DANU ROBOTICS

Green. For Life.

AI Guided Robotic Waste Management System

We have a waste problem

Over 2 billion tonnes of waste generated every year

Less than 10% of it is recycled

Efficient waste management has become a global challenge

All recycling facilities reliant on slow manual sorting

Low quality recyclable outputs => **Low revenue**

Raising labour costs

Raising labour shortages
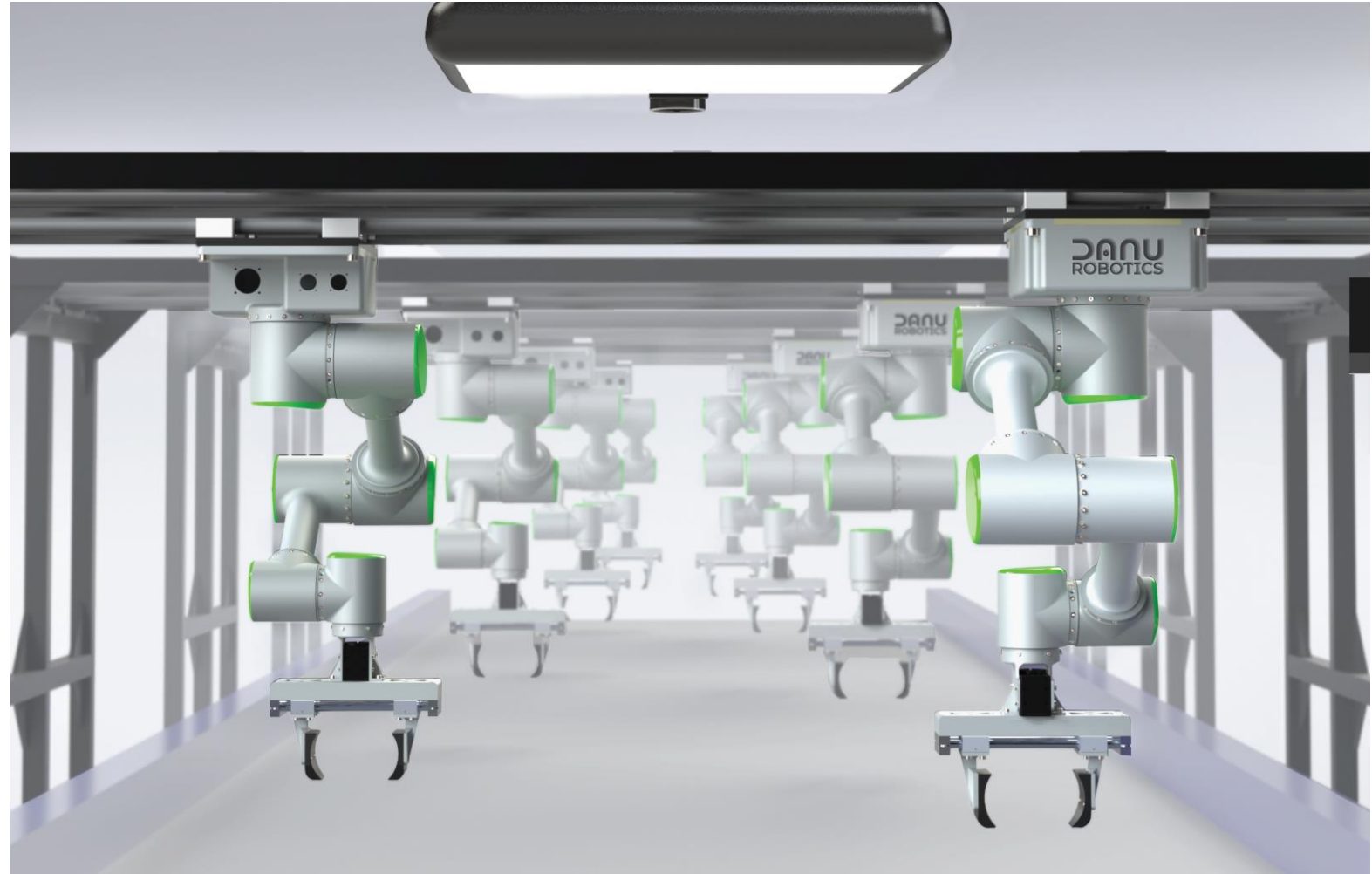
Increasing environmental & regulatory costs

Our solution – H.E.R.O

An AI guided multi-picker robotic sorting system that operates like an octopus: 8 pickers can pick out 8 different things

