



Sustainability and data in practice: a circular economy case study

Dr Tom Dawson

Visiting research fellow, circular health economics, University of Exeter; and Founder, Revolution-ZERO



#bettercarecostsless



Revolution-ZERO

More effective, more economic, more sustainable

Q2 2025



Single-use textiles are a problem

- Textile global supply chains are vulnerable
- Medical textiles contribute the equivalent entire CO₂e emissions of either Sweden or Finland*
- The UK outputs more than 53,000 tonnes of regulated medical textile waste a year**
- Surgical textiles represent 12% of all hospital waste
- Cost and quality control challenges remain



Derived from:

* Kellera et al., 2021. 33 Swiss Hospital LCA study

** <https://www.gov.uk/government/statistics/> search "PPE"; Operating theatre system audits and extrapolation; NHS England data



Reusable textiles also present problems

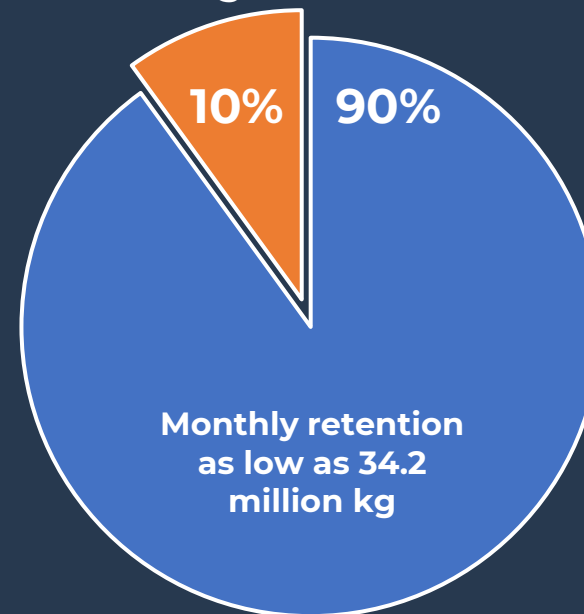
- Loss in service
- High energy petrochemical fuelled processes
- Rental models only partially address supply chain security
- Contracts have potential to be far more collaborative
- Significant ongoing single-use (packaging)



190,000 tonnes of CO₂e equivalents*

UK NHS 38,000,000 kg
Linen and Clothing Processed per
month

Monthly loss
up to **3.8 million kg**



453,000,000 kilograms of linen and clothing are utilised by the NHS every year. The loss rate for items processed for the NHS is around 80% per year*.

*<https://tsa-uk.org/the-nhs-wastes-81-of-its-linen-each-year/>

Revolution-ZERO can save the UK NHS

>250,000 tonnes of CO₂e equivalents every year



> 80% improvement in carbon savings associated with processing compared to competitors



23,000 tonnes of waste every year (just in gowns)



