the shut-off valve (electrovalve) of the natural gas supply pipe of appliances consuming gaseous fuels.

In case of using detectors, the glazed surface can be reduced to 0.02 m2 per m3 of net room volume.

By construction, in the building where the installation for use was designed, this condition is met. The project provided for the installation of automatic electrovalve valves connected to natural gas sensors with a lower limit of 2% CH4 in air. The beneficiary will be responsible for the proper functioning of the solenoid valve and sensors.

Art. 8.6. The total flow rate of free-flame appliances that can be installed in a room must satisfy the condition: 15 cubic meters of internal room volume for each Nmc/h of installed natural gas flow.

In rooms with a volume of less than 18 cubic meters and in bathrooms, regardless of their volume, appliances for the instantaneous preparation of hot water for consumption, appliances for central or local heating, equipped with an atmospheric burner and draft break, even if they have a chimney thermostat, are not allowed.

Exceptions make the appliances consuming gaseous fuels to which, through sealed piping, access from the outside of the air necessary for combustion is ensured and the exhaust of combustion gases under pressure is discharged to the outside (with a sealed combustion chamber and draft-free flue).

For all appliances connected to a chimney or with a free flame, the air necessary for combustion and the exhaust of the flue gases to the outside are ensured, completely and without risks, so that the concentration of flue gases allowed by the occupational safety and environmental protection standards is not exceeded in the atmosphere of the room.

The air necessary for combustion must be ensured according to the V/Q ratio, where V is the volume of the room in cubic meters and Q – the installed gas flow rate in cubic meters/h. The condition is: V/Q > 30.

The air intakes are made at the bottom of the room. The gap for the access of combustion air is not provided with closing or regulating devices, and blocking the outlet is prohibited.

The exhaust of flue gases from kitchens where appliances with a free flame are installed, regardless of the volume, is done by natural draft, through the gap for the exhaust of flue gases, under the conditions specified by NTPEE-2018 art. 139.

The execution plans mention how to fulfill each technical condition for the safe operation of the indoor natural gas installations, and all cases where the conditions were not met were solved.

The natural gas installation will be put into operation after the beneficiary executes the air intakes, flue gas exhaust holes and ventilation gaps provided in the apartment where the natural gas installation was designed.

The execution plan mentions how to fulfill each technical condition for the safe operation of the indoor natural gas installations, and all cases where the conditions were not met were solved..

Exhaust of flue gases from appliances connected to chimneys: for this project, appliances connected to the chimney were installed.
In order to be able to put the natural gas installation into operation, the beneficiary is obliged to execute for each heating plant in the technical space a chimney with internal dimensions Θ 300 mm, which is connected to a chimney Θ 600 mm, h active draft of 15 m.
The chimneys made of brick masonry will be lined on the inside with aluminum or stainless steel tubes.
To establish the chimney parameters, the instructions of the appliance manufacturers will also be taken into account.
It is specified that the connection of two or more natural gas consuming appliances to the same chimney is done at different levels and the chimney section must be able to take the total flue gas flow rates of all appliances connected to the same chimney. In case of connecting several appliances to the same flue, care must be taken to prevent the danger of flue gases from appliances that are not in operation being introduced into the room through appliances that are in operation.
For the installation of rigid or flexible sheet metal flues, the following specifications are made:
the flue section must be at least equal to the section of the outlet connection from the appliance, the vertical distance of at least 0.4 m at the outlet from the appliance,
the distance from the chimney to the appliance must be less than 5 m, the slope towards the chimney must be at least 8%, if the distance exceeds 1 m, the flue must be thermally insulated, if the distance exceeds 3 m,
the joint and connection to the chimney must be airtight.
It is prohibited:
- passing flues from one room to another, except for airtight flues joined by welding,
- installing devices to close or block the flue gas outlet section of individual consumption appliances,
- exhausting flue gases into the attics of houses or directly through the external walls of buildings;
- exhausting flue gases directly through the external walls of buildings, with the exception of appliances using gaseous fuels provided with such exhaust from the factory;
- connecting appliances using gaseous fuels to smoke ducts related to dormitorys fed with another type of fuel (wood, fuel oil, coal, etc.), with the exception of appliances using gaseous fuels that have been built for mixed fuel (natural gas - liquid / solid fuel)
Exhausting flue gases through the external walls of buildings is allowed only for appliances approved for use or with technical approval, provided with such exhaust from the factory.
In the event that appliances connected to the chimney are installed, the beneficiary is obliged to carry out the smoke codes based on a construction project, in compliance with STAS 6793, STAS 6724, STAS 3417, Normative P118 and other regulations in force, Annex 6 of NTPEE-2018 and the provisions of the appliance supplier.
Only standardized burners, approved or with technical approval in accordance with the provisions of the legislation, may be installed in the appliance installations. When installing the burners, the manufacturer's instructions shall be taken into account.
Imported burners may only be used if they have an ISCIR approval.
Appliances and burners are rigidly connected to the interior installations.
Appliances can be installed on masonry or concrete walls, without a combustible insulating layer on the wall side and on a non-combustible floor.
Thermal power plants can be insured against import only if they are accompanied by an ISCIR import permit, a quality certificate and have a technical manual translated into Romanian.
The installation, assembly, commissioning, verification and servicing of thermal power plants will be carried out only by units authorized by I.S.C.I.R. and which have authorized staff in accordance with technical norms PT A1/2002 and PTC9–2003.
When commissioning the thermal power plant, the beneficiary must submit the service contract concluded with a company that is authorized by I.S.C.I.R..

Materials and devices:

Steel pipes and all materials used in the construction of natural gas supply systems must have quality certificates issued by the manufacturer.

When executing low-pressure installations, only drawn steel pipes for installations, black or galvanized, shall be used.

The pipe wall thickness is calculated according to the stresses to which the pipe is subjected and the degree of aggressiveness of the soil.

In natural gas supply systems, the reuse of pipes is prohibited.

The measuring panels shall be made only of seamless steel pipe, hot-rolled STAS 404/1 or cold-drawn STAS 404/2.

When executing underground utility installations or branches, pipes with SDR 11 of the PE 100 type are used.

The joining of steel pipes for installations will be performed by fittings or welding according to art1.231, 232, 233, 234 of NTPEE - 2018. All materials will be accompanied by quality certificates. It is prohibited to introduce materials that do not have quality certificates into work.

The joining by welding is performed only by authorized welders based on the provisions of the ISCIR CR–9–84 Instructions, according to the technological sheet for welding prepared by the constructor. The welds must be of quality class II. according to 1.27/82.

Changes of direction will be performed according to art. 231 of NTPEE-2018, with malleable iron fittings for diameters of 3/4" and smaller and with welding bends for diameters larger than 3/4". The welding bends will be made of the same material as the pipe to which they are welded. For threaded joints, sealing will be done with hemp string, lead paint, Teflon tape.

Dutch connection joints are allowed only for pressure regulators for small flows, meters and after safety valves from appliances installed in kitchens and offices. Longitudinal welded pipes will not be curved.

The ends of pipes to which no consumer appliances are connected shall be closed with sealed plugs made of cast iron or steel, even if the respective pipes are equipped with valves.

The use of plugs made of other materials is prohibited.

The anti-corrosion protection of the aerially mounted utility installation is carried out after the pressure test, by priming with lead primer and painting in two layers with oil paint, according to Art. 257 of NTPEE - 2018. The anti-corrosion protection of the pipeline mounted in the ground is carried out by highly reinforced insulation made with bitumen and fiberglass felt, according to standard 7335/3 and art259 of NTPEE–2018.

Pipeline testing conditions:

Before commissioning, the indoor and outdoor utility installation are subjected to tests of:

-strength and - tightness.

The installation tests will be performed at the following parameters provided for in NTPEE-2018:

a) For the above-ground installation in OL, low pressure:

- the sealing test is performed at a pressure of 0.2 bar and a duration of 24 hours with the handling of the fittings, time required for temperature equalization 30 minutes,

- pressure resistance test at 1.0 bar and a duration of 1 hour, time required for temperature equalization 30 minutes.

b) For the connection pipe, the strength test will be performed at 4 bar for 1 hour and the sealing test will be performed at 2 bar for 24 hours. The time required for temperature equalization of the pipe is 50 minutes.

The strength test of the pipes in the control station is performed with the regulator and meter insulated with blind flanges.

The tests are performed only with air. The joints of the utility installation and the connection that have not been tested with air will be checked with a foaming product under the pressure of the gases in the installation.

Both the new installation and the old utility installation that remains in operation will be pressure tested.

Technical acceptance and commissioning:
The testing of the completed installation represents a decisive phase, under the conditions established by law 10/1995 and is subject to verification by the Construction Inspectorate.
The technical acceptance of the installation will be carried out based on ANRE Order No. 156/01.09.2020 and will be carried out between the beneficiary-builder and any specialists in the field invited by the beneficiary.
The technical operations necessary for the acceptance of the new installation for use are carried out by the contractor through the authorized installer in the presence of the beneficiary. If deemed necessary, the designer is also summoned.
According to NTPEE-2018 art. 289, and ANRE Order No. 156/01.09.2020, for the installations for use, a definitive file is submitted containing all the parts of the preliminary file, with the changes that have occurred.
The technical acceptance is confirmed on the basis of documents concluded in accordance with NTPEE –2018 and ANRE Order No. 156/01.09.2020, respectively Annex 4, 5, as well as by verifying the quality of the works and their compliance with the project verified by a certified MDRAP verifier, performing pressure and tightness tests by the contractor in the presence of the beneficiary.
The commissioning of the works within the natural gas supply system is carried out by the licensed operator of the distribution system through specialists delegated following the request of the contractor's authorized installer.
The technical operations necessary for commissioning the new installation for use are carried out by the contractor through the authorized installer in the presence of the delegate of the licensed operator of the distribution system and the beneficiary. If deemed necessary, the designer is also summoned.
According to NTPEE-2018 art. 289, and ANRE Order No. 156/01.09.2020 for scheduling the commissioning shall be submitted to the distribution system operator: the technical acceptance report, the isometric diagram of the installation in original, the document issued by the natural gas supplier, licensed by ANRE, which certifies the existence of a supply contract for the project location, concluded with the beneficiary.
The commissioning shall be confirmed on the basis of documents concluded in accordance with the NTPEE –2018 and ANRE Order No. 156/01.09.2020, respectively annex 5, 6, 7, as well as by checking the Access Agreement for its validity, the appropriate completion of the technical acceptance reports, the validity of the permits of the company that performed the work and the existence of the document issued by the distribution system operator for the conclusion of the supply contract.
When putting into operation the user installations, the behavior of the regulators, burners and user devices is monitored, checking the stability and qualitative aspect of the flame with: all burners and consumer devices in operation; a single burner in operation (with the lowest flow rate in the installation);
For each burner and device, the way how the exhaust of combustion gases is carried out is checked in the following situations: individual operation of the burners and devices, simultaneous operation of all burners and devices, in case of connection to the same chimney of several gas-consuming devices. In case of faulty operation of the exhaust of combustion gases, the commissioning is postponed until the channels or chimney are repaired, the burner or user device valves are sealed.
Gas-consuming appliances connected to the chimney are put into operation only after the subscriber presents proof (not older than 30 days) of checking and cleaning the chimneys by a certified company.
The commissioning is carried out based on the Technical Acceptance Report after concluding the subscription or contract for the supply of natural gas.
When commissioning any user installation, the delegate of the distribution system operator has the following obligations:
to install the natural gas meter and draw up the Protocol for the installation of measuring instruments, according to NTPEE-2018, Annex 13.
to verify the conclusion of the gas supply contract;
to conclude with the consumer and the installer authorized for execution an opening report according to the annex;
to instruct the consumer in the correct use of the user installation;
to hand over to the consumer the instructions for the use of natural gas, provided by ANRE Order No. 156/01.09.2020, annex 6.

- When carrying out the works, the labor protection norms of the regulations in force will be mandatory. The builder and the beneficiaries will take all measures to prevent work accidents during the works exection.
- Upon commissioning, the beneficiary will submit the warranty contract for the Thermal Power Plants, concluded with an authorized I.S.C.I.R. company according to the Order of the Ministry of Industry and Resources no. 397/2002 (PT- A1–2010 and PTC9 - 2010). A copy of the contract will be attached to the Final File.
- Before starting the execution works, the builder will study the provisions of the PTh phase documentation.

Exterior improvements

Exterior improvements involve:

- - Creation of a kinetic floor on an area of approximately 200 square meters located according to the situation plan. This innovative system involves installing special tiles on pedestrian areas, so that when stepped on, the tiles capture the kinetic energy generated by the steps and transform it into electricity. The system is based on the piezoelectric effect that converts the mechanical pressure into electrical energy. Each kinetic energy unit is maximized and transformed into green energy, making each step a contribution to a sustainable future.
- - Considering that the High School is the building most exposed to sunlight, on the southern side, natural shading systems made of metal nets/galvanized metal rods anchored to the southern facade are proposed, intended to support green climbing plants.

EQUIPMENTS NECESSARY FOR DISABLED PEOPLE

Note:

The prices displayed are extracted from the online environment and are for informational purposes only without reference to a specific manufacturer or supplier.

No crt.	Equipment	M.U..	Quantity	Total cost
1.	Mobile elevator for stairs	pcs	2	40,000.00 LEI+TVA

Features:

Minimum landing depth 970 mm with wheelchair with footrest and passenger on board;
Color: Light blue RAL 5015;
Weight: 47 kg (37 kg mobile unit, 10 kg steering bar);
24 V power supply, via 2 V-12 Ah batteries connected in series. Built-in electronic battery charger, type 24 V-3 Ah, made with switching technology and powered directly at 230V. Socket for the battery charger power cable on the car body, with relay for deactivation when connecting the equipment;
Motorization: Irreversible gearbox with reducer, self-braking, with axial transmission driven by an electronically controlled motor, with characteristics 24V-500 W, brushless. The electronic system allows an 80% reduction in current surges when switching on (starting on load) with a linear consumption of the power supplied by the batteries, which allows the machine's operating time and battery life to be extended. In addition,

	"allows the equipment to start gradually and smoothly from the first step of the ramp. Speed: 5 m/ 1' ascending; 5 m/ 1' descending (same speed in no-load mode); Wheel transmission belts: Non-marking, high-friction rubber, even on very rounded stairs, which ensures grip without leaving marks on the trajectory; Slope: max. 35º; slope indicator is located on the control panel; Load: 130 kg; Use: Various versions are available to adapt to any type of wheelchair; Safety: Irreversible gearbox with reducer; electronic speed control; delayed controls to avoid accidental operation; steering bar provided with mechanical clamping system on both sides and checked by safety switch; movement approval only when the mechanical (and electrical) clamping system is properly adjusted; seat belt and adjustable headrest. Safety device on wheelchairs, which prevents accidental opening. Emergency STOP. Emergency manual operation, consisting of a device to be inserted into the square connector connected directly to the reduction gearbox and installed in the front of the drive assembly to manually raise and/or lower the equipment in the event of a stop on stairs.			

