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## TEHNICAL REPORT

- 1. Name of the Paper: Smart Urban Services Through Homogenous Quality Standard in Public Infrastructures for Higher Energy Efficiency - RORS36**
- 2. Location: Territorial Administrative Unit Recaș**
- 3. Design Phase: PT-DE**
- 4. Beneficiary: Territorial Administrative Unit Recaș**
- 5. Specialized designer:**  
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- 6. Executive director:** ing.Adrian BALACI

### 1. Object of the project:

The present project aims at increasing the energy efficiency of the public lighting system in UTCA Recaș by replacing all existing luminaires and bringing the public lighting system to the national and international standards in force as well as managing the lighting system as efficiently as possible.

### 2. The necessity of the work:

The lack of a public lighting system corresponding to the national standards (SR 13201) and the international ones (CIE 30-2, CIE 31, SR EN 13201) in the city of Recaș

### 3. Design basis:

According to contract no.83102 / 30.06.2017; 83099 / 30.06.2017 concluded with the Ministry of Regional Development, Public Administration and European Funds





#### **4. Environmental protection according to SR EN ISO 14001/2005 - "Environmental Management Systems" and GEO 195/2005 - "Emergency Ordinance on Environmental Protection", Law 265/2006, Law 167/2010 and OUG 58/2012.**

##### **Legislation in the field:**

- Ordinance 78/2000, repealed by art.68 from the Law 211/28 November 2011
- Government Decision 349/2005, modified by Government Decision 210/2007 and Government Decision 1292/2010.
- Law 465/2001
- Government Decision 856/2002 – on waste management records and on approval of the list of waste, including hazardous wastes, modified by Government Decision 210 / 2007
- Government Emergency Decision 16/2001 on the management on the management of the industrial waste recycling, repealed by art. 68 of the Law 211/28 November 2011.
- Government Decision 1518/2009 for amending and completing Government Decision 448/2005 on waste electrical and electronic equipment
- Government Decision 1037 / 2010 repeal no.448 of 19 May 2005 on waste electrical and electronic equipment
- Order MTCT 2.133/2005 – for the approval of the Regulations on the certification of the registration of road vehicles registered in the technical norms regarding road safety, environmental protection and in the category of use according to destination, by periodical technical inspection - RNTR 1, modified by the Order 42 /2012 and the Order 1107/2012.
- **Order of the MAPM 462/1993** – for the approval of the Technical Conditions for Atmospheric Protection and Methological Normas for Determination of the Pollutants Emissions from Stationary Sources, repealed by **Article 86 of Law 104/28<sup>th</sup>** of July 2011.

In addition to the legislative acts mentioned above, the following should be considered:

- Criteria applicable from 11<sup>th</sup> of June 2013 to determine the conditions under which glass waste ceases to be waste under **Regulation (EU) no. 1179/2012** of the Comission from 10<sup>th</sup> of December 2012, laying down the criteria for determining the conditions under which glass crates ceases to be waste pursuant to **Directive 2008/98/EC** of the **European Parliament and the Council** – correlation to **Law 211/2011**.
- Applicable criteria for determining the conditions under which certain metal scrap is no longer waste Regulation (UE) no. 333/2011 of the Council, from 31<sup>st</sup> of March 2011,



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laying down the criteria for determining the conditions under which certain types of metallic waste are no longer waste, pursuant to Directive 2008/98/EC of the European Parliament and of the Council.

- **New Directive of the European Union 2012/19/UE** on waste electrical and electronic equipment WEEE – Preparing companies and institutions for the implementation of the Directive with regard to separate collection, treatment, collection rate and recovery targets.
- **Regulation 423/2012** – preparing recyclers to achieve recycling efficiency levels in waste and battery recycling processes according to **Regulation 493/2012** – link to waste minimization program – **Requirement of Law 211/2011**.
- Electronic recording of information specific to the recording, monitoring and ecological disposal of PCB contaminated electrical equipment in Romania.
- **Order 3838/09-11-2012** for the amendment of the **Water Management Order 95/2005** regarding the establishment of the acceptance criteria and of the acceptance procedures of the waste for storage and the national list of accepted waste in each class of landfill.
- S.I.M. System User Guide Waste P.C.B. to register applications for PCB waste reporting.
- Waste Prevention and Reduction Program – imposed by the end of 2013 – Law 211/2011.

