

Nothing to Waste: A Green Venture Business Model supporting local communities to Circular Economy pathways

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Abstract Nothing-to-Waste is a green venture about the promotion and implementation of circular economy in the area of Western Thessaloniki, Greece, where 24 businesses are attempting to self-manage their waste in sustainable way. The project is being planned, implemented, coordinated and monitored by NoWaste21, a non-profit enterprise running projects in circular economy, sustainable waste management and recycling. The project uses an integrated approach that includes the implementation of a pilot separate collection program by setting up 29 green points with bins for the separate collection of 6 different waste streams: paper, PET bottles, other plastics & metals and Tetrapak packaging, electrical & electronic equipment, household batteries, and cooking oils. Concurrently, the project includes an educational and training program of businesses and their employees to raise a awareness on circular economy principles and ensure their active participation. Preliminary findings of 2 months showed inefficiencies and malpractices regarding the sorting of waste which over continuous communication and education decreased significantly collecting over 6.5 tonnes of recyclable material. Best results were reported for paper in terms of purity with most of the quantities being stocked material. As the project progresses there is a gradual improvement in the collected quantities and the purity of the materials.

Keywords: circular economy, business model, recycling

1. Introduction

Nothing to Waste is a green venture project launched in January of 2021, by 24 businesses of the private sector. The initiative was visioned by TITAN S.A. an international cement and building materials producer based in Greece in cooperation with NoWaste21 a non-profit enterprise responsible to plan, implement, coordinate, monitor and optimise the project.

The initiative is a pilot project promoting the circular economy principles following an integrated approach of not only the implementation of separate collection but also the promotion of reduction of waste and reuse of the

materials through an educational and training program in order to raise a awareness and motivate the participants.

The priority target groups are the participating businesses and their employees along with their households but the project is also targeting indirectly the clients of the businesses and the residents of the surrounding area.

The objectives of the project are to highlight the value of waste as resources, to develop and enhance the environmental awareness of the target groups, and to improve the environmental performances of the participating businesses regarding their waste management (including waste from their households). Moreover, the project is attempting to explore the private sector's ability to form alliances and implement an integrated action plan to manage their own waste and to contribute to local society and the protection of the environment.

The end goal of the project is for it to constitute a good practise and standard for other businesses from the private sector and to inspire them to transition to a circular economy-way of operating by forming partnerships despite the differences in their interests or size that could gradually evolve in industrial symbiosis.

The project constitutes an innovative action as it is the first time in Greece where an alliance of businesses has implemented an integrated approach fully funded by the private sector (1st year fully funded by TITAN S.A.) to self-manage their produced municipal waste.

Furthermore, the project contributes to the local society and local authorities as it initiates the transition towards a circular economy and society and contributes to a cleaner, safer and healthier environment for the citizens by nurturing and enhancing the environmental awareness of both the employees and their households (most of them residents in the wider area of Western Thessaloniki) as well of the citizens in general (clients, neighbours etc). Additionally, the citizens are being encouraged to participate in separate collection of their municipal waste in general, facilitating their transition to the upcoming "Pay As You Throw" or "Reward As You Throw" schemes and Deposit Refund System (DRS) of PET and metals.

Finally, as the participating businesses are self-managing their own municipal waste in a circular way it can provide the municipalities with a clearer view of the produced municipal waste, (the results of the project will be freely and easily accessible), and concurrently decreases the managed municipal waste quantities as well as the management cost.

This paper is focused on the approach, the methodology and planning of the project presenting the early stages of the implementation (equipment, education & training, dissemination) along with the preliminary findings for the first two months of operation (quality and quantity of the collected material).

2. Methodology

2.1. 1st Phase – Initial Planning

The development of the conceptual project was undertaken by NoWaste21 in collaboration with the coordinator and financial supporter TITAN.SA.

The selection of the participating businesses was made based on predetermined criteria such as the proximity of the businesses to the TITAN S.A. cement factory in Efkarpia area of Western Thessaloniki, the type of business in terms of business activity along with a pre-existent collaboration between the businesses. The most important factors for the final selection were the willingness of the businesses to actively participate in the project and sharing the same vision with the coordinators.