Fully automate the whole waste sorting process

Fast & accurate

H.E.R.O – High performance, environmentally friendly, reconfigurable operator

H.E.R.O increases revenue and profit

- Modular low cost system can retrofit into any recycling facilities with two engineers and half a day's time

- High quality recyclable output lead to increased revenue

- Saving on operational costs ranging from 30% to 70%

- 50% cheaper and more productive

- Reconfigurable to sort out many waste materials

Glasgow city council beta system trial

Belt speed: 0.5m/s to 0.7m/s
Installation: 2 people, half day
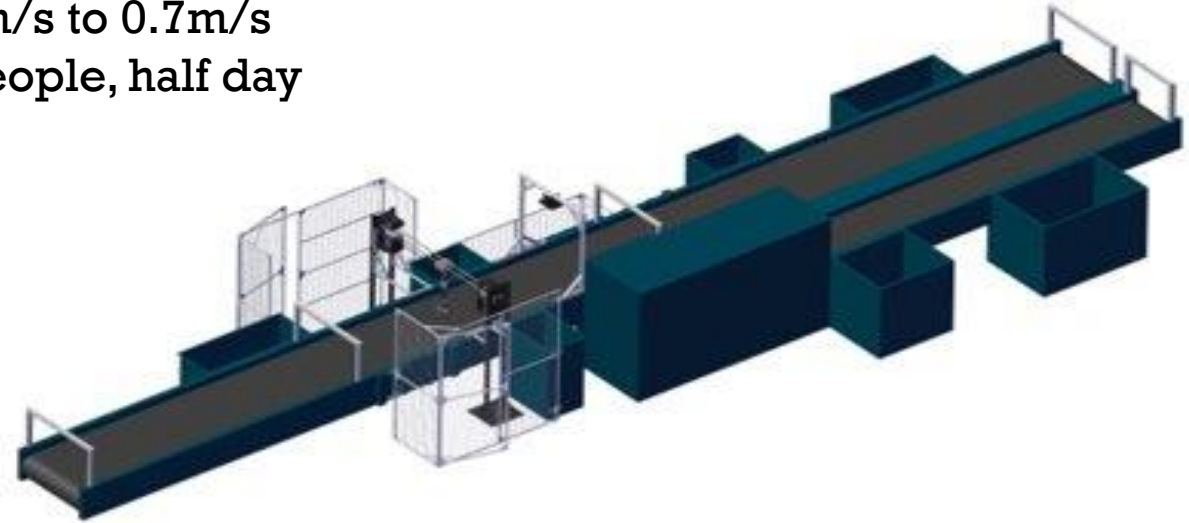
96% accuracy identifying plastic bottles, etc
Meets all the safety requirements

Outcome: 2nd beta system has been requested

Paid-for projects

EGF is Portugal's biggest waste management company, processing 60% of country waste and operating 22 MRFs.

A future potential 200 units group sales within Portugal.

Oct 2023
Secured 2 projects with EGF via a competitive process

Dec 2023
Shortlist and commercial proposal

Jan 2024
Letter of intent

April 2024
Purchase orders received

August 2024
Installation of first order

EGF as a long term customer

Their challenges:

- Severe labour shortage
- Limited space within facilities
- Increasing volume of waste
- Regulatory pressure

Our system offerings:

- Accurate waste sorting
- Retrofit-able
- Scalable
- Operational efficiency

international footprint

Attracted significant market attention

100% product market fit from Scottish companies

Commercial conversations with the UK leading companies representing 60% of market share

LOI for 4 units of H.E.R.O

19 recycling facilities in UK

11 recycling sites in the UK
33 recycling sites in France

15 recycling facilities in the UK,
Operating in 48 counties

Global leader in recycling equipment: North America and the EU

HQ in the UK and Netherlands with operations in Germany and France

Automated waste sorting market

TAM

SAM
£1.58bn

CAGR
19.6%

SOM
£110m

UK & EU Markets

Beachhead Market

	Household & packaging waste	Construction waste	E-waste	Medical waste
Value	$88bn	$56bn	$99bn	Emerging
Light weight robots	Yes	Yes	Yes	Yes
Standalone recycling station	Yes	Yes	Yes	Yes

Highly experienced professionals

CEO & CTO, Xiaoyan Ma

10 years experience as a technology lead within large international corporations developing vision, system specifications and technology

Specialises in Data Science, AI, Supercomputers and distributed systems.