**According to Law 137/1995 and Law 195/2005 the executor has the following obligations:**

- ensure their own system of surveillance of technological installations and processes for environmental protection
- identify all relevant environmental factors so as not to degrade the natural environment of arrange for uncontrolled waste disposal of any kind.
- to determine how these impacts can be diminished and controlled to become environmentally acceptable

The necessary measures will be taken to bring the environment to the conditions imposed by the environmental legislation in force.

**4.2. Air protection:**

Pollutants for air during execution are: dust, exhaust gases.

The technology specific to the execution of the works foreseen in the project does not lead to air pollution.

Exhaust gases result from machinery and equipment during execution.



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Through the course of the works, measures are taken to minimize the dust, both by watering it and by carefully handling the used equipment.

Pollution of the AIR environmental factor is short-lived, limited in time (execution period).

**4.3. Protection against noise and vibration:**

The noise and vibration sources are produced during the execution of the machinery and the car traffic.

Protection against noise and vibration is achieved by the use of high-noise tools and machines with vibration attenuators. The noise level at the source is approx. 85 ÷ 95 dBA, in some cases 110 dBA. The noise is low and the duration is approx. 8 hours / day. The total noise level does not exceed 70 dBA at the built-up perimeter limit and 50 dBA at the nearest protected receptor.

Electromagnetic influences do not cause disruptions in neighborhoods.

**4.4. Protection against radiations:**

The works in this documentation do not produce radiation.

The proposed work does not produce or use radiation in the technological process, so it does not require protection measures.

**4.5. Soil and subsoil protection:**

The proposed works do not affect the soil and the subsoil.

**4.6. Protection of the terrestrial and aquatic ecosystems:**

The present works have a minimal impact on the terrestrial ecosystem. The aquatic ecosystem does not exist in the work area, so it is not affected.

**4.7. Protection of the human settlements and other public interest objectives:**

Taking into account that the documentation of the presentations will be carried out in the town of Recaș and Izvin village, measures will be taken to minimize the effects on the adjacent populated areas.

**4.8. Waste management:**

Evidence of waste management generated during the operation, collection, transport and temporary or permanent disposal of these works will be done according to the **Government Decision 856 of 16.08.2002** and **Law 211/2011**.





According to the service contract concluded with the beneficiary, the waste resulting from the works executed is collection from the place of production, transported and handed over to the landfill of the beneficiary or to the landfill by the contractor.

Ferrous and non-ferrous metal waste is temporarily stored on concrete platforms or labeled containers. This kind of waste will be sorted and recycled.

The recovery is generally done by selling this waste to licensed units.

#### **4.9. Management of Toxic and Dangerous Substances:**

This is not the case in the documentation.

#### **4.10. Ecological reconstruction works:**

The works included in this project do not require ecological reconstruction because they do not affect the environment.

#### **4.11. Provisions for environmental monitoring:**

The works to be executed according to the documentation do not require environmental monitoring provisions.

The works in this documentation do not affect other installations or buildings, they are in accordance with **PE 106/2003** or **NTE / 007/08/00** and do not produce polluting agents for ground air or groundwater during the exploitation period and the measures taken do not accidents occur, except in the case of natural disasters.

In accordance with the provisions of "**SR EN ISO 14001/2005**" and **Government Emergency Ordinance 195/2005 - "Emergency Ordinance on Environmental Protection"**, the provisions for the protection of human settlements, soil protection, atmospheric protection shall be observed when carrying out the work in this documentation.

### **LIST OF ENVIRONMENTAL ASPECTS**

<b>Nr. Crt</b>	<b>Environmental Aspect</b>	<b>Impact name</b>	<b>Means of control</b>	<b>Compliance</b>
1.	Generating metal waste – from dismantling	Potential soil pollution	Visual	Sorting, identification and storage





2.	Electricity consumption	Air pollution in emergency situations - FIRE	Visual	Sorting, identification and storage
3.	Noise and dust generation from machines, unloading and loading of materials	Impact on human factor	Visual	According IP SSM
4.	Noise	Sound pollution		
5.	Vibrations	Sound pollution		
6.	Exhaust emissions from transport, welding emissions	Pollution of air	Visual	Monitoring vehicles exhaust emissions
7.	Defective lighting fixtures (fluorescent tubes)	Potential soil pollution	Visual	Sorting, identification and storage

## 5. Framing according to Law 10/95, complemented by Law 123/07:

### 5.1. Building importance category according to Government Decision 766/97:

The constructions whose installations are dealt with in this project fall under the “C – Normal” category of importance of constructions.