Up to 20% in direct costs of gowns and drapes

Co-development with and Validation by



Net Zero Processes



Engineered efficiency



Renewable energy

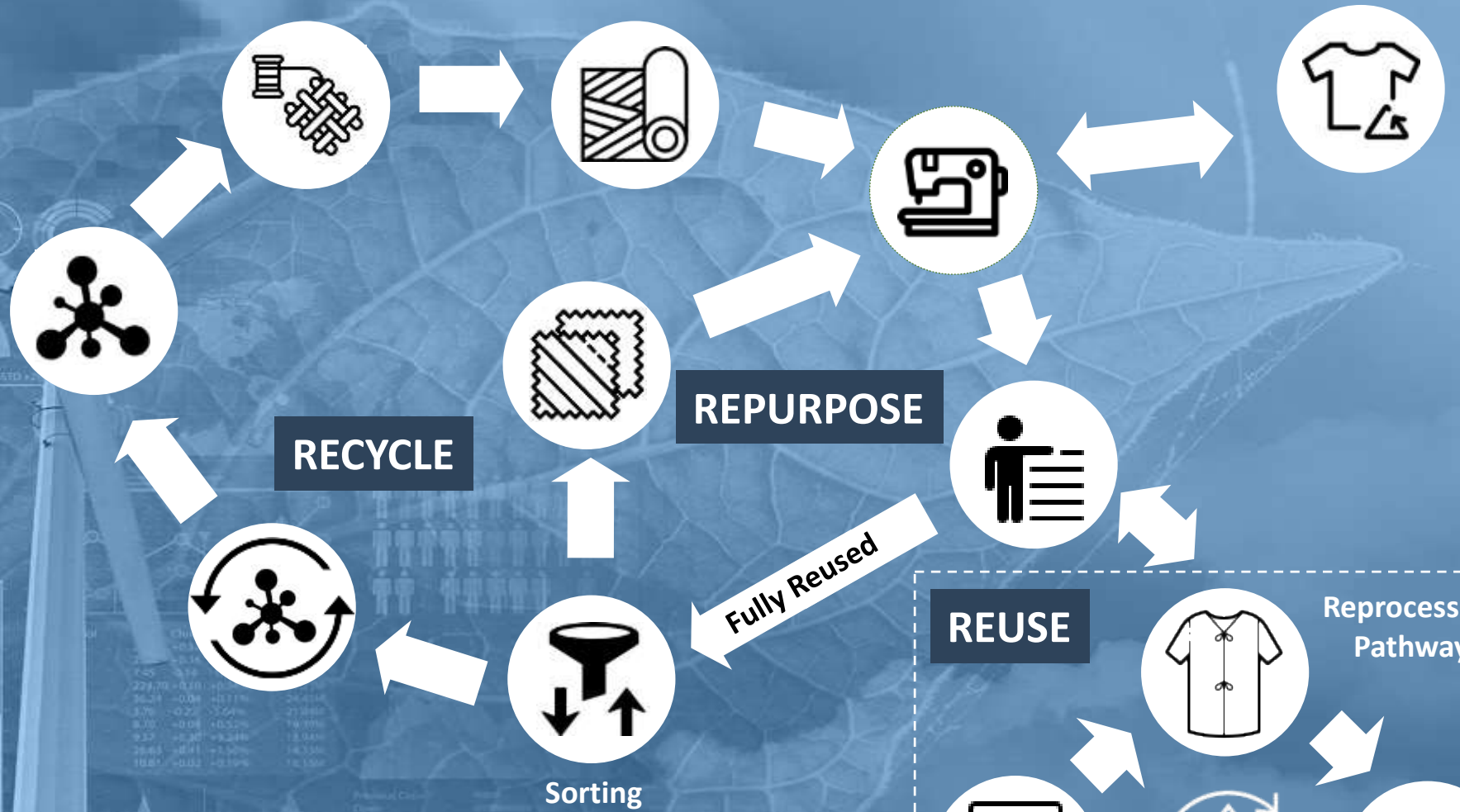


Chemicals



Local

- Manufacture
- Reprocessing
- Recycling



Integrated Evaluation tracking:

Assets

Process

Compliance

Carbon

Waste

Water



Revolution-ZERO - a transformational approach



Next Generation Reusables



Advanced Processing



Healthcare Compliance Software



Revolution-ZERO delivers:

Effective - Supply chain resiliency for critical medical textiles/devices

Economic - Saving healthcare and veterinary institutions' expenditure

Sustainable - Reducing the environmental footprint (carbon, water, waste)





GS1 Integration as an enabler

- MDR compliance – linked to product codes
- Standardisation across supplier networks
- Individual product unique RFID linking
- Linked to ISO14040 Life Cycle analyses and cost centres
- Enables real-time internal and stakeholder facing reporting

Edit Sub Category

INDICATORY NAME*
Reinforced gown S - RFID

TRANSCODING ID*
Transcoding code

GS1 CODE*
506077720270

MAXIMUM WASHES*
75

WELDING*
0

CATEGORY*
Gown

ENVIRONMENTAL PARAMETER*	METRIC QTY*
carbon	3.951
water	2.751
waste	0.82

[Add material](#) [Save](#)



GS1 Integration as an enabler

GS1 Sub-Category

Material name: Head Barrier Shut-Off Drapes - RFID

Transcoding code

Barcode: 506077720982

Accession number: 76

Quantity: 0.583

Material: Drapes

Material (dropdown): Efficiency:

Material (dropdown): Efficiency:

Material (dropdown): Efficiency:

