

11 SUSTAINABLE CITIES  
AND COMMUNITIES



# WHAT RUBBISH? SUSTAINABLE WASTE MANAGEMENT CHALLENGES AND PRACTICES IN BELFAST (A2 UNIT 2, OPTION B, GCSE THEME D)

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**QUEEN'S  
UNIVERSITY  
BELFAST**

SCHOOL OF  
NATURAL AND  
BUILT ENVIRONMENT

# OUTLINE

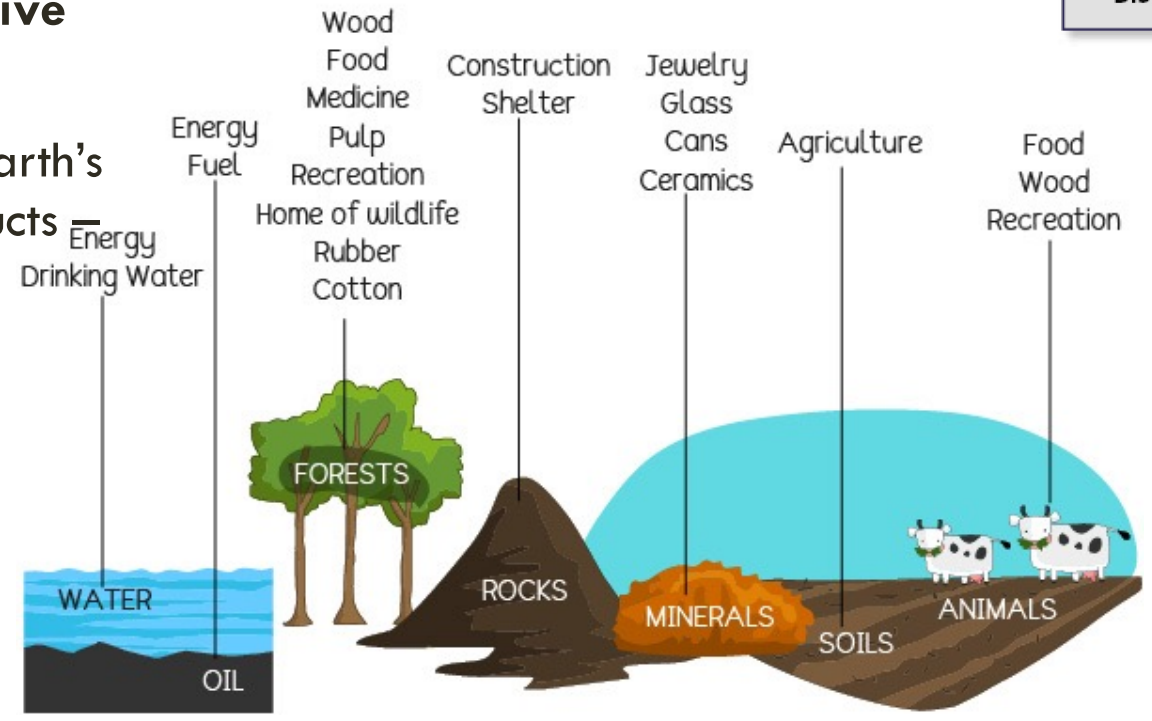
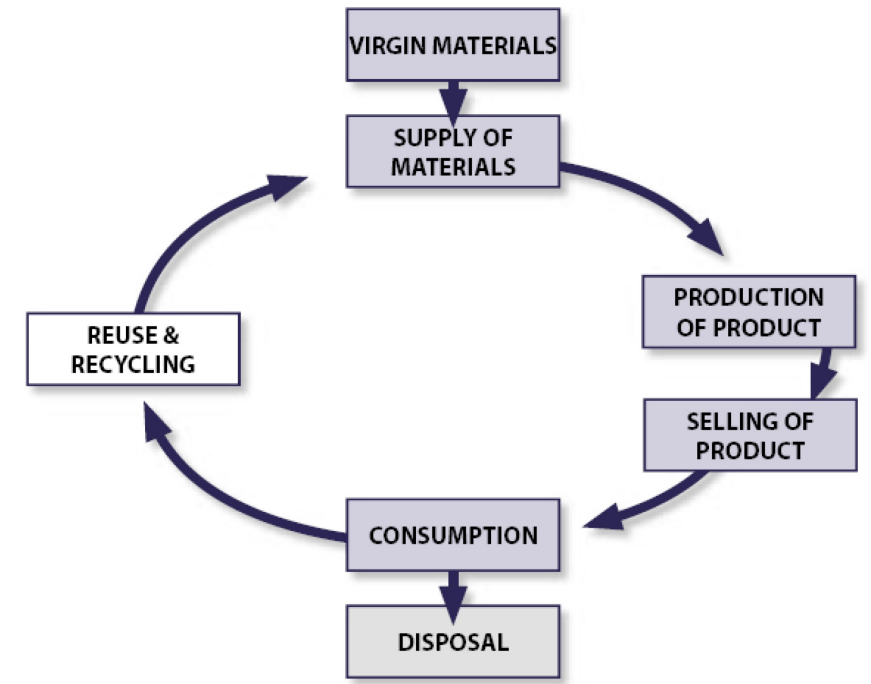
1. Concept and Challenges of Waste
2. Policies and Strategies for Waste
3. The Challenge for Belfast – Zero Waste Action Plan, Arc21
4. Innovations for Waste Management
5. Q&A

