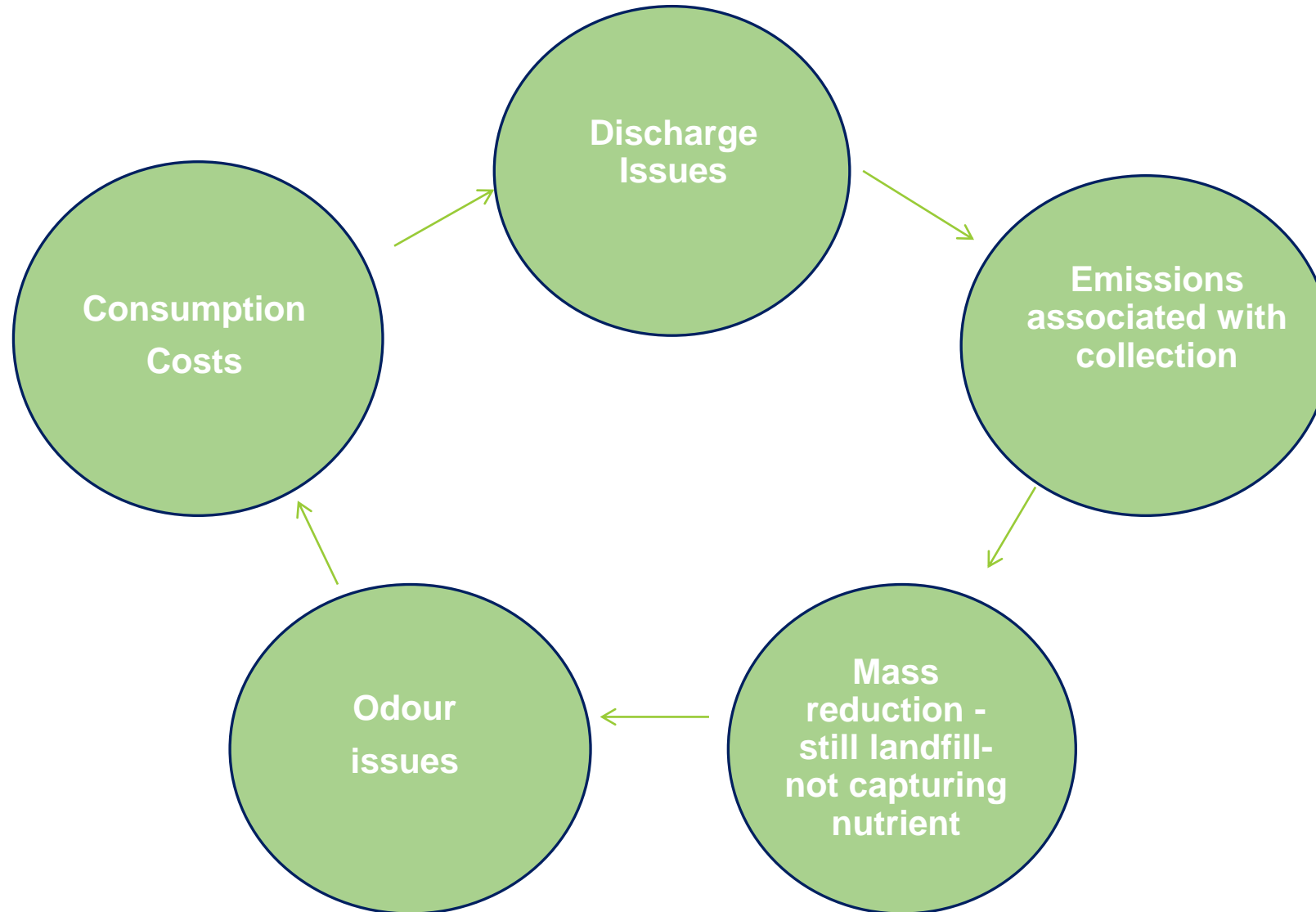


WASTE MANAGEMENT

2021



TRADITIONAL FOOD WASTE SYSTEMS

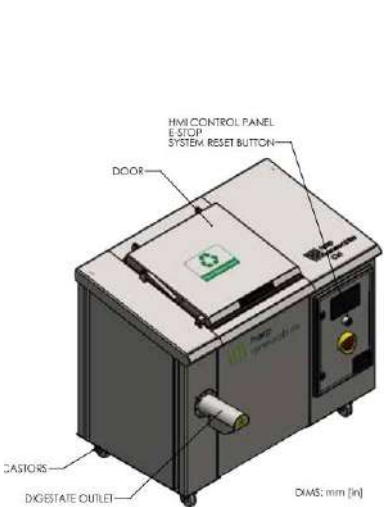


KISS
- the -
GROUND

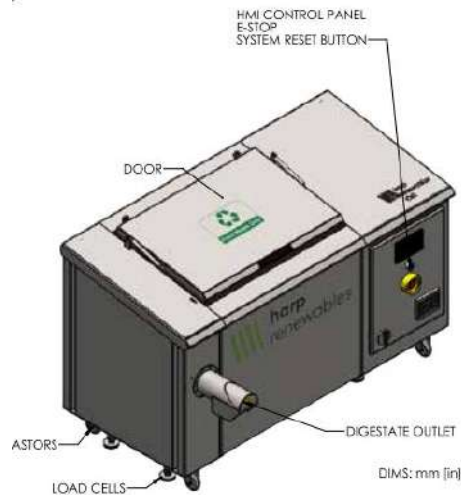
PRESENTS



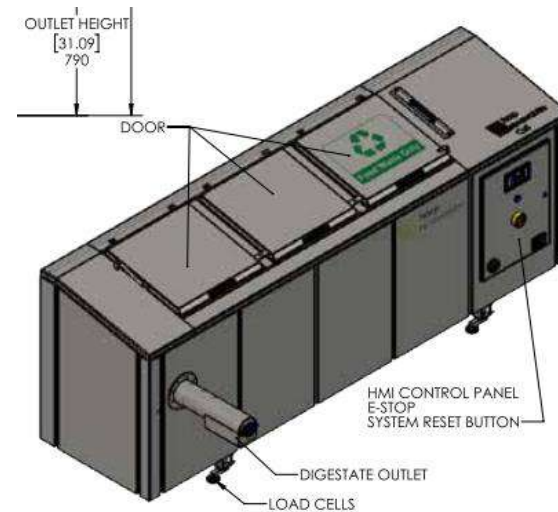
Processing Capacity-
From 1000 to 50,000 litres per week