COO, Steven Marshall

A Chartered Mechanical & Electrical Engineer

One exit

Over 30 years experience in engineering operations, system designing, testing, quality control, production and commissioning

CMO, Nick Noble

A highly experienced B2B Marketing specialist

30 years experience in strategic marketing primarily in technology companies inc IBM, IMG & Salesforce through to startups

Industry Consultant, Marcus Thomas

Ex-technology lead at Viridor (a waste management company)

30 years experience in the recycling and waste management industry

Sustainability Advisor, Sophie Rippinger

Specialise in helping companies developing circular economy and net zero strategies

10 years experience in the waste management industry

Expert engineers

Senior Product Design Engineer
Shane Mason
**+10 years experiences
in developing physical products**

Electro-Mechanical Engineer
Daniel Adamczyk
**BEng Electronic and Electrical
Engineering**

Robotic Control Engineer
Persie Rolley-Parnell
PhD Robotics

Robotic Software Engineer
Joseph Milligan
**MEng Robotics, Autonomous
and Interactive Systems**

Robotic Hardware Engineer
Younes Bouhoun
**MEng Mechatronics, Robotics
and Automation Engineering**

System Integration Engineer
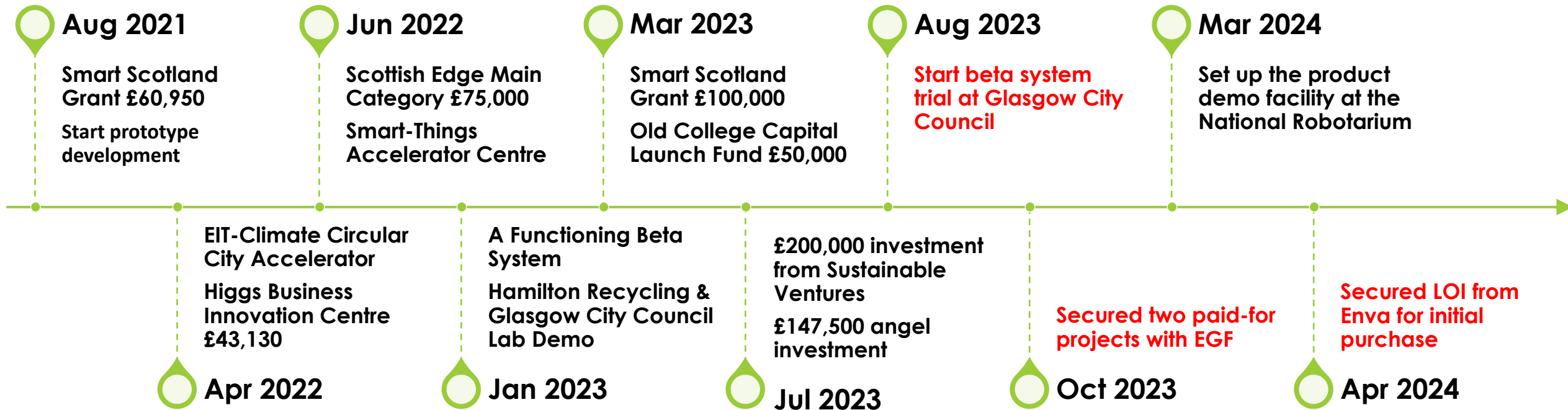**Bence Toth**
**BEng Electromechanical
Engineering**

Computer Vision Engineer
Muhammad Ahmed Raza
PhD Computer Vision

Computer Vision Engineer
Tiago Le
MSc Artificial Intelligence

Achievements with £750k investment

Aug 2021

Smart Scotland Grant £60,950

Start prototype development

Jun 2022

Scottish Edge Main Category £75,000

Smart-Things Accelerator Centre

Mar 2023

Smart Scotland Grant £100,000

Old College Capital Launch Fund £50,000

Aug 2023

Start beta system trial at Glasgow City Council

Mar 2024

Set up the product demo facility at the National Robotarium

EIT-Climate Circular City Accelerator

Higgs Business Innovation Centre £43,130

Apr 2022

A Functioning Beta System

Hamilton Recycling & Glasgow City Council Lab Demo

Jan 2023

£200,000 investment from Sustainable Ventures

£147,500 angel investment

Jul 2023

Secured two paid-for projects with EGF

Oct 2023

Secured LOI from Enva for initial purchase

Apr 2024

Business model 1

Product	Hardware	Monthly licensing fee
H.E.R.O. Model One (2-picker system)	£60,000	£1,500
H.E.R.O. Model Two (4-picker system)	£120,000	£3,000
H.E.R.O. Model Three (8-picker system)	£240,000	£6,000