### 5.2. The essential requirements for the project are:

le - MLPAT project verifier - electrical installations related to constructions, which include:

- Electrical installation interior / exterior, including low current
- protection equipment to atmospheric discharges
- automation and signaling installations,
- fire detection, signaling and alarm systems,
- telecommunication and information transmission installations,







f) electric power supply installations for cars;

- ANRE - Electrical installation projects checker

## **6. Fire and explosion prevention:**

### **6.1. Compliance with the Prevention and Firefighting and Explosion Norms:**

- according with NTE 009/10/00 – “Unrated”;
- according with NP-099-2004 – “Unrated”;
- according with I7-2011 : “AA4” (ambient temperature: -50C +400C); “AB4” (climate conditions: -50C +400C); “AC1” (altitude under or equal to 2000m); “AD3(U2)” (water presence: rain water); “AE6” (presence of foreign bodies: dust, deposits between 350 și 1000 mg/m2 per day); “AF1” (presence of corrosive or polluting substances: negligible); “AG1” (slight mechanical stresses); “AK1” (presence of flora and/ or mold: negligible); “AL1”(presence of fauna: negligible); “AM1” (electromagnetic, electrostatic or ionizing influences: negligible:); “AN2” (solar radiations: average); “AP1” (seismic effects: **corner seismic period** Tc=0,7s, acceleration ag=0,2g); “AQ2” (keraunic level > 25 days/year); “AR2” (air movements: average); “AS2” (Wind: average); “BA4(EE)” (the competence of persons: trained maintenance and explosion agents).

### **6.2. Main Fire and Protection Measures (P.S.I.)**

#### **6.2.1. Design measures:**

When performing the work, the fire protection measures contained in the following regulations, prescriptions and instructions shall be followed:

- **Law nr. 307/2006** on fire protection;
- **Order no. 163/2007** on general rules for fire protection;
- **PE 009/93** – Standards for prevention, extinction, transport and distribution of electric and thermal energy vol.1 part.I, volume I, part II, volume II;
- **Order no. 89/2013** on the regulation for the planning, organization, preparation and development of the emergency prevention activity;
- **Order no. 88/2012** of Minister of the Interior for approving the Methodology for Certification of conformity of technical approvals and technical approval for the manufacture, marketing and use of technical means of fire protection;
- **Order no. 210/2007** of the Minister of the Interior for approving the Methodology regarding the identification, assessment and control of fire risks;
- **Order no. 58/2009** of the Minister of the Interior for the approval of the Methodology for attestation of technical staff from the ministries, from the central and local public



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administration bodies, as well as the technical staff of the economic agents and institutions, with the task of guiding, controlling and finding the violation in the the field of fire prevention and extinguishing.

In accordance with **Law no. 307/2006** on fire protection, section 7, art. 23, in this document no special measures are required except those that are an integral part of the normative provisions on the basis of which the electrical installations are being executed.

**Obligations of the beneficiary:**

According to **Law no. 307/2006, Section 6, Art. 19** the beneficiary has the obligation to fully comply with the provisions of points "a" to "r" of which mention:

- to prepare fire-fighting instructions and to determine the duties of employees in the workplace;
- ensure the use, verification, maintenance and repair of fire protection equipment with attested personnel, as instructed by the designer.

**7. Description of the planned installations (works):****A.**

The present project aims at increasing the energy efficiency of the public lighting system in **Administrative Territorial Unit Recaș** by replacing all existing luminaires and bringing the public lighting system to the national and international standards in force as well as managing the lighting system as efficiently as possible.

For upgrading the **Administrative Territorial Unit Recaș** public lighting system, street lighting fixtures (numbered in the design with T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11 depending on the power consumption and the flow bright product).