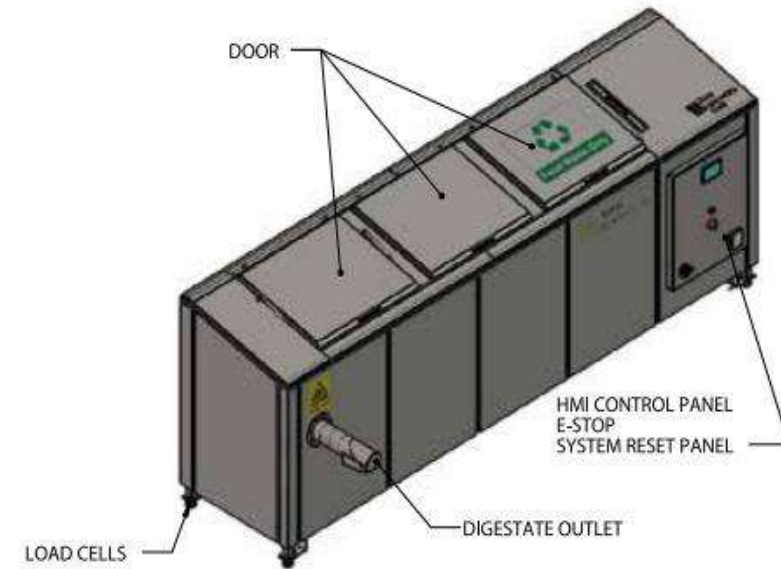
Cx-1 – 1000ltr Wkly



Cx2- 2000ltr Wkly



Cx5- 5000ltr Wkly



Cx10- 1000ltr Wkly

CASE STUDY - NHS

Chesterfield Hospital installed twin Cx2 units to deal with food waste in a sustainable way. The hospital are delighted with the quiet, odour free units which has resulted in an 77% decrease in food waste mass.