SPECIFICATIONS REGARDING THE CHARACTERISTICS OF THE EQUIPMENT/ENDOWMENTS PROVIDED BY THE PROJECT

The preparation of the specifications will be carried out in accordance with the legislation in force and having as guidelines the characteristics listed for each equipment/endowment. In practice, a technical comparative analysis of the existing offers on the market for the different equipment/endowments is necessary for the implementation team before drafting the specifications in order to avoid as much as possible the moral wear of the equipment. Given that certain equipment is no longer manufactured, there are new, more efficient technologies, technological updates will be applied - hardware and software, technological configurations, etc. that modify certain guidelines, the implementation team will do all the diligence in order to draw up the most up-to-date specifications in the spirit of increasing the performance, without modifying the functionality of the equipment/endowments.

c) Analysis of vulnerabilities caused by risk factors, anthropogenic and natural, including climate change that may affect the investment;

- From the point of view of anthropogenic and natural risk factors, we identify the risk of delays in the execution of the works due to sudden climate changes. These changes may affect the implementation of the investment by extending the execution period. In order to reduce this vulnerability in establishing the execution schedule, a rigorous planning of the project activities will be carried out and some time margins will be taken into account. The works will also be permanently monitored in accordance with the climate changes that occur. In the studied area, natural risk factors will not significantly affect the investment, proposing solutions according to the use of materials with increased resistance to climatic factors, freeze-thaw, etc.
- In order to limit the vulnerabilities caused by anthropogenic risk factors, durable materials have been provided, resistant over time.
- In order to reduce the risks arising from fires, the following measures are provided in order to fulfill the specific fire safety conditions and performance levels:
- The construction materials used meet the minimum fire behavior and resistance performances established for classification in fire strength level II.
- In buildings, materials and finishes that do not easily spread fire, that do not emit smoke and toxic gases will be used. The use of PVC materials/finishes that meet the additional smoke emission criterion s1 is allowed.
- - The facade and roof elements are made differently so as not to favor the spread of fire.
- - Inside the buildings, between spaces with different destinations and fire risks, fire protection separation elements are provided (walls, doors) in accordance with the requirements of Norm P118/25, which should limit the spread of fire and smoke in the event of a fire.

- CT technical space separation: RF 180' walls, 120' floors
- medium fire risk spaces: minimum RF 60' walls/floors and solid doors
- library and archive spaces: RF 180' walls, 120' floors, EI-C 90' doors
- The buildings have horizontal and vertical circulation paths for normal operation designed so that in case of fire they are sufficient and meet fire safety conditions, for the evacuation of people directly at ground level
- The dimensions of the vertical and horizontal escape paths ensure the exhaust of the necessary flows.
- The escape routes are short, lead directly to the outside of the buildings and are marked, according to the legal regulations in force, so that they can be easily known by the people who use them in case of fire.
- Users are mostly people who have the ability to self-evacuate. In cases of disabled people, they will be assisted in evacuation by persons designated as companions and/or by persons designated among employees on normal evacuation routes. It is appreciated that in all areas of the building, evacuation of people is ensured.
- Access of intervention forces inside the building is achieved through doors made in the exterior walls and further on the interior stairs of the buildings.
- Through the geometry of the buildings, their location and the existing roadways within the premises, accessibility conditions for mobile firefighting equipment are ensured.
- Access, evacuation and intervention routes are located and constructed in such a way as to ensure:
- unhindered and safe evacuation of people in danger and material goods; access throughout the year of machines, equipment and staff working to extinguish the fire or rescue people and goods.
- By maintaining the accesses from the premises throughout the year, their condition, practicability and easy identification will be ensured, an aspect that leads to the reduction of operative intervention times, especially travel time and evacuation time.
- All spaces in the building are easily accessible from the outside for interventions in case of fire.

To mitigate seismic risks, the following measures are provided:
- life safety requirement: the structure has been evaluated to determine to what extent it can respond to the seismic action with the design value with a sufficient margin of safety compared to the deformation level at which local or general collapse occurs, so that people's lives are protected.
- degradation limitation requirement: the structure has been evaluated to determine to what extent it can respond to seismic actions with a higher probability of occurrence than the design seismic action, without degradation or decommissioning of the items which costs are excessively high compared to the cost of the structure.

Following the expert assessment of the buildings, they fall into the seismic risk class RsIII.
According to the geotechnical study, the risks from landslides are null.
Due to the fact that the site is not located in a flood zone, the buildings are not exposed to the risk of flooding.
d) Information regarding possible interference with historical/architectural monuments or archaeological sites on the site or in the immediate vicinity; the existence of specific conditions in the event of the existence of protected areas;
Not applicable.
e) Technical characteristics and specific parameters of the investment resulting from the implementation of the intervention works;

Technical indicators resulting from the implementation of solution 1:
Building C3 - Workshops (Technical B+Gf+2F):
Existing/proposed built area of the studied building C3 (Workshops) = 747.00 sq m

Existing/proposed developed area of the studied C3 building (Workshops) = 1,657.00 sqm - energy refurbished
maximum H: +18.30m from the elevation ±0.00m

Building C4– Gym Hall (Gf):
Existing/proposed built area of the studied C4 building (Gym Hall) = 624.00 sqm
Existing/proposed developed area of the studied C4 building (Gym Hall) = 624.00 sqm – energy refurbished
Maximum H: +9.05m from the elevation ±0.00m

Building C5 - High School (Technical Basement + Gf+2F):
Existing/proposed built area of the studied C5 building (High School) = 1,482.00 sqm
Existing/proposed developed area of the studied C5 building (High School) = 4,002.00 sqm - energy refurbished
Maximum H:+15.60m from the elevation ±0.00m

C6 Building - Dormitory (Technical basement+Gf+3F):
Existing/proposed built area of studied C6 building (Dormitory) = 833.00 sqm
Existing/proposed developed area of studied C6 building (Dormitory) = 3,398.00 sqm – energy refurbished
Maximum H: +17.80m from elevation ±0.00m

Total existing/proposed built area (C1+C2+C3+C4+C5+C6 building) = 4,099.00 sqm
Total existing/proposed developed area (C1+C2+C3+C4+C5+C6 building) = 10,094.00 sqm

Total existing/proposed built area (C3+C4+C5+C6 building) = 3,686.00 sqm – energy refurbished
Total existing/proposed developed area (building C3+C4+C5+C6) = 9,681.00 sq m - energy refurbished

Existing/proposed POT - 21.71% - unchanged
Existing/proposed CUT = 0.53 % unchanged
Significance category: C

Territorial balance:
Land area in documents: 18,880.00 sq m
Constructions: 4,099.00 sq m (21.71%)
Landscaped green spaces: 7,683.00 sq m (40.69%)
Pedestrian alleys/paved platforms/landscaped sports fields: 7,098.00 sq m (37.60%)

Based on HGR no. 766/97, the construction meets the essential requirements stipulated by article 5 of Law no. 177/2015 in the significance category "C" class III – normal, with common functions where failure to ensure quality levels does not imply major risks for society and the natural environment.

Conclusions:
- following the implementation of solution 1, the seismic risk class remains RsIII;
- the requirements regarding increasing the comfort level will be met by renovating the existing spaces with modern finishes and state-of-the-art equipment;
- by implementing refurbishment and modernization measures, the thermal protection level of buildings, the energy efficiency of interior heating installations, hot running water preparation and lighting will be increased, a proper microclimate will be created for the overall development of educational activity by achieving the minimum performance values of the component elements of the envelope, reducing the amount of primary energy from non-renewable sources and carbon dioxide emissions, falling within the maximum normalized consumption for heating stipulated by Order no. 2641/2017 on the amendment and completion of the technical regulation

- „Calculation methodology the energy performance of buildings', thus satisfying the criteria requested on the nZEB type building, defined in Annex L— C107/3-2005, updated by GEO 386/2016(Annex 2);
- -by implementing specific measures, the building will also meet the needs of disabled people.

5.2 The resulting utility requirement, including estimates of exceeding initial utility consumption and how to secure additional consumptions:

Achievement indicator for package P3 - for all investment sites, namely the high school building, gym, workshops and dormitory	Indicator value before renovation	Indicator value after renovation	Discount (%)
Total final thermal energy consumption (MWh/year)	1146.249	383.986	66.5
Total final electrical energy consumption (MWh/year)	197.078	204.098	•3.6
Energy consumption toe/year	115.526	50.575	56.2
Amount of CO2 equivalent emissions (tons of CO2/year)	323.70	50.03	84.5
Final thermal payment energy [MWh/year]	1146.33	62.40	94.6
Final electricity payment energy [MWh/year]	I 197.13	| 122.90	I 37.7

5.3 Implementation duration and the main stages correlated with the data provided in the indicative schedule for the investment implementation, detailed by main stages;
Execution duration of the intervention works is maximum 20 months.
Investment duration is maximum 36 months.
In order to highlight the investment as accurately as possible, we show all the activities carried out within the project. The investment implementation schedule will include the activities necessary for the project implementation. We thus distinguish the following categories of activities:

CONSTRUCTION ACTIVITIES including:

Works design and execution

To carry out the intervention works, it was decided to contract the combined design and execution services of the works.

Starting from the documentation for approving the intervention works, the selected business operator will prepare the technical project by specialties, on the need for construction, installation and assembly works in accordance with the legislation in force.

The technical project will be drawn up in accordance with the provisions of the legislation in the field of constructions and will be carry out by the business operator.

Activity 1: Preparing the procurement documentation

The procurement documentation will be prepared by the project beneficiary based on the intervention works approval documentation and the specifications.

Activity 2: The procurement procedure for the design and execution of the intervention works will be carried out in accordance with the legislative provisions in force on the date when their procurement will be made. The beneficiary will establish the periods necessary for the awarding procedure depending on the complexity of the contract and/or the specific requirements, so that the business operators concerned benefit from a proper and enough time for the preparation of tenders and of the documents requested by the specifications.

Activity 3: The technical execution project (TP, ED, TDBP, TDEO) will be carried out in accordance with the legislation in force and the intervention works approval documentation, in close collaboration with the beneficiary.

Activity 4: Obtaining the building permit based on the technical documentation prepared by the design company

Activity 5: Contracting site management services.

Activity 6: The construction phase involves the execution of all categories of works provided by the Approval Documentation of Intervention Works and detailed in the technical execution project phase and related execution details. The execution activity will begin with the site organization and site release. The area where the execution works will be carried out for their entire duration will be delimited with a special perimeter fence for the site. A P.S.I. point will be arranged. A container for storing materials/site management, a container for rubble will be placed.

This activity will be carried out in the 3rd month of the second year of implementation.

Throughout the works, the labor protection norms and the fire safety and prevention norms will be observed.

The execution of the works provided by the documentation will be carried out only after drafting the execution details and their verification according to Law no. 10/10.01.1995 updated regarding quality in constructions.

The contractor will comply with the legislation in force regarding the reception of works in phases that are decisive for the strength and stability of the construction, will draw up hidden works reports for the works carried out and will ensure the assistance of a technical manager with the execution.

The beneficiary will ensure the monitoring of the construction's performance over time in accordance with the "Regulations on the monitoring of the constructions performance over time", reference P130-97, approved by the MLPAT with order no. 109/N of 01.08.1997.

Activity 7: Works reception

This activity involves the works reception:

- appointing the reception committee;

- preparing the technical and economic documentation for reception;

- checking the works performed;

- drawing up the reception report and establishing any additions and remedies;

- carrying out any additions and remedies.

Activity 8: Procurement of equipment

Equipments procurement procedure

The procurement documentation will be drawn up by the project beneficiary based on the project's cost estimate and the lists of equipment to be purchased, documents that are not the subject of this study. Specifications will be drawn up for each awarding procedure organized in order to purchase equipment/endowments according to the needs of the beneficiary. The beneficiary will prepare the list, technical sheets and the estimated estimate of the necessary endowments.

Installation and commissioning

Within this sub-activity, the purchased equipment/endowments will be assembled and installed within the spaces built. The designated technical staff will be responsible for the installation and commissioning of these equipment/endowments. To carry out this sub-activity, the equipment will be assembled and connected to the electrical network and together with the goods suppliers, basic testing and training will be carried out regarding their operation. Installation and commissioning will be carried out in close connection with the completion of the rooms where the equipment/endowments were provided after the acceptance of the construction works.

Fulfillment chart of the investment site:

No. crt	Activity	Months/Year																																								
		Year 1												Year 2												Year 3																	
1	Procurement procedure of the design contract and works execution																																									
2	Drafting the design documentation							5						13																													
3	Contracting the site engineer													13	14																												
4	Site construction															15																									34			
5	Reception at the end of works																																								35	36

5.4 Estimated investment costs:

- the costs for carrying out the investment, estimated based on the prices existing on the market at the time of the development/revision/update of the documentation for approving the intervention works or based on cost standards for similar investments carried out through investment programs financed from public funds, correlated with the technical characteristics and parameters specific to the investment site, applied to the estimated quantities of works;

GENERAL ESTIMATE				
Of the investment site				
OPTION I				
IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE Sibiu Municipality, Electricienilor Street, No. 1, Sibiu County				
No. crt.	Name of expenditure chapters and subchapters	Amount (VAT excluded)	VAT (19%)	Amount VAT included
		Iei	Iei	Iei
1.	2	3	4	5
	CHAPTER 1 Expenses for purchasing and developing the land			
1.1	Land purchase	0.0	0.00	0.00
1.2	Land development	2,180,190.00	414,236.10	2,594,426.10
1.3	Environmental protection and restoration of the land	0.00	0.00	0.00
1.4	Expenses for relocation/protection of utilities	0.00	0.00	0.00
TOTAL CHAPTER 1		2,180,190.00	414,236.10	2,594,426.10
CHAPTER 2 Expenses for providing the utilities necessary for the investment site				
2.	Expenses for providing the utilities necessary for the site	0.00	0.00	0.00
TOTAL CHAPTER 2		0.00	0.00	0.00
CHAPTER 3 Expenses for design and technical assistance				
3.1	Studies	39,500.00	7,505.00	47,005.00
3.1.1	Field studies	7,000.00	1,330.00	8,330.00
3.1.2	Environmental impact report	0.00	0.00	0.00
3.1.3	Other scientific studies (archaeological, historical, etc.)	32,500.00	6,175.00	38,675.00
3.2	Supporting documentation and expenses for obtaining approvals, agreements and permits	1,000.00	190.00	1,190.00
3.3	Technical expert report	32,000.00	6,080.00	38,080.00
3.4	Energy performance certification and energy audit of buildings, road safety audit	34,400.00	6,536.00	40,936.00
3.5	Design	949,650.00	180,433.50	1,130,083.50
3.5.1	Design Topic	0.00	0.00	0.00
3.5.2	Pre-feasibility Study	0.00	0.00	0.00
3.5.3	Feasibility study/Documentation for approval of intervention works and general estimate	176,200.00	33,478.00	209,678.00
3.5.4	Technical documentation required to obtain TDBP/TDEO approvals/agreements/authorizations	182,628.00	34,699.32	217,327.32
3.55	Technical quality check of the technical design and execution details	164,690.00	31,291.10	195,981.10
3.5.6	Technical project and execution details	426,132.00	80,965.08	507,097.08
3.6	Organization of procurement procedures	0.00	0.00	0.00
3.7	Consulting	220,000.00	41,800.00	261,800.00
3.7.1	Project management within the investment objective	220,000.00	41,800.00	261,800.00
3.7.2	Financial audit	0.D0	0.00	0.00
3.8	Technical assistant	368,862.00	70,083.78	438,945.78
3.8.1	Technical assistance from the designer:	193,362.00	36,738.78	230,100.78