A call for participation was launched by TITAN S.A. in which 23 business responded. A meeting with the directors & managers of the business was held in order to inform them about the project, its goals and their involvement as well as for them to express any concerns regarding their participation (Figure 1).

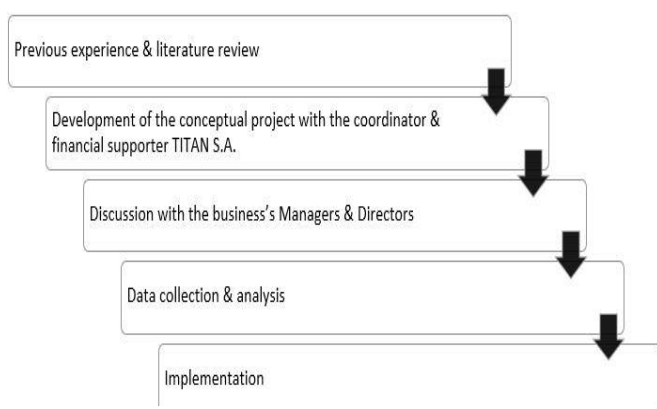


Figure 1: 1st phase - Initial planning of the project

2.2. 2nd Phase – Integrated approach

The second phase of the project included the planning of the implementation. Data collection was required regarding the participating businesses core activities, the number of employees, the type of the main produced waste and their average quantities.

The planning was made according to each business needs. The required data were acquired through on-line research for each business (websites and/or on-line articles/publications), the exchange of emails as well as semi-structured interviews through the telephone.

Based on the collected data and their analysis NoWaste21 procured the equipment. The number and capacity of the bins to be appointed to each business were determined by the size of the business and the number of employees, the estimated weekly waste production of each waste stream, the storage as well as the available spacing within the business's perimeter.

The bins were procured through an extended market research of the manufacturers and procurers with the criteria of localisation, quality and characteristics of the bins as well as the cost of the equipment. Locality was preferred following the principles of circular economy to minimise the transportation footprint and supporting and enhancing the local economy. The manufacturer is based in the wider area of Kozani in the region of Western Macedonia, with an estimated distance from Thessaloniki of about 125km. The bins were manufactured based on international standards set on an EU and national level (EN-840) to secure primarily the health and safety of the employees and environmental protection as well as the quality of the collected materials to avoid any spoilage and/or deterioration.

Concurrently with the supply of the bins NoWaste21 has developed the educational and training program. The curriculum of the education and training was selected considering the educational level of the majority of the business's employees, as well as the necessary content that would be of interest and would motivate the employees. Due to the nature of the majority of the business's activities and the multi-layered educational level of the employees the team of NoWaste21 chose the content to be simple, to the point and expressed in a clear and indelible manner.

The collection of the material would be carried-out by a Social Cooperative Enterprise (EcoGreece), operating in Thessaloniki, to transfer the collected recyclable material to appropriate certified sorting and recycling plants. The selection was made based on the social characteristics of the enterprise, its experience and of course its contracts with certified recipients where the collected materials would be transferred.

Extreme care was given to the dissemination and communication of the project. Local mass media and especially those in electronic forms (e-papers) were selected for the information to be widely spread and easily accessed by everyone despite the pandemic of covid-19 and the imposed by the Greek government safety-measures.

NoWaste21 is responsible for the continuous monitoring and evaluation of the project in order to suggest optimisation measures in regards to the operation of the overall project, the education and training of the participants, as well as the quantity and quality of the collected materials.

The project includes also the rewarding of the participating businesses at the end of the year with the best performances based on the quantities and quality of the collected materials as well as their overall approach regarding the reduction or re-use of materials.

Lastly, NoWaste21 based on the results and the optimisation measures will plan and facilitate the expansion of the program with the involvement in the project of businesses that wish to participate.