Introduction of the units has not only substantially reduced the bin charges but also freed up substantial space in the hospital yard area.

Catering management of the hospital are delighted with the ease of use and implementation has been a resounding success.



HOW IT WORKS



'Nord' German Gearbox

High Grade Stainless Steel 304

**Organic
Waste
Inserted**

Stage 1

**Material heats
internally to a
controlled
core
temperature of
72°C (162°F)**

Stage 2

**Proprietary
microbial enzyme
mix breaks down
the waste as
interior paddles
mix and move the
material through
the digester**

Stage 3

**After 24 hours,
the process is
complete and
the stable, safe
material is
augured out**

Stage 4

THE SOLUTION

Mass Reduction (80%)- Increasing Space & Drastically Reducing bin charges

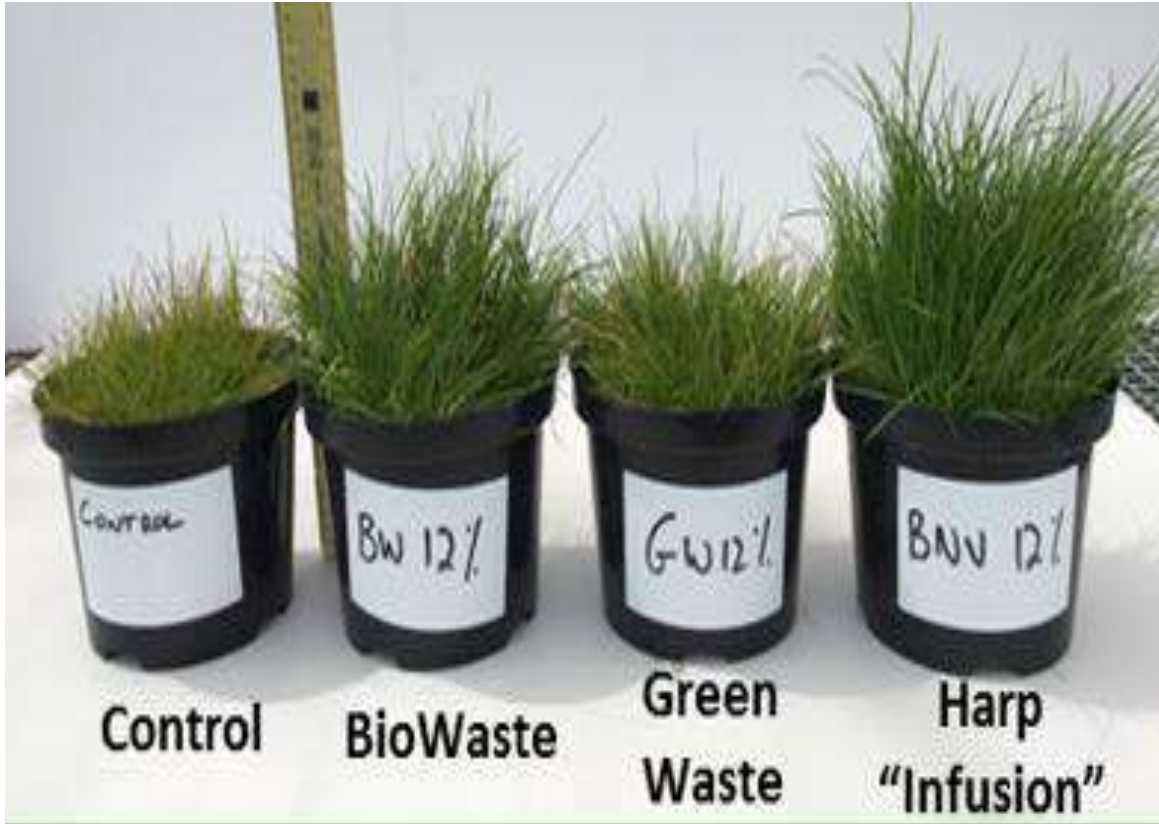
CSR Enhancement- Drop Transport Emissions/Production of vital soil enhancer

CSR Reporting- Control Panel Reporting – demonstrating carbon capture/emissions

Odour Free/Low Consumption/Easy Operation/Ability to Segregate Waste Streams

Production of 'Infusion'!

