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Hospital Waste Sorting

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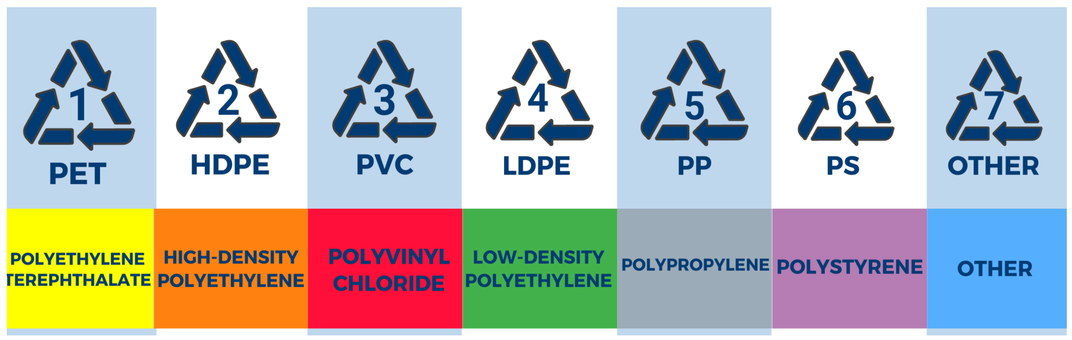
1.Plastic waste

Due to a new law, all Danish companies and hospitals are required to implement sorting and disposal of the waste they produce. The law states that sorting should be divided into 10 fractions but does not state how companies should do the sorting and disposal. Plastic waste is responsible for the most amount of Co2 emission. In order to reuse or recycle plastic, it has to be sorted to 7 different fractions.



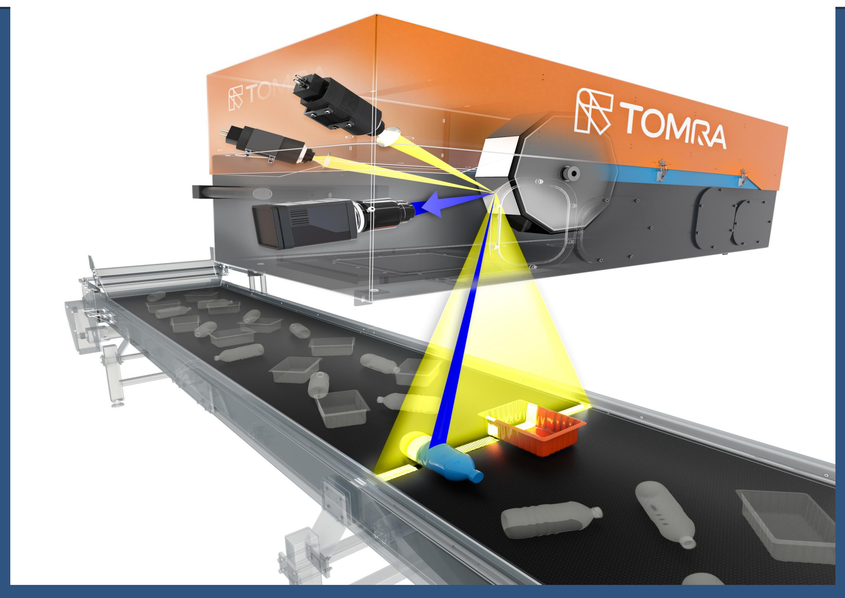
2. Purpose and scope

This project focuses to compare and combine both centralized solutions and decentralized solutions and solve the problem of plastics not being sorted at hospitals as mentioned above and help the government to achieve its sustainability goals.

- Centralized waste management: Wastes from the hospitals are collected, sorted, and transported to a single location and processed.
- Decentralized waste management: Wastes from the hospitals are sorted in the site and then transferred to a single location and processed.

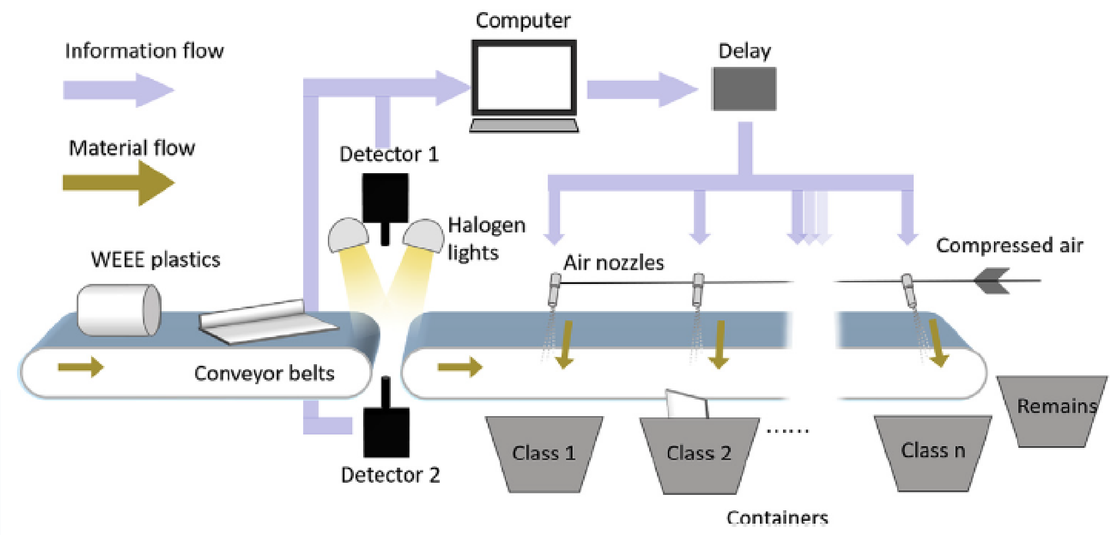
3. Vision based sorting

Computer vision (CV) is used to assist in sorting either at the source or when it is collected at the (recycling place/ internal trash room). Along with a model it can be trained to identify various materials, integrated with smart deceives the CV model can aid users to determine the types of generated waste materials for proper classification.
It can also be applied alongside a robotic solution to sort it automatically into bins, furthermore, it can aid unmanned ground vehicles in automatic waste collection in construction sites or manufacturing places.



4. Solutions

In the first phase of the solution, 7 decentralized plants will be implemented all over the country to sort the most common type of plastic.
In the second phase, a central plant will be added to the setup. After, the 7 decentral plants will be used to purify plastic and sort any non-plastic material from the flow. Number of the machines, capacity and the layout of the plants have been calculated and designed based on the requirements of Danish hospitals. Environmental goals were more important than economical goals in this project. Transportation cost is not considered in this solution. However, if transportation cost is le3.7 million DKK a year, this solution has financial profit.
Also, a decentralized Solution, which allows more flexible and distributed decision-making, can be perfect in some cases where the availability of space is less, where the hospital might be located in a remote area and hard to reach, and finally limited resources. In such cases, a decentralized solution is ideal for sorting plastics. This can result in improved efficiency, scalability, and robustness.



5. Conclusions

The circular economy is essential when it comes to plastics. It highlights the concept of closing the loop, which means keeping plastics in the economic system for as long as possible to reduce the need for fresh production and waste generation. Plastic sorting efficiency is critical to developing an economy that is circular for plastics. Hospitals can optimize waste sorting, increase recycling rates, and contribute to a cleaner, healthier future through the integration of decentralized and centralized systems. These solutions support resource conservation, employment creation, growth in the economy, and sustainable development

Acknowledgement

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