2.3. Barriers

During the planning and implementation of the project the team of NoWaste21 had to overcome significant barriers. The most challenging barrier was the pandemic of Covid-19 and its consequences in terms of planning and implementing. The weekly meetings of NoWaste21 with the coordinator during the 1st phase of the program were conducted through teleconferencing in order to discuss the aspects and the required actions for the development of the project. Data collection for the procurement of the necessary equipment as well as the weekly contact with the businesses was made through online means (internet, emails) as well as approaches via phone calls.

Long-distance was a predetermined and thus expected barrier the planning team had to overcome. As the scientific coordinator is based in Athens and the project is taking place in Thessaloniki, the obstacles were mainly the limitations of frequent visits to the businesses for the 2nd phase of the project including the setting-up of the green points and the bins as well as the monitoring of the collected materials. These issues were resolved with the help of the involved Social Cooperative Enterprise as the mediator between the scientific coordinator and the businesses by sending comments and pictures on a weekly basis in regards to the quality along with the quantities of the collected material per business.

Finally, many businesses have initially expressed scepticism regarding the collection of the material, the space occupation of the green points and the issues that might arise from them by limiting the businesses a variable spacing and the potential obstructions in their daily workload. The objections were eliminated with the setting of weekly collection routes and with the suggestion of optimum placement of the green points based on each business available space and in regards to the businesses considerations.

3. Results & Discussion

3.1. Pilot project-equipment

To cover the requirements of the participants, 29 green points were set with 6 different bins of separate collection each, with a total of 174 bins. Depending on the collected material each bin had a different colour: red bin - PET bottles (water, juice etc.), blue bin - metal & tetrapak packaging, Other plastics, yellow bin - paper & cardboard, green bin - Electrical & Electronic Equipment, cylindrical AFIS bin household Batteries, grey bin - cooking oils

3.2. Training & Education

The educational and training program of businesses and their employees was carried-out through teleconferencing and on-site visits. Teleconferencing was carried out on specific dates and times for the businesses and their employees to connect. The education focused on the circular economy concept, the program, and the conferring benefits for the businesses, the environment and the local society.

Additional education was provided through available information on the website of the program, including a "Guide on Circular Economy and Zero Waste" in electronic form available for free downloading. A printed form of the Guide was also distributed in the businesses and their employees.

Lastly, as soon as the restrictions on transportation were lifted the team of NoWaste21 arranged a visit in Thessaloniki to the businesses where a brief education and training was provided in each business, focusing on the conferring benefits and the proper sorting of their waste.

3.3. Monitoring & Evaluation

Monitoring and evaluation of the program is being carried-out in a weekly basis through the weekly report submitted to NoWaste21 by the cooperated collector. The quantities of the collected material are being recorded weekly per business along with comments regarding the quality of the material and the sorting on the bins.

At the end of each month a total evaluation report is being submitted to the overall coordinator and optimisation measures are being discussed and implemented.

4. Preliminary Findings

4.1. Waste sorting and equipment

Regarding the quality of the collected material and the sorting of waste by the participants some inaccuracies and malpractices were recorded.

To be more precise there were a lot of inaccuracies in the content of the red bin (PET bottles) where the participants were confused about the different types of plastics as well as in the case of blue bins confusing the accepted materials for the blue bin of the program with the accepted material in the blue bins of the municipalities (accepting mixed recyclable packaging: glass, metal, paper, plastic). Another issue that occurred was with the grey bin (cooking oils) where there were reported cases where the participants emptied the cooking oils directly into the bin instead of disposing it together with the plastic bottle in which they carried it from their households as instructed by the coordinators.

Nonetheless, gradually and with the continuous communication from NoWaste21 those cases have significantly reduced.

A few cases of vandalism and loss of equipment were mentioned basically by wandering individuals.

Lastly, it was shown that on the businesses where the administrations and/or management of the business were actively involved the employee's participation was increased.

4.2. Collected quantities

The total collected materials for the 1st month of the program's collection phase were impressive with a total of 5.4 tons of collected materials. The highest quantities were recorded on paper (yellow bin) mainly due to the stocked quantities from the archive of the businesses, followed by waste of electrical and electronic equipment (WEEE) (Figure 2).