TESTING - THE RESULTS



Stimulates growth, replaces nutrient, enriches soil NPK values.

Teagasc 'Pot Tests' EPA Approved

- 'Infused' soil – 400% increase in growth
- 4 cuts still strong growth
- Replacement of 'slurry spreading' lowers emissions
- NPK introduced slowly and consistently to soil
- High Nutrient Value in plant

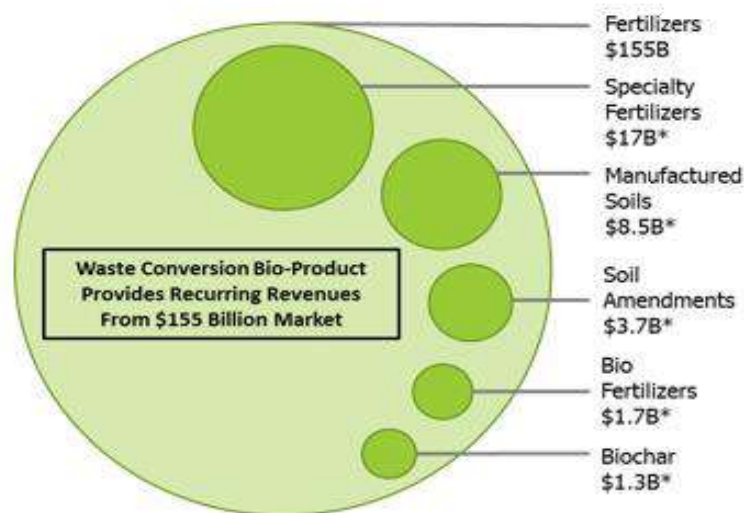
TESTING - THE RESULTS



UNTREATED

TREATED

TESTING - THE FACTS



* Specialty segments growing at 7-10+ % CAGR



Conventional Composting	Harp Bio-Fertilizer
Bugs and bacteria create self-generated heat	Microbes secrete potent hydrolytic enzymes - bio-catalysts for accelerated thermal process
Significant GHG emissions: CO ₂ + N ₂ O + CH ₄	Low GHG emissions. Binds carbon & nitrogen
Temperature 55 to 65 C for weeks to months.	Temperature >70 C; Pathogen free
Waste volume reduced 40-50%.	Waste volume reduced 80% in 24 hours
Requires structure. Suitable for woody material	Ideal for food waste
Open batch system; consumes space	Closed continuous system; small footprint
Open windrows carry risk of rodents etc.	No risk of rodents and other pests
Variable moisture. Sometimes wet & heavy.	Low moisture content; Light weight material.
Some odours present	Odor-free. Enzymatic process binds ammonia.
Lower & less consistent nutrient content	Higher & more consistent nutrient content.
Suitable as soil amendment	Suitable as soil amendment and fertilizer





ACCREDITATIONS

- All machines are CE Marked & Certified
- Worked with EPA
- Teagasc Pot testing completed



CONSUMPTION RATES (TESTED & VERIFIED)

Cx 1 – (Euro) 2.58 Daily
18.08 Weekly
939.91 Yearly

Cx 2 – 2.78 Daily
18.08 Weekly
1013.29 Yearly

Cx 5 – (Euro) 9.32 Daily
65.27 Weekly
3393.94 Yearly

Cx 10 – 14.29 Daily
100.04 Weekly
5202.20 Yearly

WHERE BIOTECHNOLOGY MEETS ELECTRICAL ENGINEERING.