Each existing pole will be equipped with a metallic console and a light body and a total of 940 pieces will be mounted. metallic consoles and 940 pcs. lighting objects.

The layout of the designed pillars will be done according to the drawings in the project, in conjunction with the enclosed pendulum.

According to the calculations, the orientation parameters of the luminaires are:

- T1 : P = max.17 W, luminous flux = min.2000 lm, Color temperature = 3000 K
- T2 : P = max.28 W, luminous flux = min.2500 lm, Color temperature = 3000 K
- T3 : P = max.37 W, luminous flux = min.4000 lm, Color temperature = 3000 K
- T4 : P = max.47 W, luminous flux = min.4800 lm, Color temperature = 3000 K
- T5 : P = max.58 W, luminous flux = min.6500 lm, Color temperature = 3000 K
- T6 : P = max.67 W, luminous flux = min.8000 lm, Color temperature = 3000 K
- T7 : P = max.78 W, luminous flux = min.9000 lm, Color temperature = 3000 K
- T8 : P = max.84 W, luminous flux = min.11000 lm, Color temperature = 3000 K
- T9 : P = max.127 W, luminous flux= min.15500 lm, Color temperature = 3000 K





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- T10 : P = max.152 W, luminous flux = min.19000 lm, Color temperature = 3000 K
- T11 : P = max.79 W, luminous flux = min.12000 lm, Color temperature = 4000 K

All these luminaires will be equipped with LEDs and the driver will be capable of dimming DALI or 1-10 V.

By implementing this project, taking into account the fact that **UAT Recaş** is crossed by the European Road E70, in the right way pedestrian crossings will be installed on both sides of the roadway lighting fixtures that will create a higher level of illumination than the rest of the lighting, for the pedestrians to be better visible and pedestrian crossing to be visible from a greater distance and increased attention from traffic participants, these luminaires will be equipped with light sources whose color temperature will be of 4000 K, ie white, while the rest of the luminaires will have a color temperature of 3000 K, warm white. We believe that their implementation in the project can create a possibility to reduce the risk of accidents in these areas. This project in the area of road intersections has created an additional level of illumination over the rest of the streets, thus creating the premises for increased visibility at intersections, thus reducing the risk of accidents.

To optimize power consumption and optimize maintenance costs, an intelligent telegraphy system will be implemented.

**B.****The description and parameters of the telegraphy solution are described below:**

Telemanagement equipment will be an integral part of the luminaires. Thus, by installing the luminaires, it is practically the installation of the telemanagement equipment for each body.

**General functionalities**

- The system will have the ability to manage and monitor the entire lighting infrastructure (lighting fixtures, power supplies, ignition points, energy metering, etc.) and hardware components will be installed or attached to each luminaire.
- The system will be centralized into a server CLOUD and access and monitoring of the system will be accomplished by encrypted communication from any location with a PC (according to the Technical Data Sheet attached) or tablet device or other devices connected to the Internet.
- No additional wiring for data transmission will be used.
- The information in the system will be bidirectional, the luminaries will have the ability to receive, interpret the commands transmitted by the server.



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- The central server communicates via GPRS with the connected luminaires and the lighting system - the communication will be done by a radio frequency, licensed ANCOM network.
- The system will allow an unlimited number of queries with each light / ignition point, and data traffic will be unlimited for these queries.
- Will use as much as possible a single communication and control technology.
- The system will allow the management of a small area and an extended area of thousands of luminaires on the same platform; at the same time the system will allow the introduction of new luminaires connected to the platform.
- Energy consumption will be available at any query, and can produce comparative graphical representations of energy consumption over configurable intervals.
- The system will monitor power supply voltage and input current in the luminaire, and all alarms and system fault information will be stored in the server and will be available at any time.
- Also, the control system has the ability to reduce the dimming for any luminaires in the system using DALI and / or 1-10V communication protocols that accept dimmer commands.
- Time and date information will be synchronized with those of the Astronomical calendar
- The system will generate alarms in the event of a lack of total voltage
- The system will allow the prioritization of different dimming scenarios.