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3.8.1.1	throughout the works execution period	135,354.00	25,717.26	161,071.26
3.8.1.2	for the designer's participation to the phases included in the execution works control program, approved by the State Construction Inspectorate	58,008.00	11,021.52	69,029.52
3.8.2	Site management	139,000.00	26,410.00	165,410.00
3.8.3	Health and Safety Coordinator — according to Government Resolution No. 300/2006, as amended and completed	36,500.00	6,935.00	43,435.00
TOTALCHAPTER 3		1,645,412.00	312,628.28	1,958,040.28
	CHAPTER 4 Basic investment expenses			
4.1	Constructions and installations	40,041,096.00	7,607,808.24	47,648,904.24
4.2	Installation of machinery, technological and functional equipment	1,300,540.00	247,102.60	1,547,642.60
4.3	Machinery, technological and functional equipment that requires assembly	5,247,594.00	997,042.86	6,244,636.86
4.4	Machinery, technological and functional equipment that does not require assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	40,000.00	7,600.00	47,600.00
4.6	Intangible assets	0.00	0.00	0.00
TOTAL	CHAPTER 4	46,629,230.00	8,859,553.70	55,488,783.70
	CHAPTER 5 Other expenses			
5.1	Site organization	470,082.19	89,315.62	559,397.81
5.1.1	Construction works and installations related to construction site organization	80,082.19	15,215.62	95,297.81
5.1.2	Costs related to the organization of the construction site	390,000.00	74,100.00	464,100.00
5.2	Commissions, fees, taxes, cost of credit	269,211.45	1,444.00	270,655.45
5.2.1	Commissions and interest related to the financing bank loan	0.00	0.00	0.00
52.2	State Constructions Inspectorate share for quality control of construction works	43,601.91	0.00	43,601.91
5.2.3	State Constructions Inspectorate share for state control over territorial planning, urban planning and for the authorization of construction works	218,009.54	0.00	218,009.54
5.2.4	The share related to the Social House of Builders	0.õ0	0.00	0.00
5.2.5	Fees for agreements, compliance notices and building/demolition permits	7,600.00	1,444.00	9,044.00
5.3	Miscellaneous and unforeseen expenses (10%)	5,011,643.20	952,212.21	5,963,855.41
5.4	Information and advertising expenses	84,500.00	16,055.00	100,555.00
TOTAL	CHAPTER 5	5,835,436.84	1,059,026.82	6,894,463.67
	CHAPTER 6 Expenses for technological samples and tests			
6.1	Operating staff training	0.00	0.00	0.00
6.2	Technological samples and tests	0:00	0.00	0.00
TOTAL	CHAPTER 6	0.00	0.00	0.00
	CHAPTER 7 expenses related to the budget margin and for the establishment of the implementation reserve for price adjustment			
7.1	Expenditures related to the budget margin 10% din (1.2 +1.3 + 1.4+ 2 + 3.1 + 3.2 + 3.3 + 3.5 + 3.7 + 3.8 + 4 + 5.1.1)	5,053,001.42	960,070.27	6,013,071.69
7.2	Expenses for establishing the implementation reserve for price adjustment (5%)	2,180,095.41	414,218.13	2,594,313.54
TOTAL CHAPTER 7		7,233,096.83	1,374,288.40	8,607,385.23
GRAND TOTAL		63,523,365.67	12,019,733.30	75,543,098.97
Of which: C + M (1.2 + 1.3 + 1.4 + 2 + 4.1 + 4.2 + 5.1.1)		43,601,908.19	8,284,362.56	51,886,270.75

ESTIMATE

Of the site C3 *WORKSHOPS within the project IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE Sibiu Municipality, str. Electricienilor no.1 Sibiu county.*

OPTION I

No. crt.	Expenditures chapters and subchapters denomination	Amount (VAT excluded	VAT	Amount VAT included
		Iei	Iei	Iei
1	2	3	4	5
Chap. 4	Expenses for basic investment			
4.1*	Construction and installations	8,515,267.00	1,617,900.73	10,133,167.73
4.1.1.	Earth works, vertical systematization and exterior arrangements	0.00	0.00	0.00
4.1.2.	Strength	373,500.00	70,965.00	444,465.00
4.1.3.	Architecture	5,913,102.00	1,123,489.38	7,036,591.38
4.1.4.	Electrical installations	1,259,320.00	239,270.80	1,498,590.80
4.1.5.	Thermal installations	331,400.00	62,966.00	394,366.00
4.1.6.	Sanitary installations	248,550.00	47,224.50	295,774.50
4.1.7.	Ventilation installations	356,255.00	67,688.45	423,943.45
4.1.8.	Fire extinguishing installations	33,140.00	6,296.60	39,436.60
TOTAL I— subchap. 4.1		8,515,267.00	1,617,900.73	10,133,167.73
4.2	Assembly of machinery, technological and functional equipment	155,000.00	29,450.00	184,450.00
TOTALII— subchap. 4.2		155,000.00	29,450.00	184,450.00
4.3	Machinery, technological and functional equipment requiring assembly	775,000.00	147,250.00	922,250.00
4.4	Machinery, technological and functional equipment not requiring assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	20,000.00	3,800.00	23,800.00
4.6	Intangible assets	0.00	0.00	0.00
TOTAL III — subchap. 4.3+4.4+4.5+4.6		795,000.00	151,050.00	946,050.00
Total estimate per site (Total I + Total II + Total III)		9,465,267.00	1,798,400.73	11,263,667.73

ESTIMATE

Of the site C4 *GYM HALL within the project IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE Sibiu Municipality, str. Electricienilor no.1 Sibiu county*

OPTION I

No. crt.	Expenditures chapters and subchapters denomination	Amount (VAT excluded	VAT	Amount VAT included
		Iei	Iei	Iei
1	2	3	4	5
Chap 4	Expenses for basic investment			
4.1`	Construction and installations	2,627,321.00	499,190.99	3,126,511.99
4.1.1.	Earth works, vertical systematization and exterior arrangements	0.00	0.00	0.00
4.1.2.	Strength	312,000.00	59,280.00	371,280.00
4.1.3.	Architecture	1,632,961.00	310,262.59	1,943,223.59
4.1.4.	Electrical installations	474,240.00	90,105.60	564,345.60
4.1.5.	Thermal installations	53,600.00	10,184.00	63,784.00
4.1.6.	Sanitary installations	40,200.00	7,638.00	47,838.00
4.1.7.	Ventilation installations	101,840.00	19,349.60	121,189.60

4.1.8.	Fire - extinguishing systems	12,480.00	2,371.20	14,851.20
TOTALI — subchap. 4.1		2,627,321.00	499,190.99	3,126,511.99
4.2	Assembly of machinery, technological and functional equipment	128,086.00	24,336.34	152,422.34
TOTALII— subchap. 4.2		128,086.00	24,336.34	152,422.34
4.3	Machinery, technological and functional equipment requiring assembly	426,956.00	81,121.64	508,077.64
4.4	Machinery, technological and functional equipment not requiring assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	0.00	0.00	0.00
4.6	Intangible assets	0.00	0.00	0.00
TOTAL III — subchap. 4.3+4.4+4.5+4.6		426,956.00	81,121.64	508,0T7.64
Total estimate per site(Total I + Total II + Total III)		3,182,363.00	604,648.97	3,787,011.97

ESTIMATE

Of the site C5 *HIGHSCHOOL within the project IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE Sibiu Municipality, str. Electricienilor no.1 Sibiu county*

OPTION I

No. crt	Expenditures chapters and subchapters denomination	Amount (VAT excluded	VAT	Amount VAT included
		Iei	Iei	Iei
1	2	3	4	5
Chap. 4	Expenses for the basic investment			
4.1"	Construction and installations	15,352,435.00	2,916,962.65	18,269,397.65
4.1.1.	Earth works, vertical systematization and exterior arrangements	0.00	0.00	0.00
4.1.2.	Strength	741,000.00	140,790.00	881,790.00
4.1.3.	Architecture	8,623,145.00	1,638,397.55	10,261,542.55
4.1.4.	Electrical installations	3,041,520.00	577,888.80	3,619,408.80
4.1.5.	Thermal installations	1,257,500.00	238,925.00	1,496,425.00
4.1.6.	Sanitary installations	600,300.00	114,057.00	714,357.00
4.1.7.	Ventilation installations	860,430.00	163,481.70	1,023,911.70
4.1.8.	Fire-extinguishing installations	80,040.00	15,207.60	95,247.60
4.1.9.	Natural gas installations	148,500.00	28,215.00	176,715.00
TOTAL I — subchap. 4.1		15,352,435.00	2,916,962.65	18,269,397.65
4.2	Assembly of machinery, technological and functional equipment	712,304.00	135,337.76	847,641.76
TOTA	II — subchap. 4.2	712,304.00	135,337.76	847,641.76
4.3	Machinery, technological and functional equipment requiring assembly	3,019,829.00	573,767.51	3,593,596.51
4.4	Machinery, technological and functional equipment not requiring assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	20,000.00	3,800.00	23,800.00
4.6	Intangible assets	0.00	0.00	0.00
TOTAL III — subchap. 4.3+4.4+4.5+4.6		3,039,829.00	577,567.51	3,617,396.51
Total estimate per site (Total I + Total II + Total III}		19,104,568.00	3,629,867.92	22,734,435.92

ESTIMATE

Of the site C6 STUDENT DORMTORY BUILDING *within the project IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE Sibiu Municipality, str. Electricienilor no.1 Sibiu county*

OPTION I

No. crt	Expenditures chapters and subchapters denomination	Amount (VAT excluded	VAT	Amount VAT included

		lei	lei	lei
1	2	3	4	5
Cap. 4	**Expenses for the basic investment**			
4.1*	Construction and installations	13,546,073.00	2,573,753.87	16,119,826.87
4.1.1.	Earth works, vertical systematization and exterior arrangements	0.00	0.00	0.00
4.1.2.	Strength	776,500.00	147,535.00	924,035.00
4.1.3.	Architecture	8,924,833.00	1,695,718.27	10,620,551.27
4.1.4.	Electrical installations	2,582,480.00	490,671.20	3,073,151.20
4.1.5.	Thermal installations	679,600.00	129,124.00	808,724.00
4.1.6.	Sanitary installations	509,700.00	96,843.00	606,543.00
4.1.7.	Ventilation installations	5,000.00	950.00	5,950.00
4.1.8.	Fire-extinguishing installations	67,960.00	12,912.40	80,872.40
TOTAL	I — subchap. 4.1	13,546,073.00	2,573,753.87	16,119,826.87
4.2	Assembly of machinery, technological and functional equipment	269,150.00	51,138.50	320,288.50
TOTA	II — subchap. 4.2	269,150.00	51,138.50	320,288.50
4.3	Machinery, technological and functional equipment requiring assembly	1,025,809.00	194,903.71	1,220,712.71
4.4	Machinery, technological and functional equipment not requiring assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	0.00	0.00	0.00
4.6	Intangible assets	0.00	0.00	0.00
TOTALIII— subchap. 4.3+4.4t4.5+4.6		1,025,809.00	194,903.71	1,220,712.71
Total estimate per site (Total I + Total II + Total III)		14,841,032.00	2,819,796.08	17,660,828.08

GENERAL ESTIMATE

Of the investment site

OPTION II

IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE
Sibiu Municipality, Str. Electricienilor, No. 1, Sibiu County

No. crt.	Expenditures chapters and subchapters denomination	Amount (VAT excluded	VAT (19%)	Amount VAT included
		lei	lei	lei
1.	2	3	4	5
	CHAPTER 1 Expenses for land purchase and development			
1.1	Land purchase	0.00	0.00	0.00
1.2	Land development	126,825.00	24,096.75	150,921.75
1.3	Environmental protection and land restoration	0.00	0.00	0.00
1.4	Expenses for relocation/protection of utilities	0.00	0.00	0.00
TOTAL CHAPTER 1		126,825.00	24,096.75	150,921.75
CHAPTER 2 Expenses for providing utilities necessary for the investment site				
2.	Expenses for providing the utilities necessary for the site	0.00	0.00	0.00
TOTAL CHAPTER 2		0.00	0.00	0.00
CHAPTER 3 Expenses for design and technical assistance				
3.1	Studies	39,500.00	7,505.00	47,005.00
3.1.1	Field studies	7,000.00	1,330.00	8,330.00
3.1.2	Environmental impact report	0.00	0.00	0.00
3.1.3	Other specific studies (archaeological, historical, etc. as appropriate)	32,500.00	6,175.00	38,675.00

3.2	Supporting documentation and expenses for obtaining approvals, agreements and authorizations	1,000.00	190.00	1,190.00
3.3	Technical expert report	32,000.00	6,080.00	38,080.00
3.4	Energy performance certification and energy audit of buildings, road safety audit	34,400.00	6,536.00	40,936.00
3.5	Design	696,000.00	132,240.00	828,240.00
3.5.1	Design topic	0.00	0.00	0.00
3.5.2	Pre-feasibility study	0.00	0.00	0.00
3.5.3	Feasibility study/Documentation for approving intervention works and general estimate	176,200.00	33,478.00	209,678.00
3.5.4	Technical documentation required to obtain TDBP/TDEO approvals/agreements/authorizations	106,533.00	20,241.27	126,774.27
3.5.5	Technical quality check of the technical design and execution details	164,690.00	31,291.10	195,981.10
3.5.6	Technical project and execution details	248,577.00	47,229.63	295,806.63
3.6	Organization of procurement procedures	0.00	0.00	0.00
3.7	Consulting	220,000.00	41,800.00	261,800.00
3.7.1	Project management within the investment objective	220,000.00.	41,800.00	261,800.00
3.7.2	Financial audit	0.00	0.00	0.00
3.8	Technical assistant	284,270.00	54,011.30	338,281.30
3.8.1	Technical assistance from the designer:	108,770.00	20,666.30	129,436.30
3.8.1.1	throughout the works execution period	88;770.00.	16,866.30	105,636.30
3.8.1.2	for the designer's participation to the phases included in the execution works control program, approved by the State Construction Inspectorate	20,000.00	3,800.00	23,800.00
3.8.2	Site management	139,000.00	26,410.00	165,410.00
3.8.3	Health and Safety Coordinator — according to Government Resolution No. 300/2006, as amended and completed	36,500.00	6,935.00	43,435.00
TOTAL CHAPTER 3		1,307,170.00	248,362.30	1,555,532.30
	Chapter 4 **Expenses for the basic investment**			
4.1	Constructions and installations	27,445,541.00	5,214,652.79	32,660,193.79
4.2	Assembly of machinery, technological and functional equipment	0.00	0.00	0.00
4.3	Machinery, technological and functional equipment requiring assembly	0.00,	0.00	0.00
4.4	Machinery, technological and functional equipment not requiring assembly and transport equipment	0.00	0.00	0.00
4.5	Endowments	40,000.00	7,600.00	47,600.00
4.6	Intangible assets	.0.00	0.00	0.00
TOTAL CHAPTER 4		27,485,541.00	5,222,252.79	32,707,793.79
	CHAPTER 5 Other expenses			
5.1	Site organization	392,891.08	74,649.31	467,540.39
5.1.1	Construction works and installations related to construction site organization	54,891.08	10,429.31	65,320.39
5.1.2	Costs related to the organization of the construction site	338,000.00	64,220.00	402,220.00
5.2	Commissions, fees, taxes, cost of credit	173,363.54	1,444.00	174,807.54
5.2.1	Commissions and interest related to the financing bank loan	0.00	0.00	0.00
5.2.2	State Constructions Inspectorate share for quality control of construction works	27,627.26	0.00	27,627.26
5.2.3	State Constructions Inspectorate share for state control over territorial planning, urban planning and for the authorization of construction works	1'38,136:29	0.00	138,136.29
5.2.4	The share related to the Social House of Builders	0.00	0.00	0.00
5.2.5	Fees for agreements, compliance notices and building/demolition permits	7,600.00	1,444.00	9,044.00
5.3	Miscellaneous and unforeseen expenses (10)	2,858,113.60	543,041.58	3,401.155.18
5.4	Information and advertising expenses	84,500.00	16,055.00	100.555.00