Environmental Impact So Far:

65

Digesters currently active

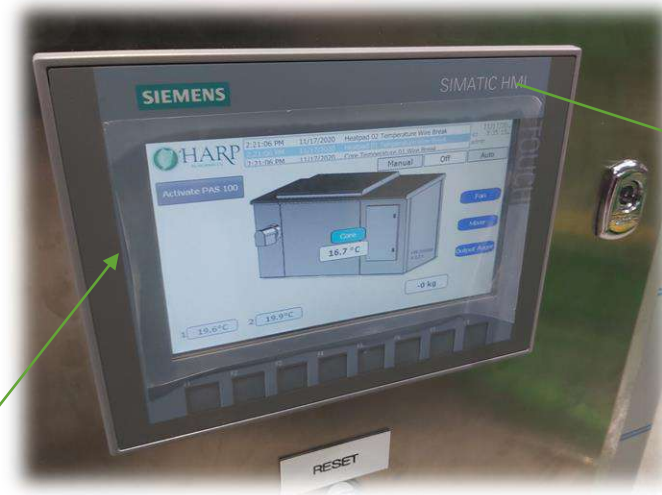
14005+

Tons of waste we are diverting from
landfills

41225.2+

Tons CO₂eq saved through Harp
Biodigesters.

REVIEWS



Helps with incoming carbon credits
Grants
Tax Incentives

CSR Reporting

- Mass reduction
- Decrease in transportation emissions
- Diversion of carbon back to soil
- Production of reports



THE HARP CX10 BIO DIGESTER



ONSITE EXAMPLES



TESTIMONIALS

Environment

We are committed to protecting life and the natural world in all its glory.

Harp Renewables are proud to work with 'Astellas', a company with sustainability at its core.

Harp have provided Astellas with a Cx5 Bio Digester. Our Biodigester processes food waste decreasing the mass by on average 75%. This drastically reduces food waste bin costs, diverting the matter from landfill and subsequently eradicated associated methane pollution. This sustainable benefit is only the first!

Harp Renewable's Cx5 turns the food waste into 'Infusion', a soil enhancer so rich in nutrient that testing, completed in conjunction with Teagasc, clearly demonstrated a 400%+ increase in plant growth. In the modern era, when over harvesting has resulted in nutrient depleted soil reserves, 'Infusion' will prove invaluable in the fight against global 'hidden hunger'.

We worked alongside Mr Eamon Foley, Environmental Co-ordinator, Astellas DPS, to integrate the system at the Astellas (Kerry Plant). Since its introduction Astellas have reduced their food waste mass by approximately 70%. They are also examining ways to further enhance their Corporate Social Responsibility (CSR) by using the unit to process other organic waste streams and investigating using the unit to produce heat via a Biomass Boiler.

The move demonstrates the Astellas commitment to sustainability in every way possible way and we look forward to continuing our business relationship.



THE HARP CX5 BIO DIGESTER



THE HARP CX10 BIO DIGESTER



Community



Meath County Council operate a number of recycling Centres across the country. These centres are used as a 'one stop shop' a variety of waste streams. Our customers tend to be highly environmentally conscious and often requested a solution for food waste. In 2016 we introduced Harp Renewables Biodigester on a trial basis in Navan Recycling Centre. The trial has long since completed and the machine remains in place today. The machine turns this food waste into a nutrient rich 'soil enhancer'. The process is odour free, user friendly and energy efficient. Our environmentally friendly customers are delighted with the implementation and feel proud to be part of a process which diverts food waste from landfill.

Harp Renewables have been extremely helpful and very responsive, particularly in the early stages as the machine and operation process bedded in. This is an ideal solution for any organisation with excess food waste.

I would have no hesitation in recommending both Harp Renewables and the Bio Nova Digester to any interested party.

Sincerely

Bernadine Carry

LARGE PROJECTS



3. Upcycle Services



Creating a Circular Economy

With our partners, we provide a fully integrated solution for a circular economy: waste collection, conversion, and soil regeneration, and assist with zero waste initiatives and carbon credits for GHG reduction.