Hardware payment ; manufacturing, assembly and installation
Monthly licensing fee; use of AI and a comprehensive professional services

Our customers can expect to recoup the initial investment within 12 months time at the most

Recycling of plastic packaging example:

Annual revenue pre 8 hours shift: £80,000

Year1 cost: £60,000 + £18,000

Afterward: £18,000 per annum

Manul sorting:

£30,000 per person per 8 hours shift per annum

System life time value

Product	Hardware	Monthly licensing fee for 7 years
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H.E.R.O. Model Three (8-picker system)	£240,000	£6,000

Average life span in the industry is 7 years

Life time value of our system is: £186,000

Bill of materials: £25,000 to £30,000

Gross margin over 7 years is 520%

Business model 2

Product	licensing
H.E.R.O. Model One (2-picker system)	£3,000
H.E.R.O. Model Two (4-picker system)	£6,000
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Life time value of our system (5 years lease) is: £180,000

Life time value of our system (7 years lease) is: £252,000

Bill of materials: £25,000 to £30,000

Key financials & milestones

	JULY-2023	JULY-2024	JULY-2025	JULY-2026	JULY-2027	JULY-2028
Revenue	£0	£100,000	£2,2m	£7,8m	£22,2m	£57,4m
EBITDA	-£336,000	-£430,000	£270,000	£3,1m	£11,2m	£30,3m
Total base units	0	2	32	105	288	728
Team	10	16	22	38	64	116
Investment	£422,500	£1-2M				

Investment plans

£2M investment will be used for:

➢ Model One 2-picker system production

➢ Deliver 2 paid-for-pilot EGF projects and initial sales with the UK waste management companies

➢ Marketing & Sales assets; website, video content, product literature, exhibition signage, and product illustration

➢ Build strong foundation for growth, increase customer reach from 50 companies to 100 companies in 2025
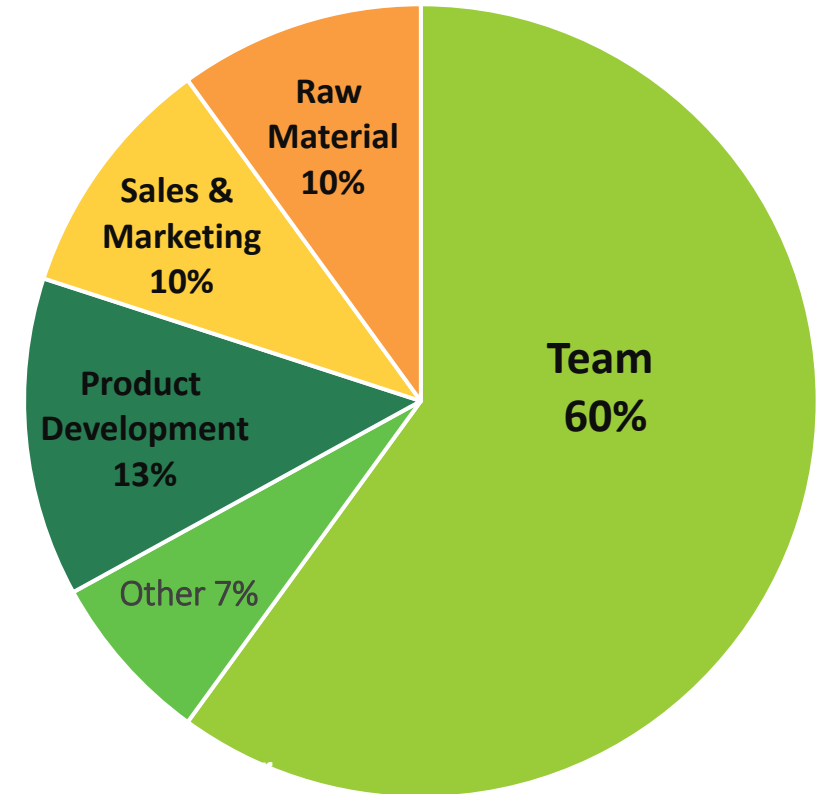
"We know robots are coming, its inevitable.
I particularly like the recyclability of your robot"

-- Audrey Duckworth, Binn Group

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For More Information:

Executive Summary

The Waste Management industry is critical to building a Circular Economy which has potential to be a trillion-dollar market*.

Our AI guided robotic waste sorting system improves productivity and profitability for waste management companies.

