

CREATIVE REUSE CENTER OF CENTRAL MACEDONIA, GREECE

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Extending the service-life of goods, components, and materials, through reuse and re-marketing, repair, re-manufacturing, and technological updating is significant for the transition to a more circular economy (EC, 2015). Reuse takes place through many different routes and involves different actors. It has been implemented more among businesses than among local waste management authorities. For instance, the repair and serial re-manufacturing of combustion engines and automotive components, of machine tools and jet turbines has existed for a long time (Cole et. Al, 2015). In addition, reusable bottles, second-hand markets, repair and renovation of buildings and infrastructure have always existed. However, reuse has only qualitatively been incorporated in local waste management systems in part because of difficulties in setting, enforcing and monitoring targets. (EPA, 2017). Enhanced reuse on the local context could be accomplished through reuse centers which are a highly relevant aspect of waste prevention. A reuse center can support the local waste management systems by both improving secondary goods and materials management and preventing disposal of valuable resources to landfills.

Under this framework The Regional Association of Solid Waste Management Agencies of Central Macedonia, Greece is initiating an innovative project of establishing the largest Creative Reuse Center (CRC) in the Balkan Region that will operate under the principles of Circular Economy. The CRC will provide "reusable materials and products" management including repairing, refurbishing, reprocessing, recycling, and creative upcycling of several categories of unwanted and/or discarded products such as furniture, bicycles, electrical and electronic equipment, household items, clothing etc., which will then be re-sold as second-hand materials within the facility. In addition, the facility will combine education and leisure activities such as environmental awareness workshops, educational reuse/recycling activities for children, creative laboratory for artists, playground, and cafeteria aiming to raise awareness over resource reuse and to enhance site visits of residents.

The CRC of Central Macedonia is a project that is expected to improve the quality of life of the residents of the city of Thessaloniki by simultaneously implementing existing legislation of Municipal Solid Waste management and the regions' compliance with the requirements of the European Union, the Reviewed National Waste Management Plan (Council of Ministers, 2020) and the Regional Solid Waste Management Plan of Central Macedonia (Enviroplan *et al.*, 2016).

The paper presents the results of the feasibility study of the CRC of Central Macedonia including description of its operating activities, primary considerations as for the practicality and the economic viability of the operation, as well as main environmental, social, and economic benefits for the local communities.

The operation of the CRC of Central Macedonia is based on repair and remanufacturing activities of the input materials, networking, education, information, and support activities which have been designed for a 15-year time horizon of operation. More specifically the operation of the center will be based on:

- business development activities that will input waste and unwanted materials as resources and raw material for the design and creation of new products
- promoting processes that provide training opportunities and skills development in the workplace for staff, trainees, visitors, volunteers and the local community
- designing education and information programs that promote waste prevention, minimization and reuse in collaboration with the local community, international organizations, educational institutions and the local market.

The activities and monitoring of operation of the center are based on a set of quantitative targets which have been defined within the feasibility study (Table 1).

Table 1: Targets of operation of the CRC of Central Macedonia

Years of operation	Materials for reuse per visitor	Level of reuse of input materials	Visitors per day	Employees (permanent staff)
1-3	3.5 kg	60-65%	100-300	13
4-8	4 kg	65-70%	300-500	18
After the 8 th year	>4 kg	>70%	>500	25

The study shows that reuse of materials within the facility could reach up to 70% and that the reuse of 950 tons, which is the CRC's maximum design capacity, may contribute to a reduction of CO₂ of up to 4000 tons during the 15th year of operation.

In terms of financial viability, the initial calculations show that the break-even point could potentially be reached by the third year of full operation.

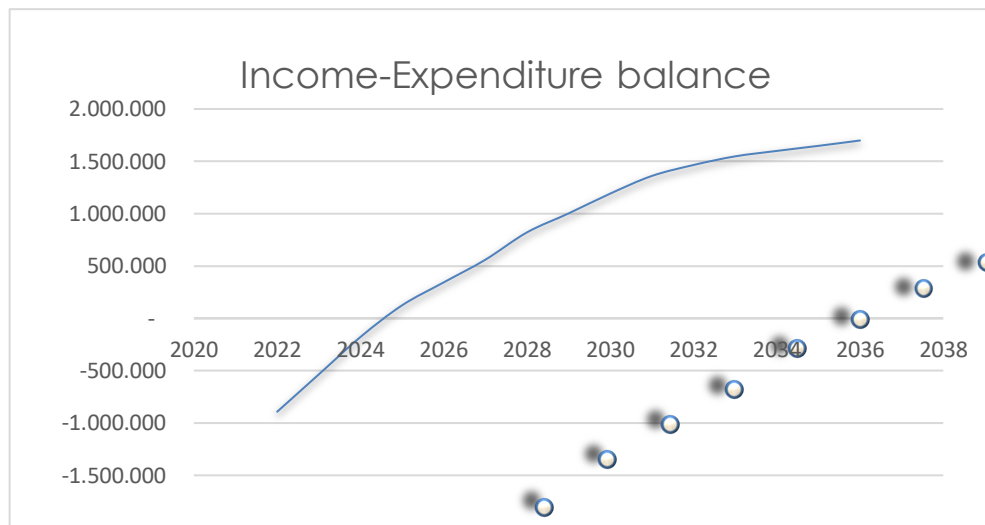


Figure 1: Income-Expenditure balance of the CRC of Central Macedonia

Finally, conclusions of the paper provide several suggestions to other Waste Management Associations and/or municipalities interested in developing a similar facility including design aspects (e.g., qualitative, and quantitative targets and monitoring indicators that need to be set) and operational challenges (e.g., how to ensure sufficient materials received and to secure optimum number of visitors). The successful operation of the center is based on increased citizens' participation and the continuous flow of materials inside and outside the center.

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