**Specific functionalities of the control system from the ignition points and the luminaires:**

- The system will allow automatic and manual control commands remotely (via GPRS); the pre-programmed scenarios will be stored and, in the absence of communication, the system will operate autonomously according to the stored scenarios.
- The system will measure the energy consumed at each ignition point and access to it by any user registered in the system by user / password, from any type of terminal Internet connected
- The system will be equipped with a switch between automatic and manual control
- The system will be able to detect and report any defective or non-functional lighting
- The system will allow for the identification of illegal electricity shields.
- The system will be compatible and will allow for the individual connection of conventional luminaires allowing for minimum on / off of them, as well as energy consumption measurement.

**User interface - functionalities:**

- Allows for the creation of visible groups for easy identification of the luminaires managed by each ignition point.



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- Allows groups to be created at the street, intersection, neighborhood, etc., independent of the power supply network.
- Allows the transmission of messages / orders / information between its users
- Allows manual operation of lighting devices to turn the power supply on and off
- Allows to query the set alarms list by filtering them.
- The user interface will also be intuitive in Romanian.
- The telegraphy system will contain a map application with all the ignition points and lighting fixtures.
- The map will be plotted as visible as possible and will contain the status of the ignition points and the luminaires, and the GPS coordinates of the ignition point or the connected lighting device can be read.
- The serial number and hardware components of each selected luminaire, the body group assigned for each ignition point, the name of each luminaire, will be displayed.
- The system will also include smartphone / tablet applications that can be used by police or intervention teams, and in case of incidents or accidents, they will be able to turn off / on the lighting in a certain area, or will cancel the hourly reduction (dimming) so that the lighting can operate at 100% intensity.
- The possibility to issue work orders to the intervention teams in the case of scheduled maintenance works or in case of faults in the lighting network, as well as real-time and remote verification if the interventions or maintenance works were executed according to the order of working;
- The interface will be open through the API for communication with other types of interfaces used in SMART solutions (video surveillance, traffic control, emergency systems, etc.);

**Reports:**

- The system will generate / generate reports in both HTML and Excel format.
- Allows you to query the list of alarms set and filter them according to severity, alarm type, alarm status (closed / open), alarm period.
- Enable reports on energy consumption.
- will allow generation of reports on operating hours.
- Allows you to generate reports from the data stored in both the control and server log history for control operations and scenarios, energy consumption, alarms, and generated alerts.

**The programming:**

- Allows the creation of astronomical calendar-based schedules and scenarios and operating scenarios can be allocated over flexible periods: daily, weekly, monthly.



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- Scenarios can be generated depending on the sunset and sunrise hours of the astronomical calendar.
- It will be possible to combine astronomical calendar operation, as primary command with photocell, as well as secondary command.
- In astronomical calendar mode, it will be possible to define delay or advance times for sunset and / or sunrise.
- Minimal dimming levels and start / stop functions can be programmed.

**Permissions groups and users:**

The system and interface will allow the creation of an unlimited number of users and will be able to set levels / access rights for each; it will be possible to determine in the application which of the users will receive SMS or email alerts; it will be possible to program that a user can control dimming levels and turn on / off the lighting system.

**Software upgrade:**

The system will allow remote upgrades through the application / web interface - the upgrade will take place automatically, without requiring user intervention.

**Reducing the dimming of LEDs:**

- The system will allow dimming steps, in addition to 100% and 0%, and these steps can be programmed anytime from a distance.
- The system will be able to reduce light and consumption on each luminaire based on preprogrammed scenarios.
- the system will be able to transmit the signal from the server to the lighting devices.
- The system will not interfere with the power supply and will not affect the operation or power supply of other consumers.
- the system will ensure the operation and storage of lighting scenarios in case of lack of communication or an accidental interruption of the power supply.
- The system will ensure that the lighting levels will not be influenced by the voltage fluctuations of the power supply.
- The system will allow programming of lighting scenarios in the user interface.
- Communication and dimming controls will not be affected by any malfunctions or malfunctions of lighting circuits in the circuit.

Reference materials for supplying the main materials:

- o **SR CEI 60502-1: 2006** for electric cables;
- o **SR EN 60598: 2001** for lighting appliances.



