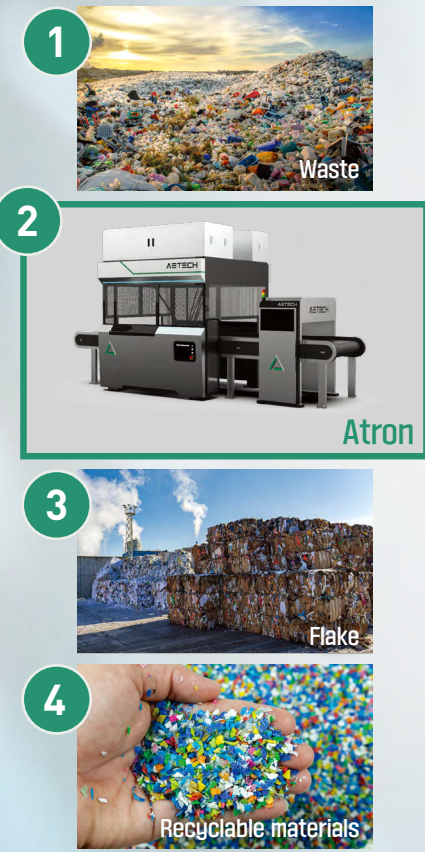


# Atron Solution



**SOLUTION**

- Sorting of recyclables **Increased speed 240%**
- Sorting facility **Increased operating hours 126%**
- Based on an 8-hour workday **Payback period 3 years 8 months**
- Compared to manual sorting **Cost reduction 279%**

\*Based on two workers

## Expected benefits of adopting Atron

- Waste Accuracy of classification **99.3%**
- Zero break time **Labor 3X efficiency**
- Operating costs per hour **700% Reduce**
- Reduced workspace required **125%**

**Patents/Certifications**

Recycling sorting system using Albased technology

**Awards**

- 1st place in the Incheon Startup Contest (Nov. 2020)
- 1st place in the Daegu Civic Hactherthon (Nov. 2020)
- 2nd place in the Smart Incheon Harbor Challenge (Dec. 2020)
- 1st place in the Data Voucher Support Project (Dec. 2020)
- Award in the Media Convergence Technology category (Aug. 2021)



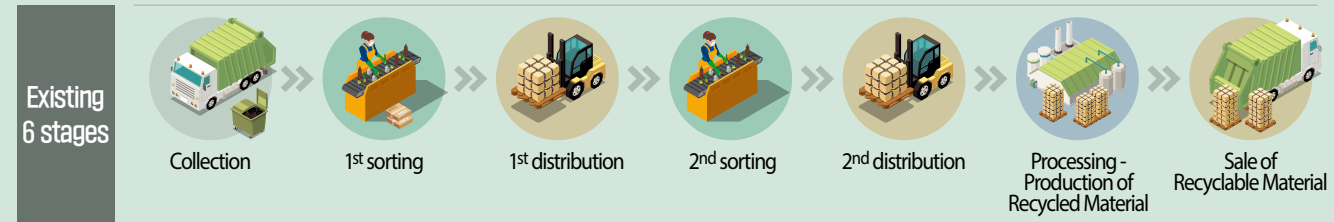
We are AETECH, looking beyond environmental technology.

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## Domestic Waste Management Process

- From Collection to Recycling



Do you know how household waste collected from your home is recycled?

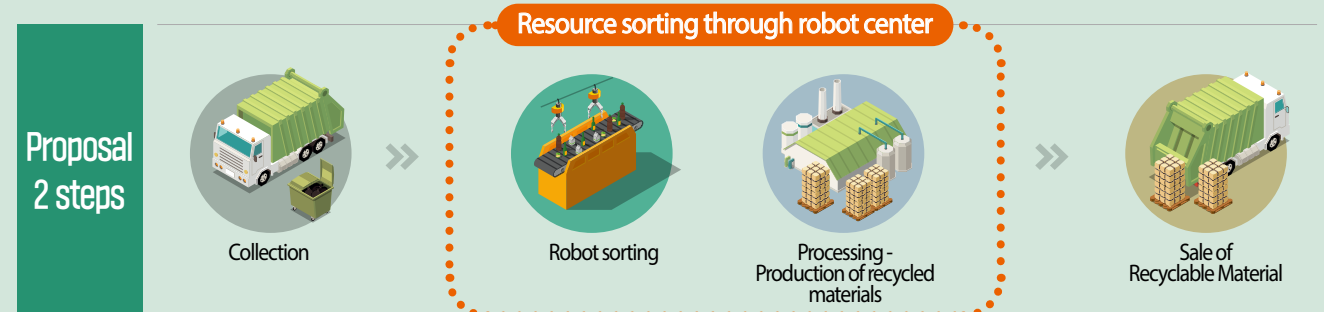
The recycling rate through sorting is **Under 40%**

Recyclable waste collected undergoes the process of being taken to a recycling facility. The waste that can be recycled is sorted out and collected separately as raw materials. All recycling facilities across the country process dozens of tons of waste every day, but they still rely on manual sorting methods by workers.