TOTAL CHAPTER 5	[3,508,868.22 |		635,189.89 |	4,144,058.11
CHAPTER 6 Expenses for technological samples and tests				
6.1 | Operating staff training	|	0.00	0.00	0.00
6.2 | Technological samples and tests	|	0.00.|	0.00	0.00
TOTAL CHAPTER 6	|	0.00	0.00	0.00
CHAPTER 7 Expenses related to the budget margin and for establishing the implementation reserve for price adjustment				
7.1 Expenditures related to the budget margin 10% of (1.2 +1.3 + 1.4 + 2 + 3.1 + 3.2 + 3.3 + 3.5 + 3.7 + 3.8 + 4 + 5.1.1)		2,896,952.71	550,421.01	3,447,373.72
7.2 Expenditures for the establishment of the implementation reserve for price adjustment f5%)		1,381,362.85	262,458.94	1,643,821.80
TOTAL CHAPTER 7		4,278,315.56 |	812,879.96 |	5,091,195.52
GRAND TOTAL	36,706,719.79 |		6,942,781.69 |	43,649,501.48
Of which: C + M (1.2 + 1.3 + 1.4+ 2 + 4.1 + 4.2 + 5.1.1)	27,627,257.08 I		5,249,178.85 |	32,876,435.93

- estimated operating costs over the normalized life/depreciation period of the investment;

Operating costs in Option I	Years									
	1	2	3	4	5	6	7	8	9	10
Utilities Expenses	99.400	109.340	126.834	118.286	121.268	123.256	126.238	128.226	131.208	133.196
Material Expenses (spare parts, consumables, etc.)	178.404	196.244	227.694	212.301	217.653	221.221	226.573	230.141	235.493	239.061
Other Expenses (repairs, etc.)	1.278.270	1.406.097	1.631.073	1.521.141	1.559.489	1.585.055	1.623.403	1.648.968	1.687.316	1.712.882
Total operating costs	1.556.075	1.711.683	1.985.553	1.851.732	1.898.415	1.929.538	1.976.221	2.007.343	2.054.027	2.085.149
Operating costs in Option I	Years									
	11	12	13	14	15	16	17	18	19	20
Utilities Expenses	136.178	139.160	141.148	144.130	147.112	150.094	153.076	156.058	171.664	188.830
Material Expenses (spare parts, consumables, etc.)	244.413	249.766	253.334	258.686	264.038	269.390	274.742	280.094	308.104	338.914
Other Expenses (repairs, etc.)	1.751.230	1.789.578	1.815.143	1.853.492	1.891.840	1.930.188	1.968.536	2.006.884	2.207.572	2.428.330
Total operating costs	2.131.832	2.178.516	2.209.638	2.256.321	2.303.005	2.349.688	2.396.371	2.443.054	2.687.359	.2.956.094

Operating costs in Option II	Years									
	1	2	3	4	5	6	7	8	9	10
Utilities Expenses	149.100 |	164.010	190.252	177.429	181.902	184.884	189.357	192.339	196.812	199.794
Material Expenses (spare parts, consumables, etc.)	156.104 |	171.714	199.188	185.763	190.446	193.568	198.251	201.374	206.057	209.179
Other Expenses (repairs, etc.)	1.278.270	1.406.097	1.631.073	1.521.141	1.559.489	1.585.055	1.623.403	1.648.968	1.687.316	1.712.882
Total operating costs	1.583.475	1.741.823	2.020.515	1.884.337	1.931.843	1.953.513	2.011.018	2.042.689	2.090.194	2.121.864
Operating costs in Option I	Years									
	11	12	13	14	15	16	17	18	19	20
Utilities Expenses	204.267	208.740	211.722	216.195	220.668	225.141	229.614	234.087	257.496	283.245
Material Expenses (spare parts, consumables, etc.)	213.862	218.545	221.667	226.350	231.033	235.716	240.399	245.082	269.591	296.550
Other Expenses (repairs, etc.)	1.751.230	1.789.578	1.815.143	1.853.492	1.891.840	1.930.188	1.968.536	2.006.884	2.207.572	2.428.330
Total operating costs	2.169.370	2.216.875	2.248.545	2.296.051	2.343.556	2.391.061	2.438.566	2.486.071	2.734.678	3.008.145

5.5 Investment sustainability:

a) Social and cultural impact;

Being a building located in a central area of the locality, visible to the local community, an impact is observed on the mentality and behavior of people, which is why it is very important to provide a good example for the population given the project goals. The investment will have a positive impact on the development of the educational infrastructure, as well as in the involvement of fair and sustainable urban development. In conclusion, the investment proposed by this project aims at long-term, sustainable results, with considerable social and cultural impact.

b) Estimates regarding the workforce employed in carrying out the investment: in the implementation phase, in the operating phase;

Number of workplaces created in the fulfillment phase:

To carry out the investment, a specialized company in the field will be contracted based on the procurement procedure as described in the previous points. Therefore, we can say that this project does not create jobs in the execution phase, since the construction works will not be carried out in-house.

However, indirectly, the project proposed may create jobs for the business agents that will participate to the implementation of this investment. However, this is difficult to determine since it depends on the current capacity of each business agent.

Number of jobs created in the operation phase

All jobs will be occupied by staff with proper professional training, as well as by specialists with various qualifications and skills, responsibilities and duties specific to the field of activity wherre they operate. An increase in the number of jobs is not expected in the operation phase.

c) Impact on environmental factors, including the impact on biodiversity and protected sites, as appropriate;

No pollution sources have been identified that could influence the environment when the investment is put into operation.

Impact of intervention works on environmental factors:

For air protection

The characteristic pollutants resulting from the construction phase are:

- specific pollutants from exhaust gases (particles, nitrogen oxides, carbon monoxide, sulfur dioxide, volatile organic compounds) resulting from the machinery and means of transport, which are used during the investment execution.

Periodic technical checks of the equipment used for construction and the transport of materials will be carried out in order to ensure that the concentrations of pollutants emitted into the atmospheric air are within the provisions of the technical route of the equipment.

Protection against noise and vibrations

The equipment used during the construction period will comply with the noise standards in force.

The activities carried out on the site upon the execution completion will not cause noise pollution or vibrations.

An increase in the level of noise and vibrations in the area is not forecast.

Protection against radiation

Not applicable.

Soil and subsoil protection

Solutions for the protection of the soil and subsoil, during the works execution and upon their completion, mainly aim to:

Reducing the land surfaces degraded by the activity carried out on the construction site.

First of all, the possibility of affecting new land is considered to be minimized. These involve:

- saving reserves, by sizing the works strictly at the level of ensuring the execution plan of the project;
- directing and concentrating the activity only in the area destined for this purpose;

The following will be carried out:

- continuous monitoring of the condition of the land and physical-geological phenomena such as landslides, - torrents, etc.

- avoiding the extension of degraded land from these causes, which could be due to the construction methods; Connection of all possible sources, such as household water and sewer, to their collection elements. Possible sources of pollution are: household waste and household water.

The following measures have been taken:

- household wastes are collected in special containers located in the temporary waste storage area and transported by the sanitation company's vehicles; & household water are discharged to the sewer.

Protection of terrestrial and aquatic ecosystems: Not applicable.

Protection of human settlements and other public interest sites: Not applicable.

The existing function is not modified.

Management of toxic and hazardous substances Not applicable.

The proposed functions are compatible and do not create neighboring easements, the newly proposed goals not raising environmental issues.

DNSH principles and measures included in the project:

Buildings are not used for the extraction, storage, transport or production of fossil fuels.

For the project preparation, the building's energy performance certificate and the energy audit report were also prepared, which establish the proposed renovation measures necessary to achieve the energy efficiency indicators, being selected the scenario with the highest energy savings and the highest impact on health and the decrease in CO2 emissions into the air, by increasing the thermal insulation performance of buildings and reducing consumption, by replacing the heating system and by completing with renewable energy sources.

According to the energy audit report, the implementation of the measures proposed will lead to increased hygrothermal comfort in buildings, ensuring the comfort of occupants regardless of the external temperature.

The audit report estimated the energy performance indicators obtained after the renovation, as follows:

Achievement indicator for package P3 - for all investment sites, namely high school building, gym, workshops and dormitory	Indicator value before renovation	Indicator value after renovation	**Discount** (%)
Total final thermal energy consumption (MWh/year)	1146.249	383.986	66.5
Total final electrical energy consumption (MWh/year)	197.078	204.098	-3.6
Energy consumption toe/year	115.526	50.575	56.2
Amount of CO2 equivalent emissions (tons CO2/year)	323.70	50.03	84.5
Final thermal energy payment [MWh/year]	1146.33	62.40	94.6
Final electrical energy payment [MWh/year]	197.13	122.90	37.7

The project aims to improve the energy efficiency of buildings, reduce the general level of pollution, reduce the pressure on the environment related to the production and consumption of energy resources, ensure comfort and optimal conditions for the use of buildings, by applying the most efficient and sustainable measures, in order not to have a negative impact on the environment even during the works execution, nor through long-term use of buildings.

The construction materials and components intended to be used in the renovation of buildings do not contain asbestos or other toxic substances. This requirement will be specified in the specifications at the Technical Design and Execution stage.

The project aimed to improve indoor air quality by avoiding the use of waxes and varnishes for cleaning surfaces. This requirement will be specified in the specifications at the Technical Design and Execution stage.

For the designed equipment, it will be ensured that all equipment meets energy efficiency standards, and only equipment with the CE conformity marking and accompanied by a European certificate/declaration of conformity will be used. At the same time, all electrical and electronic equipment will have the RoHS marking, to certify compliance with Directive No. 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restrictions on the use of certain hazardous substances in electrical and electronic equipment.

When developing the technical project and executing the works, measures will be taken to improve indoor air quality, by avoiding the use of building materials containing substances such as formaldehyde (from plywood), carcinogenic volatile organic compounds and flame retardants from numerous materials, as well as building materials that emit radon.

According to the European Radon Atlas (https://remap.jrc.ec.europa.eu/Atlas.aspx?layerID=3), produced by the Joint Research Center of the European Commission, in the area of SIBIU Municipality, the radon concentration inside buildings does not exceed 200 Bq/m3, being below the limit of 300 Bq/m3 imposed by the Order of the President of CNCAN 185/2019 for which it is necessary to take measures to reduce radon emissions.

The specifications will require the use of construction materials that reduce noise, dust and polluting emissions during renovation works.

The builder will be obliged to comply with the rules on recycling, collective selection and waste in accordance with the provisions of the applicable national legislation in force. As regards the equipment purchased, these will comply with the latest market requirements.

Non-hazardous waste from construction and demolition activities (with the exception of natural materials referred to in category 17 05 04 of the European list of waste established by Decision 2000/532/EC) and generated on the site will be prepared for reuse, recycling and other material recovery operations, including backfilling operations that use waste to replace other materials, in accordance with the waste hierarchy and the EU Protocol on the management of construction and demolition waste. The builder will prove the fulfillment of this requirement with proof of handing over the waste to economic operators carrying out waste recovery operations.

The project has no negative effects on the sustainable use and protection of water and marine resources or impact on these resources. By restoring the water and sewage networks, a decrease in water consumption will be ensured.

The location of the project is outside sensitive areas from the point of view of biodiversity (the Natura 2000 network of protected areas, natural sites inscribed on the UNESCO World Heritage List and the main biodiversity areas, as well as other protected areas)

The project contributes to the mitigation of climate change by implementing measures to reduce C02 emissions and includes measures to adapt to climate change taking into account the efficient use of resources and the decrease in resource consumption as well as the adaptation of buildings to the effects generated by climate change, to ensure sustainable use and a resilient infrastructure.

The project makes a positive contribution to all environmental objectives of the 8th Environment Action Programme, which sets out the EU's legally agreed common agenda for environmental policy until the end of 2030:

achieving the 2030 greenhouse gas emissions reduction target

increasing adaptive capacity, strengthening resilience and reducing vulnerability to climate change

promoting a regenerative growth model, decoupling economic growth from resource use, pursuing the zero pollution goal, including for air, water and soil, and protecting the health and quality of life of Europeans; protecting, conserving and restoring biodiversity and improving natural capital, reducing pressures on the climate and environment related to production and consumption, in particular in the fields of energy, industrial development, buildings and infrastructure, mobility and the food system.

The project was granted approval no. 2150/19.05.2025 by the Sibiu Environmental Protection Agency for the classification of the notification, as the project is not subject to the environmental impact assessment procedure.

5.6. Financial and economic analysis related to the implementation of the intervention works:

a) Presentation of the analysis plan, including the specification of the reference period and the presentation of the reference scenario;

Increasing energy efficiency is a priority at European level that will lead to sustainable development, competitiveness, saving energy resources and reducing greenhouse gas emissions. Energy efficiency and renewable sources have an important role in protecting the environment and the climate. The EU and all its Member States have signed and ratified the Paris Agreement, agreeing to put the EU on a path to become the first climate-neutral economy and society by 2050. In line with the requirements of the agreement, the EU has presented its long-term emissions reduction strategy and its updated climate plans, committing to reducing its emissions by at least 550% by 2030 compared to 1990 levels. Through its energy efficiency objectives, Romania must contribute to meeting the European Union's energy efficiency target by proposing measures to improve energy efficiency, reduce greenhouse gas emissions, and increase the share of energy from renewable sources in total energy consumption by renovating the national building stock. The main findings of the 2022 Intergovernmental Panel on Climate Change (IPCC) report on climate change mitigation reveal that to achieve the warming target set in the Paris Agreement, global carbon emissions need to be halved by 2030 compared to current (2019) levels, with investments needed across all sectors, with low-carbon and energy-efficient building retrofits being one of the necessary measures.