MAUI CYCLE PROJECT

Recovery of Regenerative Resources

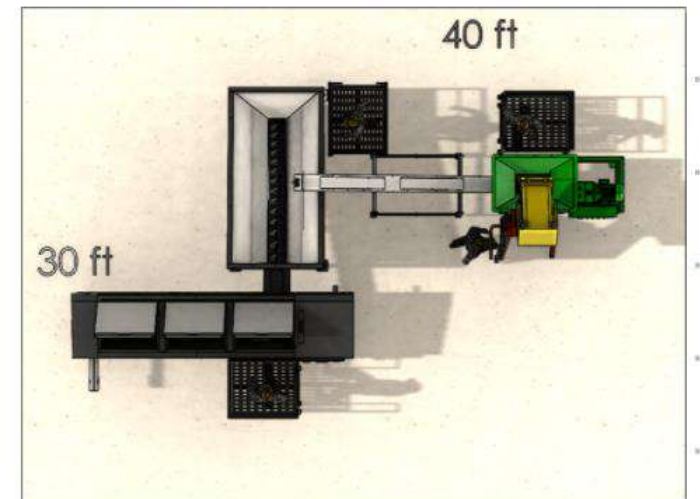
Maui Cycle **Launch**

Our Maui Upcycle facility will open in March 2021!

Maui Upcycle is designed to fulfill our corporate mission to divert organic material from landfill disposal, create regenerative soil products, and encourage sustainable resource recovery practices.

Maui Upcycle will use our Harp Accelerated BioDigester (model: CX10) to convert 1 ton-per-day of food waste into natural soil regeneration products, and thus divert over 300 tons-per-year of organic material that would otherwise be buried in the Central Maui Landfill. The recovered organic materials will be upcycled into valuable soil products (approx. 90 tons annually) to support healthy soil regeneration initiatives on Maui, and reduce the island's carbon dioxide and greenhouse gas emissions.

[ENQUIRE NOW](#)