Although sorting workers are essential to all recycling facilities, they suffer from exposure to vibration, noise, odor, and industrial accidents, making it a declining and unattractive industry with aging workers. In addition, if the waste is not sorted out when it passes by once, it cannot be recycled and ends up being incinerated or buried as waste.

## Smart City where robots sort waste from collection to recycling

- From sorting to recycling in one step



When sorting is done at the robot resource recovery center



Robotic resource recovery centers operated solely by robots can be established and operated to solve the problems of an aging workforce, labor shortages, and safety issues in the workplace.

It can reduce landfill/incineration amounts by up to 70% with a recycling rate of approximately 70%.

With eight or more robots in the robotic resource recovery center, high-purity material sorting by material type can be achieved in a single stage by reducing the distribution stage from 1st, 2nd, 3rd, and Nth stages.

Compared to the previous rate **improved recycling rate by more than 1.5~2 times**

Reduced landfill/incineration amount results in saving more than **60 million KRW** per year per unit in incineration costs. The carbon footprint of one PET bottle (15g) is about 10g, **reducing 830kg** of carbon footprint per day.

## ATRON's Structure

ATRON is a smart resource recycling sorting robot based on deep learning artificial intelligence that automates the process of manually sorting recyclables that people used to do.

Target waste (7 types)	<b>PET, PP, PE, PS, Other, Glass, Can</b>	
Small classification criteria	<b>43 classifications</b>	Thin transparent PET, General transparent PET, Green PET, Brown PET, White PET, Mixed PET, Aluminum can, Transparent glass bottle, Brown glass bottle, Green glass bottle, Blue glass bottle, Mixed glass bottle
Number of waste that can be sorted per minute	<b>96 items / 1 minute</b>	World-class
Object recognition accuracy	<b>99.3%</b>	Official certification standard
Number of training data	<b>Over 1.6 million cases</b>	

\*Increased number of trained objects can lead to continuous improvement in accuracy

Sorting command execution

Sorting unit

Model name : ATRON

### Single arm Robot Specification

Robot frame size	W1900*L1900*H3000
Vision frame size	W1100*L650*H1100
Sorting speed per minute	Up to 96ppm
Power	1-phase 220V and 3-phase 380V combined usage, 22 kW
Load capacity	4kg
Weight	Less than 1ton

\*The robot's frame size and weight may vary depending on the usage environment.

Object Selection and Data Filtering

Converter Unit

Analysis of waste types and characteristics

Analysis Unit



## Atron's core strength and differentiation

Over a 2 year period of field testing, more than 1.6 million pieces of waste data were collected, resulting in an object recognition accuracy of 99.3%.

Collection 99.3%  
Object Recognition Accuracy

- 1 Atron utilizes a blow vacuum method, which provides the technical advantage of quickly and accurately grasping objects at precise target points.
- 2 Other companies with similar products use an air compressor-type vacuum method, which lacks clear object screening, resulting in lower accuracy.
- 3 We also use the same blow vacuum method, our artificial intelligence image learning ability is low, resulting in a selection speed of around 50 objects per minute.
- 4 Atron has the ability to process 100 objects per minute and possesses competitive pricing during the manufacturing process, with a 30% lower selling price.

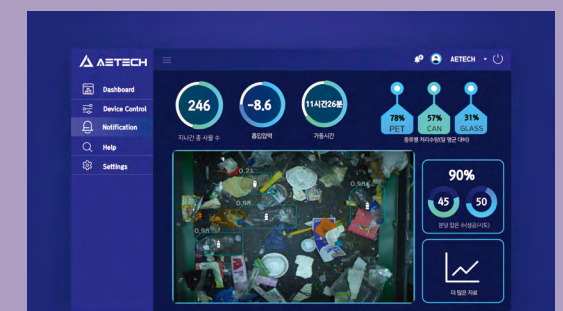
Recognition Unit

Real-time object capture and data collection

Monitoring Unit

Real-time monitoring

### Atron AI screen



### Response from current commercialized companies



S company located in Yeonsu-gu, Incheon completed a field test (21.08~21.11)



H company located in Namdong-gu, Incheon made its 1st sale

After selling the first Atron unit to H company in Namdong-gu, Incheon in April 2022, an additional sale was made to R company in Namyangju on March 1, 2023. In the first half of the year, we are proceeding with the sale of more than 10 Aitron units to eight private/public recycling sorting facilities in the metropolitan area and three private/public recycling sorting facilities in local areas.