**8. Requirements for the execution of the works:**

- All metallic parts of the electrical system which are normally unplugged but which can accidentally come in will be connected to the earth terminals with branches of OI-Zn 40x4 or MYf conductor 16 mmp;
- The minimum distances prescribed by NTE 007/08/00 between the cables and the various networks in the air should be respected;
- All metallic parts of the luminaires, which are in insulation class I, will be connected to the cable protection null.

**9. Labor protection measures:****9.1. Standards, Norm, Technological Sheets and other prescriptions that need to be respected:**

- The Law on Safety and Health at Work no. **319/2006**;
- **Government Decision 300/2006**, on minimum safety and health requirements for temporary or mobile construction sites;
- **Government Decision 1048/2006**, on minimum safety and health requirements for the use by workers of personal protective equipment at work;
- **Government Decision 1091/2006**, on minimum safety and health requirements for the workplace;
- Government Decision **HG 1146/2006**, on minimum safety and health requirements for the use of work equipment by workers;
- Government Decision **1425/2006**, for the approval of the Methodological Norms for the application of the provisions of the Law on Safety and Health at Work no. **319/2006**;
- Normative for the design, execution and operating of electrical installations related to buildings -I7- 2011;
- Guide for electrical installations with voltages up to 1000V ca. and 1500V c.c. - GP 052 - 2000;
- **NTE / 007/08/00** - Norm for the design and execution of electrical cable networks;
- **NTE 009/10/00** - General regulation of maneuvers in electrical installations;
- **PE 103/1995** - Instructions for the sizing and verification of electro-energetic installations at mechanical and thermal stresses under short-circuit currents;
- **F.T. - 4/82** - Tests, checks and measurements made on cables;
- **Law 160/2012** - Electricity Law;
- **GEO no. 195/2005** - Emergency Ordinance on environmental protection;





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- **H.G.R. no. 445/2009** - Establishment of the framework procedure for environmental impact assessment and approval of the list of public or private projects subject to this procedure;
- **Order M.A.P.M. no. 135/2010** - Approval of the Environmental Impact Assessment and Environmental Agreement Procedure;
- **Order M.A.P.M. no. 863/2002** - Approval of the methodological guidelines applicable to the stages of the environmental impact assessment framework procedure;
- **STAS: SR 8591/1997, SR 13433/1999;**
- **Standard SR HD 60364-4-444: 2011** - Electrical installations in buildings;
- Design and execution of earthing devices **1RE - Ip30 - 04;**
- Nomenclature of tests, tests and tests on the installation, commissioning and putting into service of energy facilities - **PE 003/79.**

**9.2. General Measures for Labor Protection:**

**9.2.1.** When installing, PIF, operating and repairing the equipment, the prescriptions of the Law on Safety and Health at Work no. 319/2006 on the training and training of specialists, methods and means of propaganda (workplace displays), individual equipment for labor protection, transport, handling and storage of materials, signposting of workplaces.

According to **Law no. 319/2006**, the employer has the obligation to comply with **Art. 6 ÷ Art. 21, of Chapter III (Employers' Obligations)**, from which we mention the following::

- to ensure the safety and health of workers in all aspects of work (**Art. 6.1**);
- to take the necessary measures to ensure the safety and health protection of workers (**Article 7.1.a**);
- to take the necessary measures to prevent professional risks (**Article 7.1.b**);
- to inform and train workers (**Article 7.1.c**);
- to ensure the organizational framework and the necessary means of security and health at work (**Article 7.1.d**);
- to pursue the adaptation of the measures provided for in Art. 6.1, taking into account the changing conditions and the improvement of the existing situations (Art. 7.2);
- Implement the measures provided for in Art. 6.1 and Art. 7.2 on the basis of the following general prevention principles:
  - a) avoiding risks;
  - b) assessing the risks that can not be avoided;
  - c) combating risks at source;
  - d) adaptation of work in human beings, especially in terms of designing jobs, choosing
  - e) adaptation to technical progress;
  - f) replacing what is dangerous with what is not dangerous or what is less the replace
  - g) developing a coherent prevention policy covering technologies, work





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h) to adopt, as a matter of priority, collective protection measures against individual protection measures;

(i) the provision of appropriate instructions to workers.