+ Add history

Add

+ Add Item | Report Item

Rewash (QC) 8 | Damaged (QC) 117 | Clean (QC) 3486 | Discarded 0 | Repaired 0

ID	Item code	Category	Sub-Category	Organisation
	Item code : 30155C97D461A6C00068189D GS1 Code : 506077720230 View history	Drape	AlcoBan wrap 80 - RFID	Treliske Hospital
	Item code : 30155C97D461A4C000C1D901 GS1 Code : 506077720230 View history	Drape	AlcoBan wrap 80 - RFID	Treliske Hospital
	Item code : 30155C97D461A8C00068107C GS1 Code : 506077720230 View history	Drape	AlcoBan wrap 80 - RFID	Treliske Hospital
	Item code : 30155C97D461A8C00068194C GS1 Code : 506077720230 View history	Drape	AlcoBan wrap 80 - RFID	St Michael's Hospital
	Item code : 30155C97D461A8C0006811AA GS1 Code : 506077720230 View history	Drape	AlcoBan wrap 80 - RFID	Treliske Hospital
	Item code : 30155C97D461A8C000681A18 GS1 Code : 506077720218 View history	Drape	Trolley drape - RFID	St Michael's Hospital
			AlcoBan wrap 80 - RFID	St Michael's Hospital

30155C97D461A6C00068189D (AlcoBan wrap 80 - RFID)

Wash cycles completed: 17 out of 75

- 22 JAN, 2025: Dominique Hall updated the item status to: Clean (QC)
- 09 JAN, 2025: Aayushes Ghorpade updated the item status to: Clean (QC)
- 30 DEC, 2024: Dominique Hall updated the item status to: Clean (QC)
- 28 NOV, 2024: Aayushes Ghorpade updated the item status to: Clean (QC)

Timeline details: Cornwall, Wash Cycle: 1, 25 January, 2025, 10:45 am, 18 January, 2025, 10:21 am, 14 November, 2024, 10:21 am, 23 January, 2025, 09:49 am, 23 January, 2025

How: Local and distributed supply chains



How – Integrated local workflows



Revolution-ZERO World Firsts

- All electric renewable energy barrier cleanroom laundry
- 100% reusable sterile gowns packaging system
- Real-time reporting of environmental impacts linked to digitally tagged products

How: Centralised IT to preserve CCCQ

Culture

Capability



Quality

Communication



How – Distributed local network model



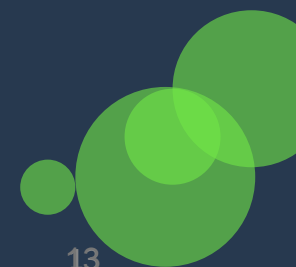
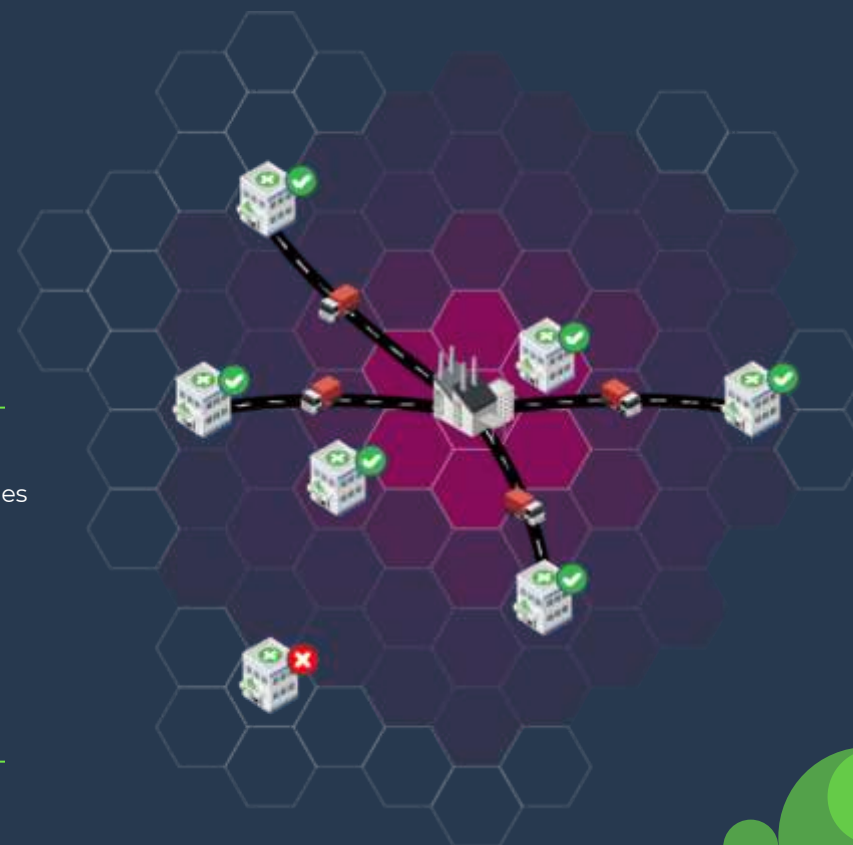
- Laundry
 - Commercial
 - Sustainability
 - Circular Economy
 - Medicine
 - Science
 - Technology
 - Surgery
 - Chemistry
-
- Asset ownership model
 - Advanced Traceability
 - Renewable Electrics
 - Agility
 - Minimising Waste
 - Complete Reporting