THE HARP CX20 BIO DIGESTER



THE HARP CX5 BIO DIGESTER



Royal Botanic Gardens
Kew

THE HARP CX10 BIO DIGESTER



THE HARP CX2 BIO DIGESTER



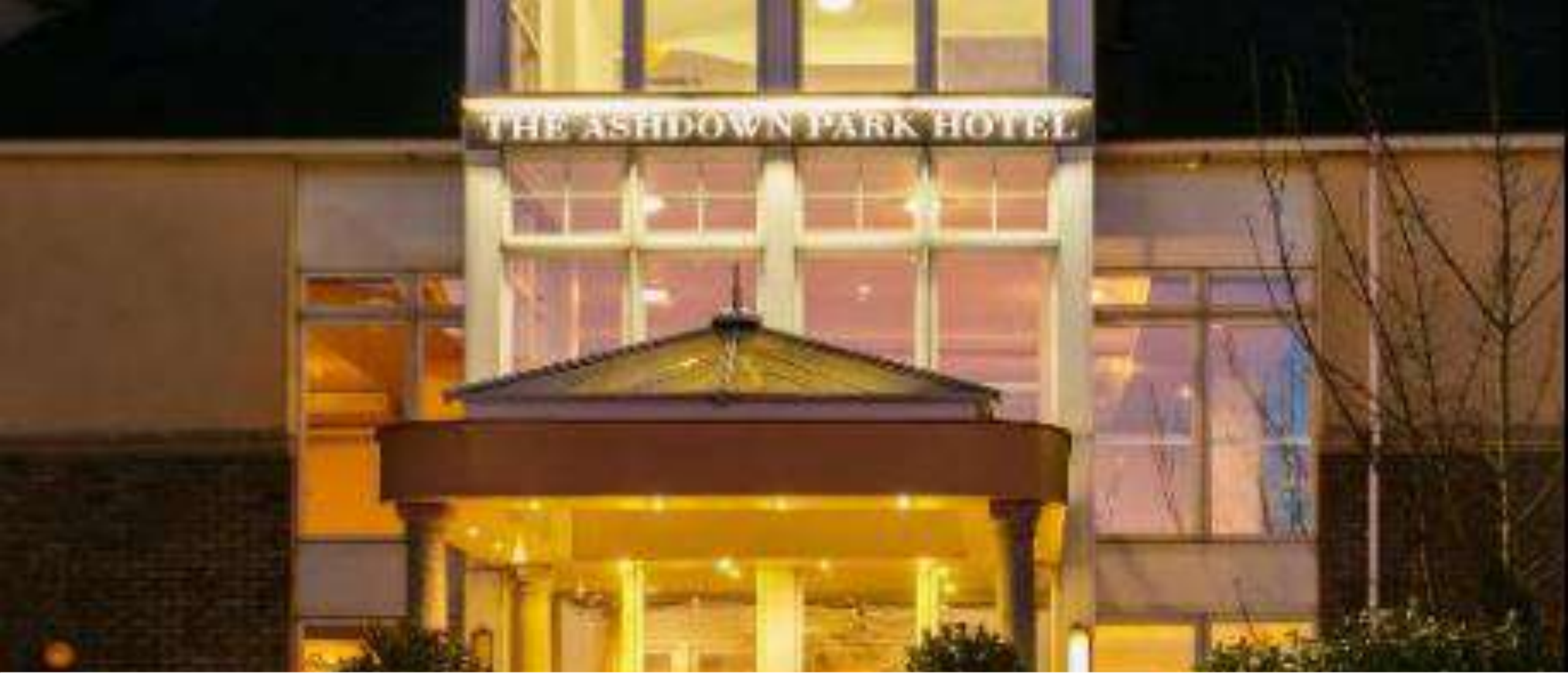
NHS

**Chesterfield Royal
Hospital**

NHS Foundation Trust



New Installations- Adare Manor – Cx5



New Installations- Ashdown Park – Cx2



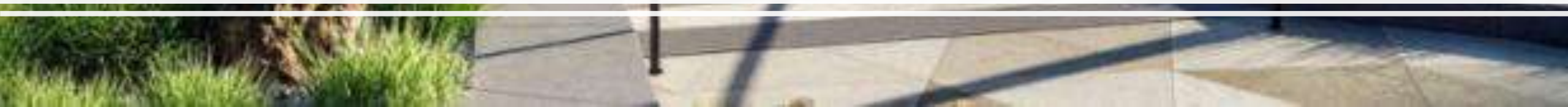


Amber Springs – Cx2





Quayside Quarter – Cx2





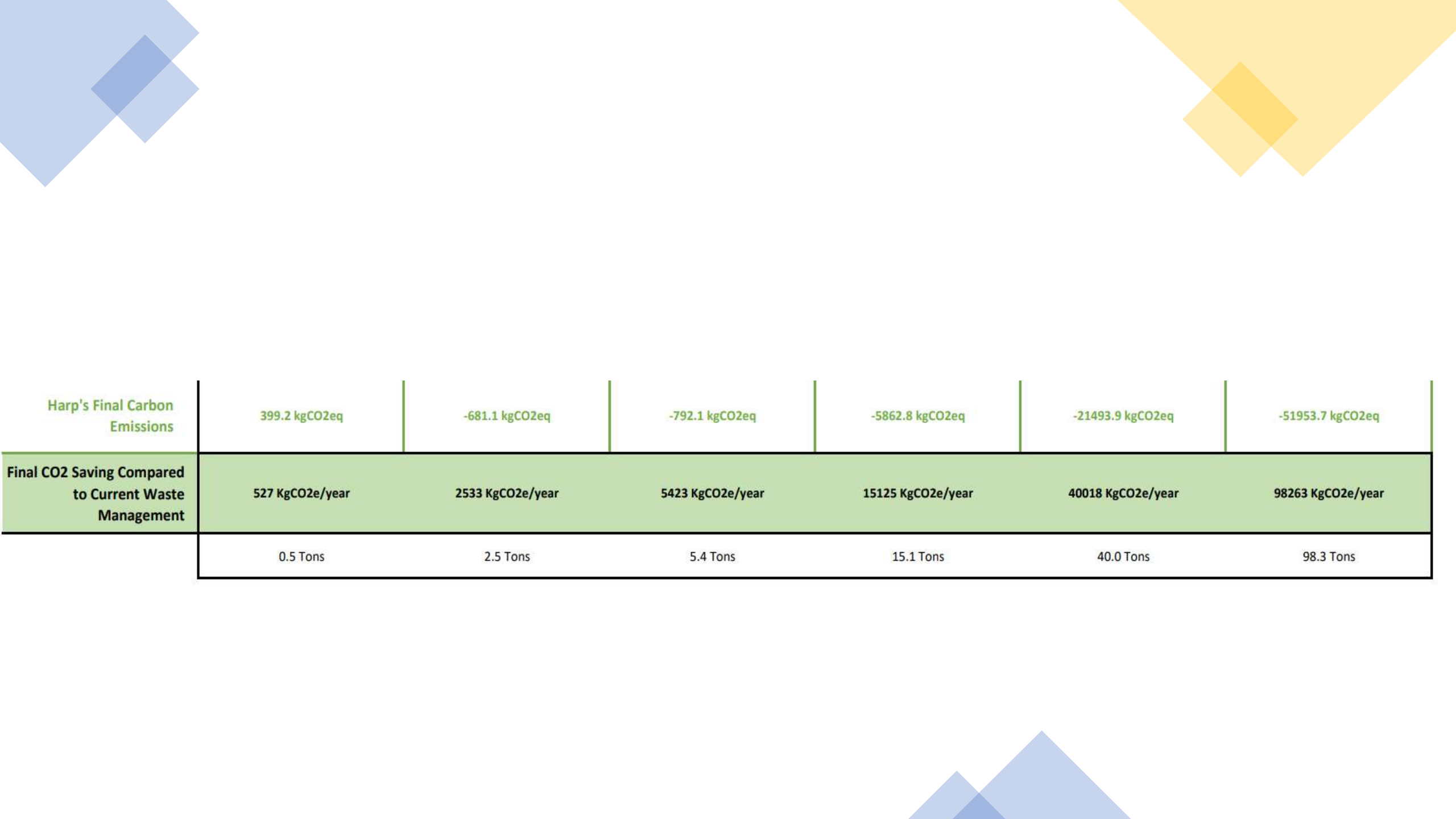
Cashel Palace/Mickey Ryans – Cx2



A Meaningful Impact!

No. Of Machines	1 units	1 units	1 units	1 units	1 units	1 units
Tons of waste	25.1 Tons	50.1 Tons	125.3 Tons	250.5 Tons	501.1 Tons	1252.7 Tons
CO2eq Released Simple Landfill	74384.1 kgCO2eq	148768.3 kgCO2eq	371920.7 kgCO2eq	743841.4 kgCO2eq	1487682.8 kgCO2eq	3719206.9 kgCO2eq
CO2eq Released Composting	1234.1 kgCO2eq	2468.3 kgCO2eq	6170.7 kgCO2eq	12341.4 kgCO2eq	24682.8 kgCO2eq	61707.0 kgCO2eq
Carbon Credits For Bio-Fertiliser	445.1 kgCO2eq	890.2 kgCO2eq	2225.6 kgCO2eq	4451.2 kgCO2eq	8902.4 kgCO2eq	22256.0 kgCO2eq