- designate one or more workers (without prejudice to the obligations laid down in Articles 6 and 7) to deal with the protective and protective activities and occupational risk prevention activities in the undertaking and / or establishment, referred to as further designated workers (Art. 8.1);
- to take the necessary measures to provide first aid, fire fighting and evacuation of workers, adapted to the nature of the activities and size of the enterprise and / or establishment, taking into account other present persons (Art. 10.1);
- to inform as soon as possible all workers who are or may be exposed to a serious and imminent danger of the risks involved and the measures taken or to be taken to protect them (Article 11.1);
- to take appropriate measures so that workers and / or their representatives receive, in accordance with the legal provisions, all necessary information on occupational safety and health risks and prevention and protection measures and activities both at the undertaking level and / or in general, as well as at the level of each post and / or function (Article 16.1);
- employers consult their workers and / or their representatives and allow them to participate in discussing all matters relating to occupational safety and health (Article 18.1);
- the employer must ensure that each worker receives adequate and appropriate training in the field of occupational safety and health, in particular in the form of information and working instructions specific to the place of work and his / her job:

a) on employment;

b) change of job or transfer;

c) the introduction of new work equipment or modifications of the existing equipment;

d) to the introduction of any new technology or work procedures;

e) when performing special works.

According to **Law no. 319/2006**, workers are required to comply with **Article 22, Article 23 of Chapter IV (Employee Obligations)**, of which we mention the following:

- each worker must carry out his work in accordance with his training and instruction as well as the instructions received from the employer so as not to expose his or her own and other persons to the danger of injury or occupational disease his actions or omissions during the work process (Article 22);



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- The workers have the following obligations according to Art. 23, point a), out of which:
  - a) Properly use machinery, equipment, tools, hazardous substances, transport equipment and other means of production;
  - b) correctly use the individual protective equipment granted and, after use, to return it or put it in the place for storage;
  - (c) not to discontinue, alter, modify or arbitrary remove security devices, in particular machinery, equipment, tools, technical installations and buildings, and to use these devices correctly;
  - (d) communicate immediately to the employer and / or workers concerned any employment situation on which they have reasonable grounds for considering it to be a danger to the safety and health of workers and any deficiency in the protection systems.

**9.2.2.** The minimum safety requirements for temporary or mobile construction sites are those set out in GD 300/2006 transposing Directive 89/391 / EEC, are detailed below, as follows:

**I. FOR EVERY TEMPORARY OR MOBILE SITE, THE BENEFICIARY OF THE WORK MUST DESIGNATE:**

- Project Manager;
- Safety and Health Coordinator during the work.

**I.1 Project Manager** - any private or legal person, authorized under the law and designated by the beneficiary, responsible for organizing, planning, programming and controlling the execution of the works under the quality conditions, costs and deadlines set;

In order to ensure and maintain the safety and health of the workers in the site, the project manager has mainly the following obligations:

- to apply the general principles of risk prevention at the workplace;
- cooperate with the health and safety coordinators during the phases of the works;
- to take into account the observations of the health and safety coordinators recorded in the coordination register;
- To establish the general health and safety measures applicable to the site, in consultation with the health and safety coordinators;
- to draw up a practical collaboration document with coordinators on health and safety.

When a beneficiary or a project manager has appointed one or more health and safety coordinators, it will not be relieved of its responsibilities in this area.

**I.2 Health and Safety Coordinator during work** - any private or legal person designated by the beneficiary of the work and / or by the project manager for the duration of the work. In



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order to ensure and maintain the safety and health of workers in the site, it mainly has the following obligations:

- To coordinate the application of the general prevention and security principles to the choice of technical and / or organizational solutions for the purpose of planning different works or phases of work that take place simultaneously or successively and to estimate the time required to carry out these works or phases of work;
- Coordinate the implementation of the necessary measures to ensure that employers and, where applicable, self-employed workers comply with and apply the health and safety plan;
- Adapt or request the implementation of possible adaptations of the health and safety plan, of the follow-up dossier, depending on the progress of the work or the possible changes;
- To organize cooperation between employers, including those who succeed on the site, and to coordinate their activities, on the protection of workers, prevention of accidents and occupational hazards that may affect workers' health, mutual information and information for workers and their representatives; case, informing self-employed workers;
- To coordinate activities aimed at the correct application of the work instructions and safety at work;
- To take the necessary measures to ensure that only authorized persons have access to the site;
- To establish, in cooperation with the project manager and the contractor, the general measures applicable to the yard;
- To take into account all interferences of activities within the site or its vicinity;
- To establish, together with the contractor, the obligations regarding the use of collective protection equipment, lifting facilities, access to the site;
- To make joint visits to the site with each contractor or subcontractor before they draw up their own safety and health plan;
- To advise on the health and safety plans developed by contractors and their modifications.