While Europe's buildings are unique and diverse and reflect the culture of our continent, many of them are also old and inefficient. More than 220 million buildings, representing around 85% of the building stock, were built before 2001 and the vast majority will still be around in 2050. In addition, they are not prepared to cope with current and future climate change, such as rising temperatures and extreme weather events. Buildings are responsible for approximately 40% of the EU's total energy consumption and 36% of energy-related greenhouse gas emissions. Renovation of buildings is essential to address this energy use and emissions, to meet the EU's 2030 emission reduction target and to become climate neutral by 2050, and to increase resilience to the effects of climate change.

By implementing the project and renovating the buildings of the Technical College of Energy to become energy and resource efficient, in addition to meeting the major objectives of environmental protection, climate change adaptation and ensuring sustainable development, it also leads to direct benefits for the beneficiaries, reducing energy costs, dependence on external energy sources for operation and at the same time improving health, comfort and well-being.

In addition to its environmental benefits, building renovation creates local jobs and stimulates much-needed investment in our economy. The International Energy Agency's (IEA) 2020 Sustainable Recovery Report found that building renovation is the single largest job creator, creating between 9-30 jobs for every million invested in energy efficiency measures in the buildings sector..

By implementing the proposed investment, the following expected goals will be achieved:
- Improving the energy efficiency of the facility;
- Annual reduction of equivalent CO2 emissions;
- Reducing energy consumption of the school buildings
- Increasing the share of energy from renewable sources
- Decreasing dependence on conventional energy sources
- Obtaining a sustainable and climate change-resilient building
- Ensuring conditions for the development of educational activities at the level of the administrative-territorial unit by modernizing the school;
Increasing comfort for all users of the school;
- Rehabilitating the building to the highest standards according to current requirements so that the educational process can take place under normal conditions;
- Improving the state of the school infrastructure through refurbishment works of the building and related facilities;
- Conforming the building to fire safety standards; Increasing the integration level into the labor market of college students.
The condition and quality of the infrastructure, the environmental quality of the space, hygrothermal comfort are basic factors for creating optimal conditions for ensuring quality education. By reducing the consumption of thermal, electrical and water energy, by installing renewable energy sources for the building's own consumption, by significantly reducing CO2 emissions and by complementary measures to optimize consumption and create optimal indoor comfort through the integrated building management system, the project directly contributes to achieving national and European environmental targets and adaptation to climate change.
In order to improve energy efficiency and renovate and optimize the conditions of use of the Technical Energy College building, two scenarios are proposed:
OPTION 1 - In-depth energy refurbishment applying the maximum package:
This package involves the construction of building envelopes (walls. floors. glazed surfaces), as well as the implementation of high-performance systems at the installation level: HVAC, sanitary. electrical, with the help of alternative energy.
OPTION 2 - In-depth energy refurbishment applying the minimal package:
This package involves the implementation of building envelopes (walls, floors, glazed surfaces), without implementing high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.
The recommended feasible scenario is OPTION 1 - In-depth energy refurbishment applying the maximum package proposed by the energy auditor, to which are added the recommendations of specialized designers, taking into account the design topic.
The financial analysis took into account the fact that this project is social, regarding the improvement of educational infrastructure, which means that it is not a revenue generator.
The reference period of the project is 20 years. In establishing the time period, the idea was started from the idea that the forecasts referring to the future trend of the project should be formulated over a period appropriate to its useful economic life and long enough to take into account its long-term impact.
To determine the relevant parameters from the point of view of environmental protection, the values resulting from the energy audit for the following parameters will be used, as follows:
Specific energy consumption and specific consumption reductions corresponding to the 2 intervention measures

Achievement indicator for package P3 - for all investment sites, namely high school building, gym, workshops and dormitory	Indicator value before renovation	Indicator value after renovation	**Discount** (%)
Total final thermal energy consumption (MWh/year)	1146.249	383.986	66.5
Total final electrical energy consumption (MWh/year)	197.078	204.098	-3.6
Energy consumption toe/year	115.526	50.575	56.2
Amount of CO2 equivalent emissions (tons CO2/year)	323.70	50.03	84.5
Final thermal energy payment [MWh/year]	1146.33	62.40	94.6
Final electrical energy payment [MWh/year]	197.13	122.90	37.7

b) Analysis of the demand for goods and services that justifies the need and sizing of the investment, including medium and long-term forecasts;

The school is relatively new, but it has gained prestige in training specialists in the electrical field, becoming a school of tradition. Equally, the daily work of the students and teachers of this school determines its identity and further evolution. The educational profiles of the school have been constantly adapted to the needs of the students, as well as to the needs and evolution of the labor market. The Energy College is the most important technical education institution in the electrical and electronic field in the county.

The school has partnerships and cooperation contracts with several companies regarding the implementation of student internships, the provision of scholarships, the employment of students during the holidays and the employment of graduates, partnerships that ensure the attractiveness of the educational unit in the technical and dual education plan for future generations, throughout the entire time period of at least 20 years of the project.

The investment goal was sized based on the analysis of the number of students enrolled in the Technical Energy College and the number of full-time and/or part-time teachers directly affected by the investment.

The evolution of the number of students in the period 2020 - 2024 is as follows:

School year	No.of students
2020 - 2021	537
2021- 2022	531
2022 - 2023	549
2023 - 2024	543

It is noted that between 2020-2024 the number of students had a relatively constant evolution, and in terms of the evolution of requests regarding the school's educational offer, there is continuity.

At the same time, direct beneficiaries of the project are also adults who follow qualification courses organized by the school, which has been authorized since 2010 to conduct qualification and training courses with adults and has been an accredited E.C.D.L. testing center since 2007.

Thus, ensuring a qualitative level of education and ensuring the minimum material base for carrying out the educational act is an essential condition for the student's co-interest, for discouraging absenteeism and reducing the phenomenon of abandonment/early school leaving, for increasing the graduation rate and transition to higher levels of education.

At the same time, the indirect beneficiaries of the investment are also:

Parents of the school's students

- Residents of the Vasile Aaron neighborhood who directly benefit from a healthier environment with low carbon emissions, approx. 15,900 people[1]

c) Financial analysis; financial sustainability;

The financial analysis aims to calculate the financial performance of the project proposed during the reference period. According to the specific legislation on the financing and administration of pre-university education units, the funds of the education units are allocated from the state budget (by standard cost) - basic financing and from the local budgets of the TAUs that manage the respective units - complementary financing, so that the unit's expenses are fully covered by the two financing sources.

In the calculation of the financial analysis, the salary expenses of the staff, as well as the student scholarships, were not taken into account, as they have no impact on the project, respectively they are maintained regardless of the way the project is implemented. Thus, the operating and maintenance costs of the school, dependent on the intervention on the building over a period of 20 years, will be considered in this regard.

By implementing the project, the building's operating costs will be reduced by reducing the primary energy requirement by over 75%, which will generate lower utility costs and at the same time the financial pressure to cover the costs of constant repairs and larger renovations will be significantly reduced.

The relevant costs will be established in 3 scenarios, as follows:

• Scenario I: failure to carry out the refurbishment project

• Scenario II: building refurbishment Option I (package P3 of the Audit)

• Scenario III: building refurbishment Option II (package P... of the Audit)

Table. Operating costs for the TECHNICAL ENERGY COLLEGE in the no-project version:

• In the no-project scenario, the operating costs estimate was based on the financial statements of the Technical Energy College, taking into account historical trends and assuming that the investment will not take place.

• All amounts are expressed in LEI and the forecasts are made in constant prices.

Operating costs in no-project scenario	Years									
	I.	2	3	4	5	6	7	a	9	10
Utilities expenses	248.500	273.350	317.086	295.715	303.170	308.140	315.595	320.565	328.020	332.990
Materials expenses (spare parts, consumables, etc)	223.005	245.306	284.554	265.376	272.066	276.526	283.216	287.676	294.367	298.827
Other expenses (repairs,etc)	1.826.100	2.008.710	2.330.104	2.173.059	2.227.842	2.264.364	2.319.147	2.355.669	2.410.452	2.446.974
Total operating costs	2.297.606	2.527.368	2.931.747	2.734.154	1301033	2.349.036	2.917.965	2.963.918	3.032.848	3.078.801
Operating costs in no-project scenario	Years									
	11	12	13	14	15	16	3.7	18	19	20
Utilities expenses	340.445	347.900	352.870	360.325	367.780	375.235	382.690	390.145	429.160	472.075
Materials expenses (spare parts, consumables, etc)	305.517	312.207	316.667	323.357	330.047	336.738	343.428	350.118	385.130	423,643
Other expenses (repairs,etc)	2.501.757	2.556.540	2.593.062	2.647.845	2.702.628	2.757.411	2.812.194	2.866.977	3.153.675	3.469.042
Total operating costs	1.147.730	3.216.459	?.262.612	3;331.541	***3.441476***	3.469.400	1.538.333	3.607,258	3,967 983	4.364.780

Table Operating costs - IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE - in Option I - recommended:

• The expenses that were considered to be generated by the investment were analyzed.

• In estimating the operating costs, the financial statements of the Technical Energy College were also used

• Following the investment, it is expected that the expenses for heating and lighting will decrease by 60%, taking into account the proposed energy efficiency measures.

• It was also estimated that the costs of current repairs and other expenses will decrease by over 40%, based on the premise that following the building refurbishment, it will not need extensive repairs for a certain period of time.

- All amounts are expressed in LEI and forecasts are made in constant prices.

Operating costs in no-project scenario	Years									
	I.	2	3	4	5	6	7	a	9	10
Utilities expenses	99.400	109.340	126.834	118.286	121.268	123.256	126.238	128.226	131.208	133.196
Materials expenses (spare parts, consumables, etc)	178.404	196.244	227.644	212.301	217.653	221.221	226.573	230.141	235.493	239.061
Other expenses (repairs,etc)	1.278.270	1.406.097	1.631.073	121.141	1.559.489	1.585.055	1.623.403	11.648.968	1.687.316	1.712.882
Total operating costs	1.556.075	1.711.683	1.985.553	1.851.732	1.898.415	1.929.538	1.976.221	2.007.343	2.054.027	2.085.149
Operating costs in no-project scenario	Years									
	11	_12	13	14	15	16	3.7	18	19	20
Utilities expenses	136.178	139.160	141.148	144.130	147.112	150.094	153.076	156.058	171.664	188.830
Materials expenses (spare parts, consumables, etc)	244.413	249.766	253.334	258.686	264.038	269.390	274.742	280.094	308.104	338.914
Other expenses (repairs,etc)	1.751.230	1.789.578	1.815.143	1.853.492	1.891.840	1.930.188	1.968.536	2.006.884	2.207.572	2.428.330
Total operating costs	2.131.832	2.178.516	2.209.638	2.256.321	2.303.005	2.349.688	2.396.371	2.443.054	2.687.359	2.456.094

Table Operating costs - IN-DEPTH ENERGY REFURBISHMENT OF THE TECHNICAL ENERGY COLLEGE - in Option II -not recommended:

- • The expenses that were considered to be generated by the investment were analyzed.
- • In estimating the operating costs, the financial statements of the Technical Energy College were also used
- • Following the investment, it is expected that the expenses for heating and lighting will decrease by 40%, taking into account the proposed energy efficiency measures.
- • It was also estimated that the costs of current repairs and other expenses will decrease by over 30%, based on the premise that following the refurbishment of the building, it will not need extensive repairs for a certain period of time.
- • All amounts are expressed in LEI and the forecasts are made in constant prices.

Operating costs in no-project scenario	Years									
	I.	2	3	4	5	6	7	a	9	10
Utilities expenses	149.100	164.010	390.252	177.429	181.902	184.884	189.357	192.339	196.812	199.794
Materials expenses (spare parts, consumables, etc)	156.104	171.714	199.188	185.763	190.446	193.568	198.251	201.374	206.057	209.179
Other expenses (repairs,etc)	1.278,270	1.406.097	1.631.073	1.521.141	1.559.489	1.585.055	1.623.403	1.648.968	1.687.316	1.712.882
Total operating costs	1.583.475	1.741.823	2.020.515	1.884.337	1.931.843	1.963.513	2.011.018	2.042.689	2.090.194	2.121.864
Operating costs in no-project scenario	Years									
	11	_12	13	14	15	16	3.7	18	19	20
Utilities expenses	204.267	208.740	211.722	216.195	220.668	225.141	229.614	234.087	257.496	283.245
Materials expenses (spare parts, consumables, etc)	213.862	218.545	221.667	226.350	231.033	235.716	240.399	245.082	269.591	296.550
Other expenses (repairs,etc)	1.751.230	1.789.578	1.815.143	1.853.492	1.891.840	1.930.188	1.968.536	2.006.884	2.207.572	2.428.330
Total operating costs	2.169,370	2.216.875	2-246,545	2.296.051	2.343.556	2.391.061	2.438.586	2.486.071	2.734.678	3.008.145

Estimated revenue evolution

The inflows of the proposed investment will be from the local budget, the state budget and from own revenues. The analysis of inflows was based on Law 198/2023, the Pre-university Education Law.

For all expenditure items related to complementary financing, the funds allocated through the local budget can be supplemented with the educational units' own funds, from donations and sponsorships, etc.

Taking into account these provisions and the fact that the acceptance of this investment by the beneficiary also attracted the commitment of this entity to financially support the functioning of educational activities as well as the maintenance of the investment during its lifetime, the value of budgetary credits was estimated as predominant.