Our technology makes efficient waste management a reality for a greener future and received 100% product-market-fit approval from the industry.

Competitive Advantages
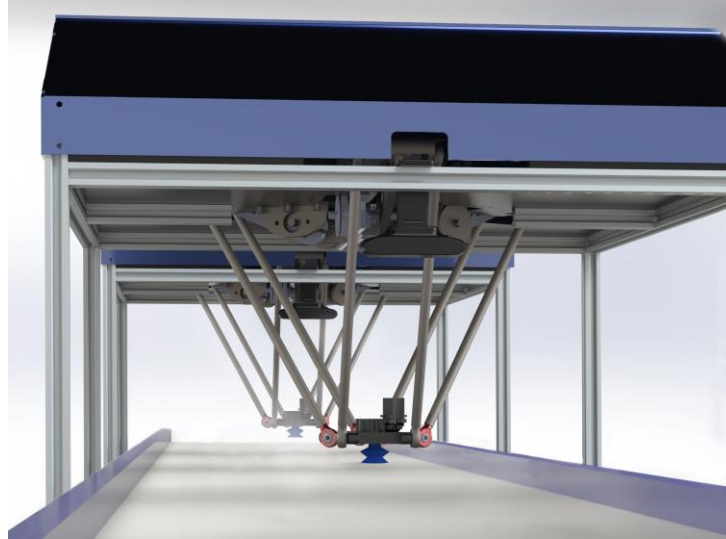
Can retrofit into any recycling facilities worldwide regardless of its size, current technology level and location

	Full Automation	Successful picking rate	Retrofittable & configurable	Energy Efficient	Easy to use
Danu Robotics	Y	90%	Y	High	Y
AMP Delta Robot	N	60-70%	N	Low	N
Recycleye	N	50%	N	Medium	N

Technology Protection

➤ The whole centralized multi-agent system design (patent pending). Any company want to develop a multi-picker system with only one control system (brain) need to license technology from Danu Robotics which is protected by this patent

➤ Individual robotic picking system design (patent granted)

➤ The unique object tracking system design (patent pending)

➤ Object segmentation system design (trade secret, will fill patent)

➤ Software system design (patent pending)

➤ Trademark over our brand and logo

Our Solution - Accuracy

Our Computer Vision system identifies object by its shape and its edge rather than a bounding box, allowing more reliable and precise mechanical grippers to be used.

Defensibility:
Access to customers' waste data
Large and expanding data lake
Unique data annotation team

Go To Market Strategy

Stage 1; Scotland; easiest serviced customers, early adopter partnerships, RMAS

Stage 2; England; 10x scale, European market leader headquarters, NEC industry showcase. ESA
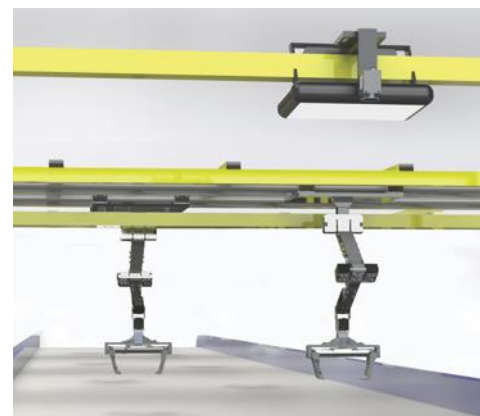
Stage 3; Europe; via market leaders, European Trade Associations & Trade shows, Reactive

Outreach then MRF site visit; Cireco, Binn, GCC, GAP etc

Demo facility at the National Robotarium Edinburgh

'Retrofit' 2 arm sale

Full System 8+ arm sale with 10 year contract

Sales Strategy

Customers - Material Recovery Facilities (MRFs)

Stage 1; Outreach – Customer Site Visit – Demo

Stage 2; 2-arm system *'retrofit'* sale

Stage 3; 8-arm system sale with 10-year service contract

Scotland; 17 MRFs	UK; 108 MRFs	Europe; 939 MRFs	APAC	USA
All owners contacted; 50% engaged in sales process. 100% requested visit to demo unit	In commercial conversations with leading 3 owners; Biffa, Suez, Enva & Veolia (60% of market)	Danu selected for two contracts after direct invitations to bid.	Trade Associations to be identified	Trade Associations to be identified

"*We maintain 16 full time staff sorting waste at our Sunderland plant but did 400 new employee inductions last year*"

-- Cumbria Waste Directors on the problems of staff retention