The Health and Safety Coordinator during the course of the work must have the necessary competence to perform the function:

- The professional experience in construction networks or the management of the yard for at least 5 years;
- Specific training of health and safety coordinator, updated every 3 years.



**II. THE BENEFICIARY OF THE WORK OR THE PROJECT MANAGER SHOULD BE ENSURE THAT, BEFORE OPENING THE SITE:**

- The security and health plan is being developed;
- The coordination register is established;
- The subsequent intervention file is drawn up;

**III. THE BENEFICIARY OF THE WORK OR THE PROJECT MANAGER MAKES A PRELIMINARY DECLARATION IN THE NEXT SITUATIONS:**

- The duration of the works is estimated to be more than 30 working days and more than 20 workers work simultaneously on the site;
- The expected workload is more than 500 people-day and will communicate it to the territorial labor inspectorate in which work will be carried out at least 30 days prior to their commencement.

**IV. THE ENTREPRENOR** (any competent private or legal person carrying out construction works on the basis of a project, at the customer's request) in order to ensure and maintain the safety and health of the workers on the site, has the following obligations in particular:

- To appoint a site manager (a private person appointed by the contractor to lead the work on the site and to pursue it according to the project);
- to draw up an own security and health plan.

**• Measures for the execution period:**

Work on electrical installations in operation may only be carried out on the basis of a written work permit and the decommissioning of the installation in the case of non-insulated LEA type. The technical measures for the protection of the work would be respected in the execution of the works, in the electrical installations in operation, with their removal from the voltage.

It is considered to work under voltage, those works, to which, depending on the technology adopted, the whole installation is disconnected from the power supply, or only that part of the installation where it is to work under safety conditions.

In order to achieve the protected area, the following technical measures must be taken in the order shown below:

- breaking the tension and visible separation of the installation;
- locking the switching devices through which the visible separation has been made and the mounting of the security signs with a prohibition character;
- verifying the lack of voltage;
- grounding and short-circuit installation.



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Only after taking these measures is the installation considered to be energized.

In order to achieve the work area, the following technical measures must be taken in the order shown below:

- verifying the lack of voltage;
- grounding and short-circuiting of the installation (operation involving the discharge of capacitive loads);
- material dimensioning of the work area;
- technical measures against non-electrical accidents;
- if the zone coincides with the protected area, the technical measures for the protected area are at the same time technical measures for the area of work, and in addition to this will be taken measures to ensure against non-electrical accidents.

To achieve the protected area and work area, the following steps will be taken:

- breaking the voltage and visible separation of the installation;
- blocking the open position of the switching devices by which the visible separation of the installation has been made;
- verifying the lack of voltage;
- grounding and short-circuit installation;
- material dimensioning of the work area;
- technical measures to ensure the area of work against electrical accidents.

**Measures for the period of commissioning and trial operation:**

For the entire period of commissioning and exploitation of samples, the operating unit and the builder shall draw up a graphical drawing on the parts of the energy object, specifying all the work and safety operations that are carried out.

**Measures for the exploitation period:**

The present project is drafted in accordance with the "**Safety and Health at Work Law**" **no. 319/2006** and the instructions in force so that normal operation conditions are ensured after execution.

**9.3. Protection against indirect touches:**

For the protection of personnel from indirect contact in low ground voltage neutral networks (T), the protection system is used by connection to the protective conductor (PE), providing a circuit (TN-C) which ensures tripping in the case of defect in less than 3 seconds, in which neutral and protective functions are combined into a single PEN conductor.

**Verified****Prepared**



## ASOCIAȚIA PENTRU MANAGEMENTUL ENERGIEI TIMIȘ

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