Input flows in the no-project version	Years									
	1	2	3	4	5	6	7	8	9	10
Revenues	2.297.606	2.527.968	2.931.747	2.734.154	2.803.083	2.849.036	2.917.965	2.963.918	3.032.848	3.078.801
	Yeaars									
Input flows in the no-project version	11	12	13	14	15	16	17	18	19	20
Revenues	3.147.730	3.216.659	3.262.612	3.331.541	3.400.470	3.469.400	3.538.329	3.607.528	3.967.983	4.364.780

Input flows in Option I

Input flows in the no-project version	Years									
	1	2	3	4	5	6	7	8	9	10
Revenues	**1.556.075**	**1.711.683**	**1.985.553**	**1.851.732**	**1.898.415**	**1.929.538**	**1.976.221**	**2.007.343**	**2.054.027**	**2.085.149**
	Yeaars									
Input flows in the no-project version	11	12	13	14	15	16	17	18	19	20
Revenues	**2.131.832**	**2.178.516**	**2.209.638**	2.256.321	**2.303.005**	**2.349.688**	**2.396.371**	**2.443.054**	**2.687.359**	**2.956.094**

Input flows in Option II

Input flows in the no-project version	Years									
	1	2	3	4	5	6	7	8	9	10
Revenues	**1.583.475**	**1.741.823**	**2.020.515**	**1.884.337**	**1.931.843**	**1.963.513**	**2.011.018**	**2.042.689**	**2.090.194**	**2.121.864**
	Yeaars									
Input flows in the no-project version	11	12	13	14	15	16	17	18	19	20
Revenues	**2.169.370**	**2.216.875**	**2.248.545**	**2.296.051**	**2.343.556**	**2.391.061**	**2.438.566**	**2.486.071**	**2.734.678**	**3.008.145**

Marginal financial projections of revenues in Option I

Marginal financial projections of revenues in Option I – input flows	Years									
	1	2	3	4	5	6	7	8	9	10
Revenues	**- 741.531**	**-815.684**	**-946.194**	**-882.422**	**-904.668**	**-919.498**	**-941.744**	**-956.575**	**-978.821**	**-993.652**
	Yeaars									
Marginal financial projections of revenues in Option I - input flows	11	12	13	14	15	16	17	18	19	20
Revenues	**-1.015.897**	**-1.038.143**	**-1.052.974**	-1.075.220	**-1.097.466**	**-1.119.792**	**-1.141.958**	**-1.164.204**	**-1.280.624**	**-1.408.686**

Marginal financial projections of revenues in Option II

Marginal financial projections of revenues in Option I – input flows	Years									
	1	2	3	4	5	6	7	8	9	10
Revenues	**-714.132**	**-785.545**	**-911.232**	**-849.816**	**-871.240**	**-885.523**	**-906.947**	**-921.230**	**-942.654**	**-956.936**
	Yeaars									
Marginal financial projections of revenues in Option I – input flows	11	12	13	14	15	16	17	18	19	20
Revenues	**-978.350**	**-999.784**	**-1.014.067**	-1.035.491	**-1.056.915**	**-1.078.339**	**-1.099.763**	**-1.121.186**	**-1.233.305**	**-1.356.636**

The investment costs are as follows:
• In Alternative I: 75,543,098.97 Lei
• In Alternative II: 43,649,501.47 Lei

c.1 Financial indicators of the investment:
The main financial indicators of the investment are the net financial discounted income (FNDI) and the financial internal rate of return (RIRF). The following assumptions were considered in the calculation of the two indicators:
• The discount rate is considered 40% , according to the recommendations in the document "Economic Appraisal Vademecum 2021-2027" developed by the European Commission for the period 2021-2027
• The input values (payments and receipts) for the calculation of the net financial discounted income and the financial internal rate of return are represented by:
o The initial investment, staggered over the project implementation period (2 calendar years)
o The marginal revenue projections, according to tab.17 and tab.18 over the operating period (20 calendar years)
The following values were obtained for the VNAF and RIRF indicators:

Table. Financial indicators of the investment in OptionI:

Investment financial indicators																				
Implementation and operating years																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total operating revenues	0	0	-946.194	-882.422	-904.668	-919.498	-941.744	-956.575	-978.821	-993.652	-1.015.897	-1.058.143	-1.052.974	-1.075.220	-1.097.466	-1.189.712	-1.141.958	-1.164.204	-1..280.624	-1.408.686
Total collections	0	0	-946.194	-882.422	-904.668	-919.498	-941.744	-956.575	-978.821	-993.652	-1.015.897	-1.058.143	-1.052.974	-1.075.220	-1.097.466	-1.189.712	-1.141.958	-1.164.204	-1..280.624	-1.408.686
Investment	37.771.549	37.771.549																		
Total payments	37.771.549	37.771.549	-946.194	-882.422	-904.668	-919.430	-941.744	-956.575	-978.821	-993.652	-1.015.897	-1.058.143	-1.052.974	-1.075.220	-1.097.466	-1.189.712	-1.141.958	-1.164.204	-1..280.624	-1.408.686
Data for RIRF	-37.771.549	-37.771.549	946.194	882.422	904.668	919.430	941.744	956.575	978.821	993.652	1.015.897	1.058.143	1.052.974	1.075.220	1.097.466	1.189.712	1.141.958	1.164.204	1..280.624	-1.408.686
Cumulated cash flow																				
Update rate	4%																			
Net financial updated revenue	-59,220.887																			
Internal rate of return	-10.83%																			

Table. Financial indicators of the investment in OptionII:

Investment financial indicators																				
Implementation and operating years																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total operating revenues			-911.232	-849.816	-871.240	-885.523	-906.647	-921.230	-942.654	-956.936	-978.360	-999.784	-1.014.067	-1.035.491	-1.056.915	-1.078.339	-1.099.763	-1.121.186	-1..233.305	-1.356.636
Total collections			-911.232	-849.816	-871.240	-885.523	-906.647	-921.230	-942.654	-956.936	-978.360	-999.784	-1.014.067	-1.035.491	-1.056.915	-1.078.339	-1.099.763	-1.121.186	-1..233.305	-1.356.636
Investment	21.824.751	21.824.751																		
Total payments	21.824.751	21.824.751	-911.232	-849.816	-871.240	-885.523	-906.647	-921.230	-942.654	-956.936	-978.360	-999.784	-1.014.067	-1.035.491	-1.056.915	-1.078.339	-1.099.763	-1.121.186	-1..233.305	-1.356.636
Data for RIRF	-21.824.751	-21.824.751	911.232	849.816	871.240	885.523	906.647	921.230	942.654	956.936	978.360	999.784	1.014.067	1.035.491	1.056.915	1.078.339	1.099.763	1.121.186	1..233.305	1.356.636
Cumulated cash flow																				
Update rate	4%																			
Net financial updated revenue	-29,587.846																			
Internal rate of return	-7.26%																			

To determine the optimal scenario, namely Option I, the following benefits were taken into account:

• Energy savings, as a result of works to increase energy performance

• Decrease in C02 emissions

• Reduction in repair and maintenance costs

• Increased quality of education and implicitly a better insertion in the labor market of school graduates. Option I, although more expensive from the investment point of view, leads to energy savings and decreases in CO2 emissions considerably higher than Option II, while repair costs are relatively identical.

d) Economic analysis; cost-effectiveness analysis;

The purpose of the economic analysis is to prove that the project has a net positive contribution for the society and, consequently, deserves to be co-financed from non-refundable funds. For the selected alternative the project benefits must exceed the project costs.

The economic (versus financial) costs of the project are measured in terms of their 'resource' or 'opportunity' costs; this represents the benefit that can be predetermined (opportunity loss) by the society by using limited economic resources in the project compared to an alternative use of funds for other purposes.

The following economic benefits were identified in the project analysis:

a) energy savings, and implicitly reduced utility costs, as a result of energy efficiency works

b) reduced costs for current repairs and maintenance of old equipment, often technically obsolete.

c) increasing the quality of education as a result of the refurbishment works on the school infrastructure, which will lead to a better insertion on the labor market of school graduates, a fact reflected in the decrease in the number of unemployed and the increase in contributions paid to the state budget (income tax, health and social insurance contributions) d) creation of jobs in the implementation phase and subsequently, during the operating period

e) benefits for the health of students, teachers and the community by reducing C02 emissions and increasing the indoor air quality in the building
f) social benefits by increasing the accessibility of students with SEN, but also by creating spaces for social and cultural interaction and non-formal education activities
g) building refurbishment creates jobs at the local level and boosts the necessary investments in our economy. The 2020 report of the International Energy Agency (IEA) on sustainable recovery found that the building refurbishment is the most important generator of jobs, creating between 9-30 jobs for every million invested in energy efficiency measures in the building sector.
h) reduction of CO2 emissions, with a direct impact on the increase in the health of the population in the vicinity. For this type of environmental benefit, its quantification is carried out by reference to: The methodology for quantifying the climate impact of a project is the one recommended in the 2014 CBA Guidelines. The methodology consists of estimating, through appropriate emission factors, the net GHG emissions generated or avoided by the project compared to a baseline scenario. The resulting amount of GHG emissions generated/avoided in tonnes of carbon dioxide equivalent (C02e) should be valued in monetary terms with a shadow carbon price (in euros per tonne of CO2e). In line with the EC technical guidance on climate proofing of infrastructure for the period 2021-2027, it is recommended to use as the shadow carbon price the values recently established by the EIB as the best available evidence on the cost of achieving the temperature objective of the Paris Agreement (i.e. the 1.5 C target). The shadow price to be used to monetize the estimated changes in C02 emissions was taken from the values used by the EIB (section 2.5 of Part I of the EAV).

Table 4. Recommended shadow cost of carbon for 2020–2050 (*)

Year	EUR / t CO_2e	Year	EUR / t CO_2e	Year	EUR / t CO_2e	Year	EUR / t CO_2e
2020	80	2030	250	2040	525	2050	800
2021	97	2031	278	2041	552		
2022	114	2032	306	2042	579		
2023	131	2033	334	2043	606		
2024	148	2034	362	2044	633		
2025	165	2035	390	2045	660		
2026	182	2036	417	2046	688		
2027	199	2037	444	2047	716		
2028	216	2038	471	2048	744		
2029	233	2039	498	2049	772		

(*) Prices in Euro 2016

Source: DG CLIMA (2021)

e) Risk analysis, risk prevention/mitigation measures

A risk analysis must be carried out from the very beginning of a project's design phase. Risk in projects represents the effect on project goals, which may arise due to the lack of knowledge of the potential set of events that exist throughout the project's implementation.

Risk management is the systematic process that identifies, analyzes and responds to risks that may arise in a project. Risk is defined as the possibility of deviation (positive or negative) from project goals. Deviations can be recorded in terms of content, duration, costs, quality. Any type of project is characterized by a certain level of uncertainty that generates a certain risk, but the implementation of project management methods will make the level of uncertainty lower or, for identified risks, can lead to the planning of response measures.

Risk identification is a continuous process that begins in the pre-project phase, is embodied in the risk management plan in the project's start-up process and will continue until the project is completed.

The main risks for the implementation and ensuring the sustainability of the project are internal and external, and mainly concern: financial, legislative, technical, environmental, contractual, sustainability, management risks, etc. Summarizing, we will show in the table below the possible risks that may arise in the project implementation and operation, as well as the preventive measures and the strategy for covering the risks identified. The risks identified are similar to both scenarios analyzed within the project.

Risk	Impact	Prevention/mitigation measures
Sustainability risk: Lack of specialized staff to maintain and ensure the operation of the building at optimal parameters, as well as insufficient funds allocated for the building maintenance	average	To mitigate this risk, the educational establishment will ensure the maintenance of the equipment and the building through its own staff and maintenance contracts. The necessary funds will also be allocated from the local budget, in addition to the amounts deducted from VAT from the state budget, for all activities necessary for the optimal functioning of the building.
Technical risk: Technical risks can be caused by: non-compliance with regulations and legislation in force, defective execution of one or more parts of the contract, as well as repeated failures of the equipment and devices used, or by the early moral wear and tear.	high	Technical risks can be reduced by: - including in the public procurement documentation clear qualification requirements/evaluation criteria regarding the experience and qualification of bidders, - concluding contracts for services and works with clauses regarding penalties for delay, damages for failure to properly fulfill the contractual obligations - monitoring the works by authorized site managers for all project specializations, as well as by the technical manager within the project team
Financial risk The increase in investment costs due to the increase in construction prices, the ineligibility of some of the expenses incurred, as well as the delay in	high	Financial risks can be mitigated through a periodic financial control of financial and accounting documents. In this regard, a significant role in reducing financial risks falls to the financial manager and the project manager. Real-time monitoring of cash flow and monitoring of the improper classification

reimbursement of expenses incurred or payment requests		of the expenses to be incurred, as well as the identification of additional financial resources, as appropriate
Environmental risk: weather conditions unfavorable for carrying out works	low	Given that a large part of the works will be carried out indoor, the risk of adverse weather conditions is low, however, for exterior works that may be affected by this risk, they will be planned accordingly for execution. The execution schedule will take into account potentially unfavorable periods..
Risk of not fulfilling the contractual clauses: the risk that during the design and execution of the works, the contractual clauses will not be observed by the contractor/subcontractors.	average	Provision of contractual clauses regarding clear delay penalties, continuous monitoring, by the project team, of design services and the actual execution of the works, as well as establishing intermediate milestones.
Management risk: The possibility that project management cannot be ensured effectively, which will lead to delays in the project and additional costs	average	To mitigate this risk, project management must be ensured by a mixed team, consisting of both specialized staff from the beneficiary and staff with proper expertise to ensure efficient and effective project management. At the same time, operational work and communication procedures will be established to streamline the management team's activities
Risk of delay in implementing the project: risks generated by possible challenges to public procurement procedures, with direct impact on the duration of the project implementation. Impact: average	average	To mitigate this risk, consideration will be given to the preparation of clear specifications and data sheets, with eligibility criteria, qualification and objective evaluation factors. Increased attention will be paid to the appropriate planning and monitoring of public procurement procedures and the involvement of people with procurement experience in project management..
Legislative risk: risks related to legislative changes in normative acts relevant to the project (normative acts regulating public procurement, price adjustment, etc.)	average	Legislative risks cannot be avoided, but the project team will be able to mitigate the impact of legislative changes by continuously monitoring legislation in relevant areas (public procurement, technical norms and regulations, fiscal and budgetary measures, etc.) and dynamically adapting the project in accordance with them..

6. OPTIMAL TECHNICAL-ECONOMIC SCENARIO RECOMMENDED

6.1. Comparison of the proposed scenarios/options, from technical, economic, financial, sustainability and risk point of view

OPTION 1 - In-depth energy refurbishment applying the maximum package:

This package involves the implementation of building envelopes (walls, floors. glazed surfaces), as well as the implementation of high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.

OPTION 2 - In-depth energy refurbishment applying the minimal package:

This package involves the implementation of building envelopes (walls, floors, glazed surfaces), without the implementation of high-performance systems at the installation level: HVAC, sanitary, electrical, with the help of alternative energy.

Considering the results of the technical expert report on the buildings regarding the stability and strength of the constructions, as well as the energy audit report, the general designer recommends the implementation of Option I which proposes the following intervention works (in-depth energy refurbishment) to respond to the design topic and bring the existing spaces up to the regulations in force:

- Interior re-compartmentation works by removing or completing masonry depending on the specific needs of the teaching activity and the regulations in force, in particular NP 010/2022 Norm on the design, construction and operation of buildings for schools and high schools
- Thermal refurbishment works of the building envelope;
- Thermal refurbishment works of the heating system and hot water supply;
- Provision of alternative systems for the production of electricity or heat (photovoltaic panels and heat pumps);
- Refurbishment and modernization works of all necessary interior installations: gas, thermal, electrical, water-sewage, weak voice and data currents, fire extinguishing installations;
- Creation of a fire detection, warning and signaling system;
- Restoration of interior finishes where specific works require it;

Exterior works for arranging kinetic floors in the premises;

- Specific works necessary to obtain ISU and DSP approvals;
- Equipping the buildings with ramps necessary for people with disabilities as well as lifting platforms for easy vertical movement;

From functional point of view and to increase the comfort level, the following interventions were proposed to bring the existing spaces up to the regulations in force, as follows:

Building C3–Workshops:

On the ground floor, considering that the P20. Garage area is currently non-functional, it is proposed to partition it with a light wall type RF 180' gypsum cardboard into two spaces for storage. Space P14. Electrical workshop and P03. Electromechanical workshop will be divided with lightweight plasterboard walls RF 60', respectively RF 150' into three classrooms and a workshop. Also, on the ground floor, two separate gender bathrooms are created.

On the 1st floor, in order to ensure fire safety requirements, it is proposed to replace the wall between axes F and I, 6 with 9, with a lightweight plasterboard wall RF 150'. Also, two separate gender bathrooms are created.

