

Action A2.1 Preparation for the Enhanced Green Centres (EGCs)

DELIVERABLE A2.D4A

Technical Preliminary Study for EGC of THE CITY OF ATHENS

Beneficiary Responsible: ERS, Beneficiaries involved: MoA, MEEN, HRA

Summary

The development of Enhanced Green Centers (EGCs), as core actions of LIFE IP Circular Economy Implementation in Greece (LIFE18 IPE/GR/000013) Project, requires preparatory actions that will ensure the implementation of the respective infrastructures in relation with Greek legislative framework concerning public works, as well as maturation of the relevant facilities, from technical and techno-economic perspectives. In this framework, this study deals with the description of preliminary technical specifications related with the design and engineering of the EGC that will be implemented at the Municipality of Athens. These specifications are related both with the infrastructures needed as well as with the equipment which is necessary for the smooth operation of the facility.

In particular, based on the LIFE IP CEI Project, EGCs are considered as facilities which combine two main units in relation with prevention, preparation for reuse and recycling of specific municipal waste streams, namely, Green Center (GC) which have as their core activity the temporary storage of these streams prior their further processing towards recycling and Re-Use Center (RUC) where its main purpose is to re-insert in the economic life cycle re-usable items and not recyclable materials. The focus on the reception of these streams, for what concerns the operation of RUCs, is given primarily on Electric & Electronic Equipment (EEE), items from textiles (clothes, shoes etc.), usable and/or ornamental household as well as the fractions of bulky waste that refers to furniture. In addition, EGCs can operate also as typical GCs enabling the reception of source-separated recyclables like packaging waste (from ferrous and non-ferrous metals, glass, plastics, paper, timber etc.), hazardous household waste (HHW), used cooking oils as well as non-operational and/or non-usable items as downstream outputs of RUCs.

In particular, concerning the operation of EGCs as typical GCs, citizens and other actors of tertiary productive sector (e.g. businesses) can deliver voluntarily quantities of those streams in a pre-sorted form. As part of the GC's operation, the assigned personnel receives, weighs, classifies and stores the respective quantities prior their loading to transportation vehicles for further treatment which is mostly related with recycling and/or



other means of materials' recovery (cases of used cooking oils and HHW). The operation of GCs may also include functional checking of items concerning their reusability, therefore these items can be upstreamed as inputs to the RUC. Key features of the GCs are related i) with the consideration of input quantities as waste streams ii) their primary role as well organized collection centers for the aforementioned waste fractions in a pre-sorted form and iii) as facilities which promote the active involvement of citizens by cultivating their environmental awareness. As the management of some of the fractions is already regulated by the Hellenic Recycling Agency and performed by national Public Responsibility Organizations (PROs), GCs are obliged by law to develop synergies with the respective stakeholders (e.g. for packaging waste, WEEE etc.) as providers of recyclables (which are pre-sorted according to target – materials' composition), with no undesired impurities and ready to be bailed and traded at the secondary materials' market by treatment plants operators (e.g. Materials Recovery Facilities). In the framework of LIFE IP CEI Project, GCs aim at the diversion of specific fractions of municipal solid waste (MSW) from landfilling (which currently stands as the dominant practice for commingled MSW) not through an implemented source separation scheme but *in situ*, through the active involvement of citizens. In addition, GCs act as facilities supplementary to the operation of RUCs concerning the further management of items that cannot be reused and therefore, shall be directed to the 'recycle' pathway.

The second and most critical activity integrated into the EGCs and differentiates these facilities from typical GCs is related with the operation of RUCs. RUCs which were recently added into national legislation through Law 4819/2021 (expressed as Centers for the Creative Re-Use of Materials), are facilities where the input quantities are considered as operational/usable items/objects and not as waste streams. The operation of RUCs foresees also the active involvement of citizens by promoting – besides the environmental perspective – the prevention of waste as well as subsequent social impacts derived from this action. Key feature of the RUCs is the fact that these facilities receive only operational/reusable items – as delivered voluntarily by citizens and/or other actors of tertiary productive sector (e.g. businesses) – that can be reused either directly, either after safety checks and small scale repair and/or cleaning activities which take place as part of RUCs' operation. In this framework, while GCs ensure the diversion of specific waste streams from final disposal through the 'recycling' pathway, RUCs ensure the re-insertion of operational and useful items by donating them to economic vulnerable groups of population, or by trading them at low prize at the second-hand markets. As a result, while the operation of GCs primarily has an environmental impact, RUCs also have a strong social dimension and as part of LIFE IP CEI Project, they are considered facilities that promote waste prevention through reuse. While RUCs are not characterized as waste management facilities, they can develop synergies with existing and/or to be developed PROs as well as other actors.