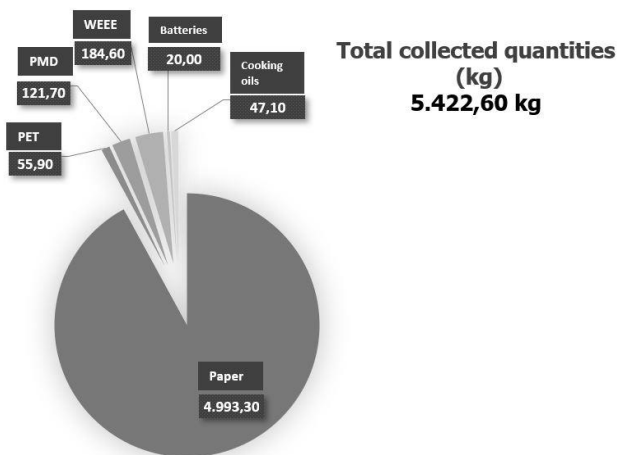


Figure 2: Total collected quantities (1st month)

Due to the differences of the businesses in terms of size and the employed personnel, the indicator of collected quantities per employee was examined (Figure 3).

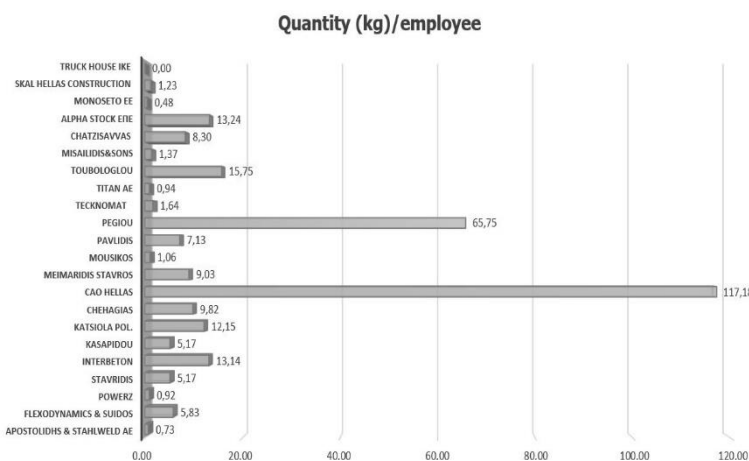


Figure 3: Quantities per employee (1st month application)

This indicator shows us more reliable data regarding the business's performances on the collected material as it is obvious that the collected quantities will be lower for small and medium businesses with up to 10 employees in contrast with businesses with 50 or more employees.

This project as mentioned before is a circular economy project not only focusing on recycling but also on the prevention of generated waste and the reuse of materials. The scientific team is collecting data per business on their

prevention measures adopted by the businesses and their employees and also on their reuse actions. For example, the option of reuse of cardboard and cardboard crates for the storage of extra cardboard boxes and plastics that would be collected by the program on the weekly route.

5. Conclusions

NothingToWaste is an innovative project that will set the standards for other businesses to follow. The preliminary findings are optimistic with the collection of 5.5 tons of collected material that would have otherwise be landfilled. The recorded inaccuracies in terms were expected and manageable as it is only the starting point of the program.

The education and training of the participants is very important to raise awareness and thus increase their involvement. As a number of international and national studies has proved people need to be informed of the reasons why it is important for them to participate to fully embrace any project especially a recycling and circular economy project as NothingToWaste.

The cooperation and active participation of the administrations and managements of the business is essential to ensure and encourage their employees participation.

As mentioned before the primary target groups of the project are the businesses, their employees and their households but non-primary targets such as the clients the neighbouring households are also targeted.

The minor cases of vandalism of the bins with the loss of the bins need to be addressed and it was proposed to the businesses to keep the bins in secluded and protected areas during the hours where the business is closed.

The project has shown interesting and significant results with a continuous improvement regarding both the quantity and quality of the collected materials. It is expected that by the end of the year the results will be impressive succeeding to increase the quality of the collected material and the quantities although as it is a circular economy program the reduction and reuse is also promoted.

The project in the beginning of its venture is hoping it will be a continuous project that will encourage cooperation in the private sector and set the first steps towards the implementation of industrial symbiosis as well as protect the environment.