On the 2nd floor, space E2.04. Telecommunications laboratory will be divided into two spaces, a classroom and a laboratory. In order to ensure fire safety requirements, it is proposed to dismantle the wall in the stairwell. Also, two separate gender bathrooms are created.

Building C4 - GymHall:

The external wall of the Thermal Power Plant between axis A and B, built later and not structurally connected to the existing building, is being abandoned and the construction is being returned to its original form.

Building C5 - High School:

On the ground floor, considering that the space P35. Warehouse is currently non-functional, it is proposed to arrange a reading library with separate access from the outside. Spaces P36, P38 and P39 will be arranged in order to expand the current Technical Space.

To ensure the fundamental fire safety requirement, certain gaps will be modified and separations will be made on the escape routes according to the specialized plans.

On the 2nd floor, space E2.08. The library and reading room becomes a classroom.

Building C6 - Dormitory:

- In order to increase the comfort level, it is desired to re-functionalize the existing accommodation spaces by abolishing the sanitary groups per level and creating them in each room. Thus, each accommodation unit will be composed of: room with 2 beds, sanitary group (with washbasin, shower and toilet), access hall, resulting in a number of 80 rooms for 160 students. Each accommodation unit will have a usable area of approximately 16m2 and will consist of: room, private bathroom equipped with washbasin, shower and toilet, access hall. The accommodation spaces will be equipped with the necessary additional adjacent functions: study (reading rooms on each level), offices, laundries, dryers, storage, cleaning booth provided on each level, etc. It will be proposed to completely replace the interior finishes with good quality ones, easily washable and without roughness: washable plasters and paints on walls and suspended ceilings to mask installation routes, tiles in hallways and stairwells, triple-layered laminate flooring for heavy traffic in rooms, reading rooms, porcelain tiles in the bathrooms, offices, laundries and dryers. The interior joinery will be completely replaced with metal ones. On the outside, the dormitory will be thermally insulated and the exterior joinery will be replaced with aluminum ones with triple insulating glass. The heating, electrical and sanitary installations will be completely replaced.

The exterior improvements involve:

- Creating a kinetic floor on an area of approximately 200 square meters located according to the site plan. This innovative system involves installing special tiles on pedestrian areas, so that, when walking, the tiles capture the kinetic energy generated by the steps and transform it into electricity. The system is based on the piezoelectric effect that converts mechanical pressure into electrical energy. Each unit of kinetic energy is maximized and transformed into green energy, making each step a contribution to a sustainable future.

Considering that the High School is the building most exposed to sunlight, on the southern area, natural shading systems made of galvanized metal nets/rods anchored to the southern facade are proposed, intended to support green climbing plants.

From the point of view of cost-effectiveness analysis, Option I is the recommended solution, which will lead to positive results in the educational process.

Next, we will briefly compare the two scenarios. We will approach a tabular evaluation in order to more easily highlight the advantages and disadvantages of each scenario.

Comparison level	Scenario 1	Scenario 2
Necessary works	- in-depth energy refurbishment works - implementation of the maximum solution from the Energy Audit Report - additionally, the complementary measures developed by the general designer's specialists will be implemented	- in-depth energy refurbishment works - implementation of the maximum solution from the Energy Audit Report additionally, the complementary measures developed by the general designer's specialists will be implemented
Energy class	A	B
Execution deadline	20 months (effective execution of	20 months (effective execution of

	the investment site)	the investment site)
Additional costs	**- high costs compared to option II**	- low costs compared to option I
Risks	according to the risk analysis presented in this documentation	according to the risk analysis presented in this documentation
Sustainability	according to the sustainability analysis presented in this documentation	according to the sustainability analysis presented in this documentation
Impact over the environment	low environmental impact	low environmental impact

6.2. Selection and justification of the optimal, recommended option(s);

Analyzing the proposed scenarios from a technical, economic, financial and risk perspective, the designer selected scenario number 1 as the optimal scenario. This scenario was chosen because overall it offers the best cost-effective solutions for the project implementation.

6.3. The main technical and economic indicators related to the investment:

a) Maximum indicators, respectively the total value of the investment site, expressed in lei, with VAT and, respectively, without VAT, of which construction-assembly (C+A), in accordance with the general estimate;

Total value of the investment site (lei with VAT): 75,543,098.97 lei
Of which C+A (lei with VAT): 51,886,270.75 lei
Total value of the investment site (lei without VAT): 63,523,365.67 lei
Of which C+A (lei without VAT): 43,601,908.19 lei

b) Minimum indicators, respectively performance indicators - physical elements/physical capacities that show the achievement of the investment site target - and, where appropriate, qualitative, in accordance with the standards, norms and technical regulations in force;

INDICATORS	Amount at the beginning of the implementation period	Amount at the end of the implementation period
Immediate (direct) result		
Developed area	9,681.00 sqm	9,681.00 sqm
Developed area refurbished/new (m2)	0	6,681.00 sqm
Facilities for disabled people	1 ramp 0 mobile elevatos	3 ramps 2 mobile elevatos

Total reductions in thermal and electrical energy for the buildings studied by the project:

Fulfillment indicator for package P3•for HIGH SCHOOL BUILDING	Indicator value before refurbishment	Indicator value after refurbishment	Discount (%)
Total final thermal energy consumption (MWh/year)	233.572	92.630	60.3
Total final electrical energy consumption (MWh/year)	91.834	76.579	16.6
Energy consumption (toe/year)	27.985	14.552	48.0
Amount of CO2 equivalent emissions (tonnes CO2/year)	79.8	13.6	83.0
Final energy for thermal payment [MWh/year]	233.572	3.40	98.5
Final energy for electrical payment [MWh/year]	91.8	45.5	50.5

Fulfillment indicator for package P3•for DORMITORY BUILDING	Indicator value before refurbishment	Indicator value after refurbishment	Discount (%)
Total final thermal energy consumption (MWh/year)	638.560	177.104	72.3
Total final electrical energy consumption (MWh/year)	50.978	65.337	-28.2
Energy consumption toe/year	59.3H	20.850	64.8
Quantity of C02 equivalent emissions (tons CO2/year)	164.6	25.7	84.4
Final thermal energy payment [MWh/year]	638.56	52.00	91.9
Final electrical energy payment [MWh/year]	51.0	48.1	5.7

Fulfillment indicator for package P3•for GYM HALL BUILDING	Indicator value before refurbishment	Indicator value after refurbishment	Discount (%)
Total final thermal energy consumption (MWh/year)	82.250	51.861	36.9
Total final electrical energy consumption (MWh/year)	14.315	18.559	-29.6
Energy consumption toe/year	8.305	6.056	27.1
Quantity of C02 equivalent emissions (tons CO2/year)	23.3	2.5	89.1
Final thermal energy payment [MWh/year]	82.30	4.70	94.3
Final electrical energy payment [MWh/year]	14.3	3.0	79.0

Fulfillment indicator for package P3•for WORKSHOPS BUILDING	Indicator value before refurbishment	Indicator value after refurbishment	Discount (%)
Total final thermal energy consumption (MWh/year)	191.867	62.391	67.5
Total final electrical energy consumption (MWh/year)	39.951	43.623	-9.2
Energy consumption toe/year	19.936	9.117	54.3
Quantity of C02 equivalent emissions (tons CO2/year)	56.0	8.2	85.4
Final thermal energy payment [MWh/year]	191.9	2.3	98.8
Final electrical energy payment [MWh/year]	40.0	26.3	34.3

Fulfillment indicator for package P3 - for all investment sites, namely high school building, gym, workshops and dormitory	Indicator value before refurbishment	Indicator value after refurbishment	Discount (%)

Total final thermal energy consumption (MWh/year)	1146.249	383.986	66.5
Total final electrical energy consumption (MWh/year)	197.078	204.098	-3.6
Energy consumption toe/year	115.526	50.575	56.2
Quantity of C02 equivalent emissions (tons CO2/year)	323.70	50.03	84.5
Final thermal energy payment [MWh/year]	1146.33	62.40	94.6
Final electrical energy payment [MWh/year]	197.13	122.90	37.7

c) Financial, socio-economic, impact, result/operation indicators, established according to the specifics and target of each investment site;

In the development of this documentation for approving the intervention works, no other indicators specific to the field of activity in which the investment is made were identified.

d) Estimated execution duration of the investment site expressed in months. Maximum 20 months.

6.2. Presentation of the manner how compliance with the regulations specific to the intended function is ensured from the point of view of ensuring all requirements applicable to the construction, according to the level of detail of the technical proposals:

FULFILMENT OF QUALITY REQUIREMENTS (established by Law No. 10/1995)

In order to obtain quality constructions, it is mandatory to achieve and maintain, throughout the entire duration of the constructions' existence, the following fundamental applicable requirements, also provided by the project, according to Law No. 177/2015 amending and completing Law no. 10/1995 on quality in construction. The project will be subject to verification of the quality requirements Af, E, Ie, Is, It.

QUALITY REQUIREMENT "A" - MECHANICAL STRENGTH AND STABILITY

The expertized constructions were evaluated in accordance with the regulations in force, in order to substantiate the decision to classify them into a seismic risk class. Thus, the buildings fall into the seismic risk class RS III, which includes buildings that may show minor structural degradation, without significantly affecting safety. In-depth energy refurbishment works of buildings are necessary, timely and justified; however, they require important technical approaches to ensure strength, stability, durability, safety in operation/use and on the requirements/level of comfort and environment of the future spaces of the refurbished and modernized building. No consolidation measures are necessary.

QUALITY REQUIREMENT “B” – SAFETY IN OPERATION

The project covers works that will positively influence safety in operation.

QUALITY REQUIREMENT “C” - FIRE SAFETY

In order to mitigate the risks arising from fires, the following measures are provided in order to meet the specific fire safety conditions and performance levels:

The construction materials used meet the minimum fire behavior and strength performances established for classification into fire strength level II.

Materials and finishes that do not easily spread fire, that do not emit smoke and toxic gases will be used in buildings. The use of PVC materials/finishes that meet the additional smoke emission criterion s1 is allowed.

The facade and roof elements are made differently so as not to favor the spread of fire.

Inside buildings, between spaces with different purposes and fire risks, fire-resistant separation elements (walls, doors) are provided in accordance with the requirements of Norm P118/25, which limit the spread of fire and smoke in the event of a fire.:

- CT technical space separation: RF 180' walls, 120' floors
- medium fire risk spaces: minimum RF 60' walls/floors and solid doors
- library and archive spaces: RF 180' walls, 120' floors, EI-C 90' doors

- The buildings have horizontal and vertical circulation paths for normal operation designed so that in case of fire they are sufficient and meet fire safety conditions, for the evacuation of people directly at ground level
- The dimensions of the vertical and horizontal evacuation paths ensure the evacuation of the necessary flows.
- The evacuation routes are short, lead directly to the outside of the buildings and are marked, according to the legal regulations in force, so that they can be easily recognized by the people who use them in case of fire.

Users are mostly people who have the ability to self-evacuate. In cases of people with disabilities, they will be assisted for evacuation by people designated as companions and/or by people designated among the employees on the normal evacuation paths. It is appreciated that in all areas of the building the evacuation of people is ensured.

- The access of the intervention forces inside the building is achieved through the doors made in the exterior walls and further on the interior stairs of the buildings.
- The geometry of the buildings, their location and the existing roadways within the premises ensure the accessibility conditions for mobile firefighting equipment.
- The access, evacuation and intervention routes are located and constructed in such a way as to ensure: the unhindered and safe evacuation of people in danger and of material goods; access throughout the year of machines, equipment and staff acting to extinguish the fire or to rescue people and goods.
- By maintaining the accesses within the premises throughout the year, their condition, practicability and easy identification will be ensured, an aspect that leads to the reduction of operational intervention times, especially travel time and evacuation time.
- All spaces in the building are easily accessible from the outside for firefighting.

QUALITY REQUIREMENT "D" - HYGIENE, HUMAN HEALTH, ENVIRONMENTAL PROTECTION AND RESTORATION

The project does not include any works that may affect human hygiene and health.

An optimal ratio between the natural environment/site/building is ensured, considering the positioning in the built-up area: The green space is planted with medium and tall vegetation. The site is ventilated and sunny.

QUALITY REQUIREMENT "E" - THERMAL PROTECTION, WATERPROOFING AND ENERGY SAVING

The thermal protection is poor due to the lack of thermal insulation and worn-out exterior joinery; the heating/cooling system is improper and inefficient.

Measures are thus required to make the building envelope more efficient (tiles and floors, glazed surfaces) in order to increase the energy performance of the building.

- by implementing the proposed thermal-energetic rehabilitation measures, the level of thermal protection of the building, the energy efficiency of the interior heating, hot water preparation and lighting installations will be increased, an appropriate microclimate will be created for the development of educational activities by achieving the minimum performance values of the component elements of the envelope, reducing the amount of primary energy from non-renewable sources and carbon dioxide emissions, and complying with the maximum standard consumption for heating stipulated by Order no. 2641/2017 on the amendment and completion of the technical regulation "Methodology for calculating the energy performance of buildings".

QUALITY REQUIREMENT "F" - NOISE PROTECTION

The activities carried out on site upon completion of construction do not cause noise pollution or vibrations. No increase in noise and vibration levels is forecast in the area.

QUALITY REQUIREMENT “G” - SUSTAINABLE USE OF NATURAL RESOURCES

This study proposes solutions for the sustainable use of natural resources, namely interventions that will lead to energy savings, reduction of emissions and use of alternative energies.

6.5 Nomination of the financing sources of the public investment, as a result of the financial and economic analysis: own funds, bank loans, allocations from the state budget/local budget, external loans guaranteed or contracted by the state, non-refundable external funds, other legally established sources.
This project will be financed from own funds, non-refundable external funds and other legally established sources.