Based on the above-mentioned principles, this study deals with the preliminary technical description of the EGC that will be developed in order to serve citizens of the Municipality



of Athens. In order to set up the conceptual baseline for this study, focus has been given on the recent legislative framework related with Extended Producers' Responsibility (EPR) programs which means to be implemented in the forthcoming decade as a framework of actions where, along with the operation of existing PROs, will integrate the alternative waste management concept by covering all specific waste streams, including those which are currently not covered by the operation of PROs. In addition, the current status – mostly at EU level – concerning the operation of both GCs and RUCs has been reviewed in terms of identifying and quantifying key parameters such as performance indicators, operational principles, specialties and quantification of involved personnel, applied technologies, cost parameters etc.

As this study presents technical and technological aspects of the EGC tailored for the Municipality of Athens, they are also examined in full detail parameters which will provide guidelines for the dimensioning and engineering of the integrated facility (GC and RUC). In particular, based on the specifications which had already been set according to the LIFE IP CEI granted proposal, the qualitative and quantitative characteristics of the input quantities in concern were analyzed in order to provide a clear view on what is going to be delivered at both GC and RUC, as a preparatory action for the dimensioning of equipment, infrastructures and personnel needed for ensuring the effective and efficient operation of the EGC. This analysis took under consideration the specific character of Athens' urban environment in order to estimate and assess the anticipated participation of the public in terms of both population response ratios and geographical coverage of the residential complexes served by the EGC. All respective data were projected to year 2025 where the City of Athens' EGC will initiate its operation.

Besides the identification of data related with the inputs of EGC, the engineering of the facility in terms of infrastructures and equipment is strongly dependent on the site that will be selected for the implementation of EGC. In this framework, this study also includes the currently applied requirements related with legislative imposed land use restrictions as well as a short journey of the sites that were examined for hosting the EGC. The procedure of selecting a proper site for implementing the EGC included several challenging tasks as it had to combine compliance with i) specifications which had already been set according to the LIFE IP CEI granted proposal, ii) legislative imposed land use restrictions iii) limitations on allowable urban planning factors related with the erection of buildings and iv) land scape adequacy for hosting infrastructures consistent with the relative experience at the EU level. In addition, given the fact that the City of Athens consists of high dense urban complexes, the sites' availability was even more limited due to the fact that some of them had already existing uses for the benefit of nearby neighborhoods (parking areas, parks etc.). It is worth noting that the compliance of the site that was finally selected with land use restrictions will be ratified through specific provisions tailored for this site.

The proposed lot with a total surface area of 4.476m² was selected, located at the residential complex of Elaionas, the technical description of the facilities was followed,



allowing for the planning of the landscape and the general layout design of the entire facility. In this framework, this preliminary study includes a description of the buildings' infrastructures, in particular, technical specifications of the construction works required for the development of the building that will host the RUC as well as specifications for the spaces that will host the storage equipment in relation with the GC's operation. The study is extended in order to include specifications related with utilities of the EGC, such as electromechanical networks regarding power and water supply, sewerage and fire safety networks, fencing, inner roads construction etc. All specifications given are related with both the construction and the operation phase of the facility. At last, this preliminary study also deals with the technical specifications related with the equipment which is deemed necessary for the operation of the integrated facility where, the relevant description is given separately for GC and RUC.

Overall, this preliminary study includes all the baseline technical requirements in relation with the implementation of the EGC tailored for the Municipality of Athens. As this facility stands as a public works project, the technical specifications mentioned in this study will be finalized during the phases of additional (at final and implementation stage) studies related with public works projects, as imposed by the respective national legislation. As these additional studies are not part of the LIFE IP CEI Project (where only environmental authorization studies are covered), they are related with specific details on architectural design and civil works (e.g. study for the static adequacy of buildings) as well as with all electromechanics networks and utilities, all in relation with the buildings' infrastructures and will be covered by Complementary Funding. This documentation portfolio of studies, in total, stands as a prerequisite for the provision of the construction permit that will initiate the EGC. On the one hand, this preliminary study stands as a preparatory action for the maturation and identification of the additional workload needed in order to proceed with the construction of the EGC, while on the other hand, this study provides feedback on all technical aspects related with the environmental impact of the facility, where the respective studies are scheduled to be delivered early at the second phase and within the framework of LIFE IP CEI Project.