Harp's Final Carbon Emissions	789.0 kgCO2eq	1578.0 kgCO2eq	3945.1 kgCO2eq	7890.2 kgCO2eq	15780.4 kgCO2eq	39451.0 kgCO2eq
Final CO2 Saving	73595.1 kgCO2eq	147190.2 kgCO2eq	367975.6 kgCO2eq	735951.2 kgCO2eq	1471902.4 kgCO2eq	3679755.9 kgCO2eq

147190.20kgCO2eq



Harp's Final Carbon Emissions	399.2 kgCO ₂ eq	-681.1 kgCO ₂ eq	-792.1 kgCO ₂ eq	-5862.8 kgCO ₂ eq	-21493.9 kgCO ₂ eq	-51953.7 kgCO ₂ eq
Final CO ₂ Saving Compared to Current Waste Management	527 KgCO ₂ e/year	2533 KgCO ₂ e/year	5423 KgCO ₂ e/year	15125 KgCO ₂ e/year	40018 KgCO ₂ e/year	98263 KgCO ₂ e/year
	0.5 Tons	2.5 Tons	5.4 Tons	15.1 Tons	40.0 Tons	98.3 Tons

WHERE BIOTECHNOLOGY MEETS ELECTRICAL ENGINEERING.



Green Apple Environmental Award
"Est. 1994 to recognize and
promote environmental best
practice around the world"



National Ploughing Championship
Enterprise Ireland Innovation:
Agriculture Environmental Award;
annual agricultural show in Ireland



Energy in Agriculture
Best Innovation 2019
Overall Award, 2018



**THANK
YOU**