7. TOWN PLANNING, AGREEMENTS AND COMPLIANCE OPINIONS
7.1. Town planning certificate issued in order to obtain the building permit Town planning certificate no. 485 of 10.03.2025 issued by Sibiu City Hall
7.2. Topographic study, endorsed by the Cadastre and Real Estate Advertising Office Topographic study endorsed by OCPI Sibiu no. 895/29.04.2025
7.3. Land registry excerpt, except for special cases expressly provided for by law Land registry excerpt no. 135611 Sibiu, cadastral no. 135611
7.4. Approvals regarding the provision of utilities, in case of additional existing capacity
7.5. Administrative act of the competent authority for environmental protection, impact mitigation measures, compensation measures, the method of integrating the provisions of the environmental agreement into the technical and economic documentation
- Environmental Agreement (APM Sibiu) – Classification notification no. 2150/19.05.2025
7.6. Approvals, agreements and specific studies, as appropriate, depending on the specifics of the investment site and which may condition the technical solutions
- Fire safety approval (ISU Sibiu)
- Sanitation approval (Soma SRL Sibiu) - no. 1795/14.05.2025
- Technical expert report
- Energy audit report
- Geotechnical study

B. DRAWN PARTS:
ARCHITECTURE:
Survey:
A_00. ZONE LAYOUT PLAN
A_01. SITUATION PLAN - survey
BUILDING C5 (High School • TB+Gf+3F)
A_02. TECHNICAL BASEMENT PLAN (Building C6 - High School) – survey
A_03. GROUND FLOOR PLAN (Building C6 - High School) - survey
A_04. 1ST FLOOR PLAN (Building C6 - High School) - survey
A_05. 2ND FLOOR PLAN (Building C6 - High School) - survey
A_06. ROOF PLAN (Building C6 - High School) - survey
A_07. CROSS-SECTION A-A (Building C6 - High School) - relief
A_08. LONGITUDINAL SECTION B-B (Building C6 - High School) - relief
A_09. MAIN FACADE (South) (Building C6 - High School) - relief
A_10. REAR FACADE (North) (Building C6 - High School) - relief
A_11. LEFT SIDE FACADE (West) (Building C6 - High School) - relief
A_12. RIGHT SIDE FACADE (East) (Building C6 - High School) - relief
A_13. PHOTO DOCUMENTATION (Building C6 - High School) - exterior
A_14. PHOTO DOCUMENTATION (Building C6 - High School) - interior

BUILDING C3 (Workshops - Tb+Gf+2F)
A_15. GROUND FLOOR PLAN (Building C3 - Workshops) - survey
A_16. 1st FLOOR PLAN (Building C3 - Workshops) - survey
A_17.2nd FLOOR PLAN (Building C3 - Workshops) - survey
A_18. ROOF PLAN (Building C3 - Workshops) - survey
A_19. CROSS SECTION A-A (Building C3 - Workshops) - survey
A_20. LONGITUDINAL SECTION B-B (Building C3 - Workshops) - survey
A_21. MAIN FACADE (South) (Building C3 - Workshops) - survey
A_22. REAR FACADE (North) (Building C3 - Workshops) - survey
A_23. LEFT SIDE FACADE (West) (Building C3 - Workshops) - survey
A_24. RIGHT SIDE FACADE (East) (Building C3 - Workshops) - survey
A_25. PHOTO DOCUMENTATION (Building C3 - Workshops) - exterior
A_26. PHOTO DOCUMENTATION (Building C3 - Workshops) - interior

BUILDING C4 (Gym Hall - Gf)
A_27. GROUND FLOOR PLAN (Building C5 - Gym Hall) - survey
A_28. ROOF PLAN LOCKER ROOM AREA (Building C5 - Gym Hall) - survey
A_29. ROOF PLAN (Building C5 - Sports Hall) - survey
A_30. CROSS-SECTION A-A (Building C5 - Sports Hall) - survey
A_31. LONGITUDINAL SECTION B-B (Building C5 - Sports Hall) - survey
A_32. MAIN FACADE (South) (Building C5 - Gym Hall) - survey
A_33. REAR FACADE (North) (Building C5 - Gym) - survey
A 34. LEFT SIDE FACADE (West) (Building C5 - Gym) - survey
A_35. RIGHT SIDE FACADE (East) (Building C5 - Gym) - survey
A_36. PHOTO DOCUMENTATION (Building C5 - Gym) - exterior
A_37. PHOTO DOCUMENTATION (Building C5 - Gym) - interior

BUILDING C6 (Dormitory - Tb+Gf+3F)
A_38. GROUND FLOOR PLAN (Building C6 - Dormitory) - survey
A_39.1st FLOOR PLAN (Building C6 - Dormitory) - survey
A_40. 2nd FLOOR PLAN (Building C6 - Dormitory) - survey
A_41. 3rd FLOOR PLAN (Building C6 - Dormitory) - survey
A_42. ROOF PLAN (Building C6 - Dormitory) - survey
A_43. CROSS-SECTIONA-A (Building C6 - Dormitory) - survey
A_44. LONGITUDINAL SECTION B-B (Building C6 - Dormitory) - survey
A_45. MAIN FACADE (North) (Building C6 - Dormitory) - survey
A_46. REAR FACADE (South) (Building C6 - Dormitory) - survey
A_47. LEFT SIDE FACADE (East) (Building C6 - Dormitory) - survey
A_48. RIGHT SIDE FACADE (West) (Building C6 - Dormitory) - survey
A_49. PHOTO DOCUMENTATION (Building C6 - Dormitory) - exterior
A_50. PHOTO DOCUMENTATION (Building C6 - Dormitory) - interior
Proposal:
A_51. SITUATION PLAN - proposal
BUILDING C5 (High School - Tb+Gf+3F)
A_52. TECHNICAL BASEMENT PLAN (Building C6 - High School) - proposal
A_53. GROUND FLOOR PLAN (Building C6 - High School) - proposal
A_54. 1ST FLOOR PLAN (Building C6 - High School) - proposal
A_55. 2ND FLOOR PLAN (Building C6 - High School) - proposal
A_56. ROOF PLAN (Building C6 - High School) - proposal

A_57. CROSS-SECTION A-A (Building C6 - High School) - proposal
A_58. LONGITUDINAL SECTION B-B (Building C6 - High School) - proposal
A_59. MAIN FACADE (South) (Building C6 - High School) - proposal
A_60. REAR FACADE (North) (Building C6 - High School) - proposal
A_61. LEFT SIDE FACADE (West) (Building C6 - High School) - proposal
A_62. RIGHT SIDE FACADE (East) (Building C6 - High School) - proposal

BUILDING C3 (Workshops - Tb+Gf+2F)
A_63. GROUND FLOOR PLAN (Building C3 - Workshops) - proposal
A_64. 1st FLOOR PLAN (Building C3 - Workshops) - proposal
A_65. 2nd FLOOR PLAN (Building C3 - Workshops) - proposal
A_66. ROOF PLAN (Building C3 - Workshops) - proposal
A_67. CROSS-SECTION A-A (Building C3 - Workshops) - proposal
A_68. LONGITUDINAL SECTION B-B (Building C3 - Workshops) - proposal
A_69. MAIN FACADE (South) (Building C3 - Workshops) - proposal
A_70. REAR FACADE (North) (Building C3 - Workshops) - proposal
A_71. LEFT SIDE FACADE (West) (Building C3 - Workshops) - proposal
A_72. RIGHT SIDE FACADE (East) (Building C3 - Workshops) - proposal

BUILDING C4 (Gym - Gf)
A_73. GROUND FLOOR PLAN (Building C5 - Gym) - proposal
A_74. ROOF PLAN LOCKER ROOM AREA (Building C5 - Gym) - proposal
A_75. ROOF PLAN (Building C5 - Gym Hall) - proposal
A_76. CROSS-SECTION A-A (Building C5 - Gym Hall) - proposal
A_77. LONGITUDINAL SECTION B-B (Building C5 - Gym Hall) - proposal
A_78. MAIN FACADE (South) (Building C5 - Gym Hall) - proposal
A_79. REAR FACADE (North) (Building C5 - Gym Hall) - proposal
A_80. LEFT SIDE FACADE (West) (Building C5 - Gym Hall) - proposal
A_81. RIGHT SIDE FACADE (East) (Building C5 - Gym Hall) - proposal

BUILDING C6 (Dormitory - Tb+Gf+3F)
A_82. GROUND FLOOR PLAN (Building C6 - Dormitory) - proposal
A_83. 1ST FLOOR PLAN (Building C6 - Dormitory - proposal
A_84. 2nd FLOOR PLAN (Building C6 - Dormitory) - proposal
A_85.3rd FLOOR PLAN (Building C6 - Dormitory) - proposal
A_86. ROOF PLAN (Building C6 - Dormitory) - proposal
A_87. CROSS-SECTION A-A (Building C6 - Dormitory) - proposal
A_88. LONGITUDINAL SECTION B-B (Building C6 - Dormitory) - proposal
A_89. MAIN FACADE (North) (Building C6 - Dormitory) - proposal
A_90. REAR FACADE (South) (Building C6 - Dormitory) - proposal
A_91. LEFT SIDE FACADE (East) (Building C6 - Dormitory) - proposal
A_92. RIGHT SIDE FACADE (West) (Building C6 - Dormitory) - proposal
A_93. 3D PERSPECTIVES
A_94. 3D PERSPECTIVES
A_95. 3D PERSPECTIVES
A 96.3D PERSPECTIVES
A_97. 3D PERSPECTIVES

ELECTRICAL INSTALLATIONS:
IE01– BUILDING C5 HIGH SCHOOL – Ground floor plan lighting, sockets, BMS and voice-data
IE02– BUILDING C5 HIGH SCHOOL – 1st floor plan lighting, sockets, BMS and voice-data

IE03– BULDING C5 HIGHSCHOOL– 2nd Floor plan lighting, sockets, BMS and voice-data
IE04– BULDING C5 HIGHSCHOOL – Single-wire diagram TEG HIGHSCHOOL
IE05– BULDING C5 HIGHSCHOOL – Ground floor plan of signaling, alarming and alerting installations in case of fire
IE06– BULDING C5 HIGHSCHOOL – 1st Floor plan signaling, alarming and alerting installations in case of fire
IE07– BULDING C5 HIGHSCHOOL – 2nd Floor plan signaling, alarming and alerting installations in case of fire
IE08– BULDING C5 HIGHSCHOOL – Attic plan of signaling, alarming and alerting installations in case of fire
IE0 9– BULDING C5 HIGHSCHOOL – Ground floor plan of lighting, sockets, BMS and voice-data
IE10– BUILDING C6 DORMITORY – 1st Floor plan lighting, sockets, BMS and voice-data
IE11– BUILDING C6 DORMITORY –2nd Floor plan lighting, sockets, BMS and voice-data
IE12– BUILDING C6 DORMITORY –3rd Floor plan lighting, sockets, BMS and voice-data
IE13– BUILDING C6 DORMITORY – Single-wire diagram TEG DORMITORY
IE14– BUILDING C6 DORMITORY – Ground floor plan signaling, alarming and fire alerting installations
IE15– BUILDING C6 DORMITORY – 1st Floor plan signaling, alarming and fire alerting installations
IE16– BUILDING C6 DORMITORY – 2nd Floor plan signaling, alarming and fire alerting installations
IE17– BUILDING C6 DORMITORY – 3rd Floor plan signaling, alarming and fire alerting installations
IE18– BUILDING C6 DORMITORY – Attic plan signaling, alarming and fire alerting installations
IE19– BUILDING C4 GYM – Ground floor plan lighting, sockets, BMS and voice-data
IE20– BUILDING C4 GYM – Single-wire diagram TEG GYM
IE21– BUILDING C4 GYM – Ground floor plan of signaling, alarming and fire alerting installations
IE22– BUILDING C4 GYM – Roof plan of locker room area signaling, alarming and fire alerting installations
IE23– BUILDING C3 WORKSHOPS – Ground floor plan of lighting, sockets, BMS and voice-data
IE24– BUILDING C3 WORKSHOPS – Floor 1 plan of lighting, sockets, BMS and voice-data
IE25– BUILDING C3 WORKSHOPS – Floor 2 plan of lighting, sockets, BMS and voice-data
IE26– BUILDING C3 WORKSHOPS – Single-wire diagram TEG WORKSHOP
IE27– BUILDING C3 WORKSHOPS – Ground floor plan of signaling, alarming and fire alerting installations
IE28– BUILDING C3 WORKSHOPS – 1st Floor plan of signaling, alarming and fire alerting installations
IE29– BUILDING C3 WORKSHOPS – 2nd Floor plan of signaling, alarming and fire alerting installations in case of fire
IE30– BUILDING C3 WORKSHOPS – Plan of the bridge of signaling, alarming and alerting installations in case of fire

SANITARY INSTALLATIONS:

1501 –BUILDING C5 HIGHSCHOOL –Plan of the sanitary and fire limitation and extinguishing situation
1502– BUILDING C5 HIGHSCHOOL –Plan of the ground floor of the sanitary and fire limitation and extinguishing
1503– BUILDING C5 HIGHSCHOOL –Plan of the 1st floor of the sanitary and fire limitation and extinguishing
1504– BUILDING C5 HIGHSCHOOL –Plan of the 2nd floor of the sanitary and fire limitation and extinguishing
1505– BUILDING C6 DORMITORY –Plan of the ground floor of the sanitary and fire limitation and extinguishing
1506– BUILDING C6 DORMITORY –Plan of the 1st floor of the sanitary and fire limitation and extinguishing
1507– BUILDING C6 DORMITORY –Plan of the 2nd floor of the sanitary and fire limitation and extinguishing
1508– BUILDING C6 DORMITORY –Plan of the 3rd floor of the sanitary and fire limitation and fire extinguishing
1509– BUILDING C4 GYM – Ground floor plan sanitary and fire containment and extinguishing
1510– BUILDING C3 WORKSHOP – Ground floor plan sanitary and fire containment and extinguishing
1511 – BUILDING C3 WORKSHOP – 1st floor plan sanitary and fire containment and extinguishing
1512– BUILDING C3 WORKSHOP – 2nd floor plan sanitary and fire containment and extinguishing

HEATING INSTALLATIONS:

IT01 – BUILDING C5 HIGH SCHOOL – Heating installation location plan
IT02– BUILDING C5 HIGH SCHOOL – Heating installation distribution technical basement plan

IT03 – BUILDING C5 HIGH SCHOOL – Ground floor plan of heating installations
IT04 – BUILDING C5 HIGH SCHOOL – 1st floor plan of heating installations
IT05 – BUILDING C5 HIGH SCHOOL – 2nd floor plan of heating installations
IT06 – BUILDING C5 HIGH SCHOOL – Thermomechanical diagram of HIGH SCHOOL, Locker rooms, Gym hall and Workshops
IT07 – BUILDING C5 HIGH SCHOOL – Ground floor plan of ventilation installations
IT08– BUILDING C5 HIGH SCHOOL – 1st Floor plan of ventilation installations
IT09– BUILDING C5 HIGH SCHOOL – 2nd Floor plan of ventilation installations
IT10– BUILDING C6 DORMITORY – Ground floor plan of heating installations
IT11– BUILDING C6 DORMITORY – 1st Floor plan of heating installations
IT12 – BUILDING C6 DORMITORY – 2nd Floor plan of heating installations
IT13 – BUILDING C6 DORMITORY – 3rd Floor plan of heating installations
IT14 – BUILDING C6 DORMITORY – Thermomechanical diagram of DORMITORY
IT15 – BUILDING C4 GYM – Ground floor plan of heating installations
IT16 – BUILDING C4 GYM – Ground floor plan of ventilation installations
IT17 – BUILDING C3 WORKSHOP – Ground floor plan of heating installations
IT18 – BUILDING C3 WORKSHOP – 1st Floor plan of heating installations
IT19– BUILDING C3 WORKSHOP – 2nd Floor plan of heating installations
IT20 – BUILDING C3 WORKSHOP – Ground floor plan of ventilation installations
IT21 – BUILDING C3 WORKSHOP – 1st Floor plan of ventilation installations
IT22 – BUILDING C3 WORKSHOP – 2nd Floor plan of ventilation installations

MIHALACHE ANDREEA-CRISTINA

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MIHALACHE ANDREEA - CRISTINA
Traducător și interpret Autorizat
Lb. Engleză
Aut.33686/2012
ROMÂNIA