Other providers of reusable sterile surgical textiles

- Laundry
- Logistics
- Commercial

-
- Central Hubs
 - Electric Vehicles
 - Solar



Case Study: The Cornwall Mission and Achievements

- To build a laundry and sterilisation asset in conjunction with the Royal Cornwall NHS Hospitals Trust
 - Increase supply resilience for essential medical textiles
 - To reduce the cost/expenditure
 - To deliver environmental gains - carbon, water and waste reduction
- To build a reproducible service delivery model that can be placed in every regional healthcare geography
- With patient safety/user experience at its core



Our mission is to displace single use medical textiles with reusable alternatives that are more **effective**, **economic** and **sustainable**.

Inward investment

- £1M investment in infrastructure
- 4 units – barrier cleanroom processing and autoclave, sorting, laboratory and office
- 100% renewable tariff electricity
- Deliveries to all hospital sites by electric van
- Employing 7 local FTEs plus the supporting team
- New technologies: RFID tracking system, material testing, product development, environmental impact calculations



Integrated local workflows, modular building

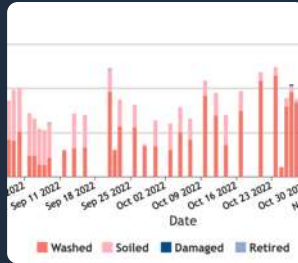


NHS Cornwall Hospitals Trust

Pioneering: Masks



Digital Tracking: SaaS Monitoring



Out Performing: Reusable Textiles



High Risk Gowns



Reusable Packaging

Commercial Demonstrator: NHS Net Zero contract



NHS Cornwall Hospitals Trust – modelling for scale up

Royal Cornwall Hospitals NHS Trust

14 Elective Operating Theatres

- Pioneering site
- Delivering and developing for Cornwall and the wider NHS



King's College NHS Trust

44 Operating Theatres

- 950,000 items per year
- 137 tonnes of waste
- 986,000 kgCO₂e

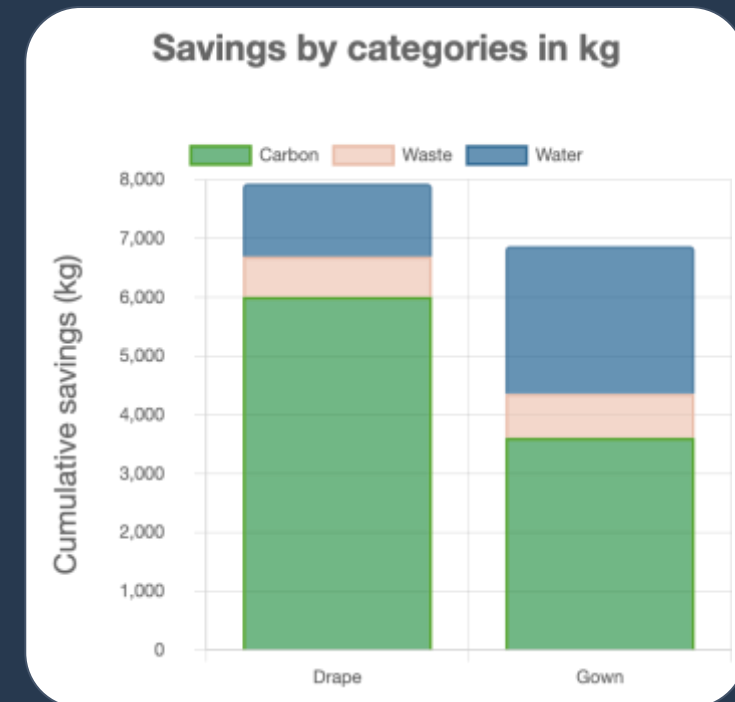


Delivered in 2024

- 13,566 items
- Estimated saving: £800 direct subcontract costs plus an additional £1600 indirect costs (staff and estates)
- Environmental savings: 9,615 kg carbon, 3,750 litres water, 1,438 kg waste

Innovation

- Modular cleanroom laundry supplying NHS
- 100% reusable gown packaging
- Real-time monitoring of environment impact
- New detergents and materials





Customer feedback

NHS Quotes:

“Love the traceability, transparency and accountability in the system”

“Your knowledge, service and quality really sets you apart”

“The savings you can make are staggering”

“So much more security with local supply chains”

“You keep raising the bar for both assurance and environmental impact”

“So much innovation, how does your team keep doing it?”

