THE FOURTH INDUSTRIAL REVOLUTION STIMULATES A CARBONLESS WASTE MANAGEMENT
The Old Model in Crisis

The American recycling business is a mess: Can Big Waste fix it?

If waste is such a valuable resource, why is UK exporting so much of it?

£2 billion fiasco as huge recycling plant dumped: Hundreds of workers facing the sack as PFI facility is shut down leaving thousands of tons of waste destined for landfill.
China Ban & The End of Recycling as we know it?

Figure E-1: Net Cost and SRM Income Comparison

- Higher vulnerability to recycling revenues
- Limited vulnerability to recycling revenues

Source: Eunomia Research & Consulting Ltd
The Disruption
THE DISRUPTION IN A GLANCE

1. WASTE TO RESOURCE
   The shift to circular economy creates new threats and opportunities for the SWM industry.

2. INTERNET OF THINGS
   The Internet of Things will provide end-to-end optimization opportunities for SWM infrastructure. Landfills will also become full of sensors. Todo: SENSOR-BASED COLLECTION SYSTEMS ARE ALREADY HERE.

3. SOCIAL NETWORKS & APPS
   Network theories, social media practices and mobile apps open the way for effective day-to-day interventions towards sustainable consumer behaviour and citizens engagement.

4. 3D PRINTERS & HOUSEHOLD TREATMENT
   3D printers will allow the development of the DIY MADE solutions for recycling, recovery and reduce options. Household treatment appliances are already in the market.

5. ROBOTICS
   The development of new cheaper and effective robots will revolutionise cleaning and waste separation activities. Hazardous waste management will benefit the most.

6. DRIVERLESS & DRONES
   The development of driverless & drones will change collection patterns and make them more flexible. Used for waste management, drones can deliver goods to customers.

THE FUTURE IS HERE!
Circular Economy or Space Race?
A carbonless waste management...

- Materials and circular economy
- Internet of Things and close loops
- 3D printers and recycling
- Reducing the CO2 footprint of waste collection
- Optimizing landfill performance
- Robotics for fully automated MRFs
- Food waste and artificial intelligence
We extract 60 billion tons of raw materials/year

We are 7.5 billion people on Earth

So, $\frac{60}{7.5} = 8$ tons/cap/year $\Rightarrow 22$ kg/cap/day

More than 50% of total GHGs emissions are related to materials management!

Only 7% re-use!
How Circular Economy can massively reduce CO2 emissions?

- Do more with less: the 7% challenge
- Substitute carbon intensive materials
- Domino effects: Extraction → Consumption
- Efficient use of energy
- Digital disruption
We need to change the concepts
We need to shift our view and re-think
**THE SITUATION**

Under a business as usual scenario, the global temperature by 2100 will be more than 4°C above pre-industrial levels.

**THE END GOAL**

To limit temperature rise to 1.5°C, we need to cut greenhouse gas emissions from 65 to 39 billion tonnes CO₂e per annum by 2030.

**THE SOLUTION**

Current national commitments achieve about half of the required emissions cuts. Circular economy may fill about half of the remaining gap.

- **National commitments**
  - Renewable energy
  - Energy efficiency
  - Reduced deforestation

- **Circular Economy**
  - Recovery and reuse
  - Lifetime extension
  - Sharing and service models
  - Circular design
  - Digital platforms

- **Other measures**
  - Further scale up of renewables and energy efficiency
  - Reforestation
  - Climate-smart agriculture

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**CIRCLE ECONOMY**

**ECOFYS**
New materials – new challenges

New materials -> New Waste: The case of coffee capsules

We all know that recently coffee capsules (known also as K-Cups) became a fad, with the support of some huge advertising budgets. Was there a special reason for making coffee capsules? Did they provide a new service or cover a real social need? Not even a single one, as the only tangible benefit they brought was to companies selling capsules and the new coffee machines that can use them. Last year America’s bought 9 million K-Cups and K-Cup’s parent company, Keurig Green Mountain, made $4.7 billion in revenue. But recently the German city of Hamburg, introduced a ban on buying "products requiring excessive or avoidable mountain transport" with council member. The ban includes items for "consumption for..."
3D printers
Internet of packaging

[Diagram showing connections between packaging tags, sensors, devices, consumer and supply chain apps, IoT smart products platform, and uniform analytics to track and optimize.]
Sensors for CO2 reduction in collection
Optimizing landfill performance with drones & sensors

Time for household AD?

1. Waste fed into system sink. Up to 6 liters per day
2. Bacteria digest the organic waste in the tank and turn it into biogas
3. Biogas is aggregated in the tank and stored at low pressure
4. Gas flows from the system to the kitchen stove via a pipe
5. Liquid fertilizer is created as the by-product of the waste digestion process

"HEY GUYS, CHECK OUT HOW BIOGAS IS CREATED!"

HomeBiogas: the household food waste treatment plant!

Join the Wasteless Future thinkers!
Get my personal insights on how social and technological innovation can reshape the recycling and waste management industry. Learn how you can contribute and be an active part of the movement towards sustainable living and waste management projects.
Artificial Intelligence for food waste

Empowering Trust in Food with Blockchain & Artificial Intelligence

- Traced Product Information
- Allergens Detection
- Product Life Cycle
- Direct & Private Feedback
- Community & Loyalty
- Safety Check Before Consumption
- Report Possible Food Intoxication
- Targeted Product Call-back
- Short Shelf Life Detection & Discount Notifications

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www.taqsparency.com
Robots are here
Wasteless or Wasteful Future?
It’s about People – not Waste

A Roadmap for closing Waste Dumpsites
The World’s most Polluted Places