"In my opinion it is the **best** example of a **circular economy system** design built from scratch. Everything has been thought through **and every challenge and barrier** that you can imagine has been **overcome..**"

Professor Peter Hopkinson

Director of the National Circular Economy Hub at Exeter University

Key messages

- GSI integration has been a vital enabler for standardisation and regulatory compliance
- Careful consideration to system engineering is critical for effective uptake
- The financial model and value proposition must stack up
- Collaborative working and independent validation
- Learning through action, evaluation and iteration
- Sustainability is a whole system improvement opportunity



Thank you.

Contact: tom.dawson@revolution-zero.com.



Appendix



Management and Technical

Paul Broadberry



CEO

Medical Device Growth
Executive



Experienced circular economy NHS-focused
medical device pioneer and leader

Dr Tom Dawson



Founder/CTO/Board

Clinician and Medical
Technologies



Experienced Founder, Inventor and
Medical Technologist

Andrew Pancer



CFO/Board

Finance Executive



Experienced CFO across digital publishing,
marketing, e-commerce and Circular Economy

Petra Kreuzeder



Head of Product

Healthcare textiles
delivery leader



Experienced operations manager, buyer and
product owner – healthcare textiles

Dr Tudor Besleaga



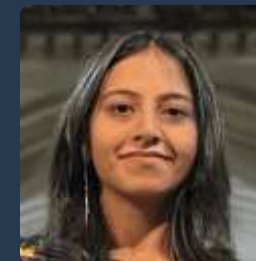
Lead Engineer

Biomedical Engineer
and data science



Experienced Biomedical engineer with strong
background in data science

Aayushee Ghorpade



Textiles Scientist

Reusable Medical Textiles



Strong background in development of
medical textiles IP

Europe, Board and Advisory



Joe Killen



CEO Europe

Social and Health Care Executive/CEO



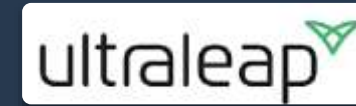
Health and Social Care Executive/Founder with established high growth record

Steve Cliffe



Chair

Growth CEO/CCO



High growth Technologies Executive leading £200m funding and international expansion

Emma Burlow



CSO - Board

Commercial Circular Economics



Internationally recognised Sustainability and Circular Economy expert

James Kraft



Board and Advisor

Healthcare Technology Scale-up



Highly entrepreneurial Founder/CEO with proven scale-up track record

Aida Yousefi



CCO

Healthcare Growth CEO/CCO/COO/Clinician



Scale up Executive Healthcare Leader with revenues of £100m and 1500 people

Eoin Flavin



Regulatory Lead

Advisor Assurance and controls



Author BS EN 14065, Contributor to ISO 9001, 31000, 56000 and EN 13795 standards.



Product photos