# 1. CONCEPTS AND CHALLENGES

**What is Waste?** “Any substance or object the holder discards, intends to discard or is required to discard”

## Revised Waste Framework Directive (2008/98/EC)

Extraction and processing of the Earth’s raw and natural resources – products – then disposed of as waste





# 1. CHALLENGES OF WASTE

## Environmental challenges

- Small contributor to GHG emissions (<5%, IPCC, 2007)
- Inadequate disposal and management of waste leads to:
  - Uncontrolled burning: pollution to air, water and soil
  - Leachate runoff entering waterways affects biodiversity
  - Non-biodegradable litter – affecting all natural environments and wildlife
- Depletion of natural resources







# OCEAN GARBAGE PATCHES





# 1. CHALLENGES OF WASTE

## Social challenges

- inadequate waste management affects the urban poor disproportionately
- in urban low-income areas around the world, 2/3 waste is not collected
- **Informal waste sector** - In Kosovo, approx. 40% of waste pickers are children.
- In Vientiane, Laos, and Cusco, Peru, 50% and 80% are women, respectively.



# 1. CHALLENGES OF WASTE

## Economic Challenges

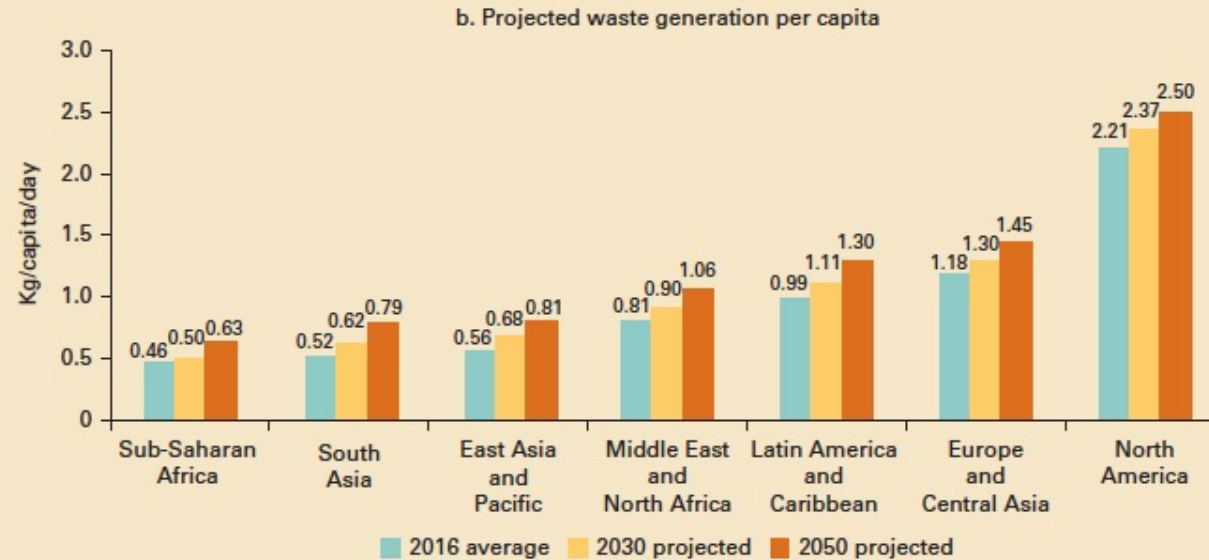
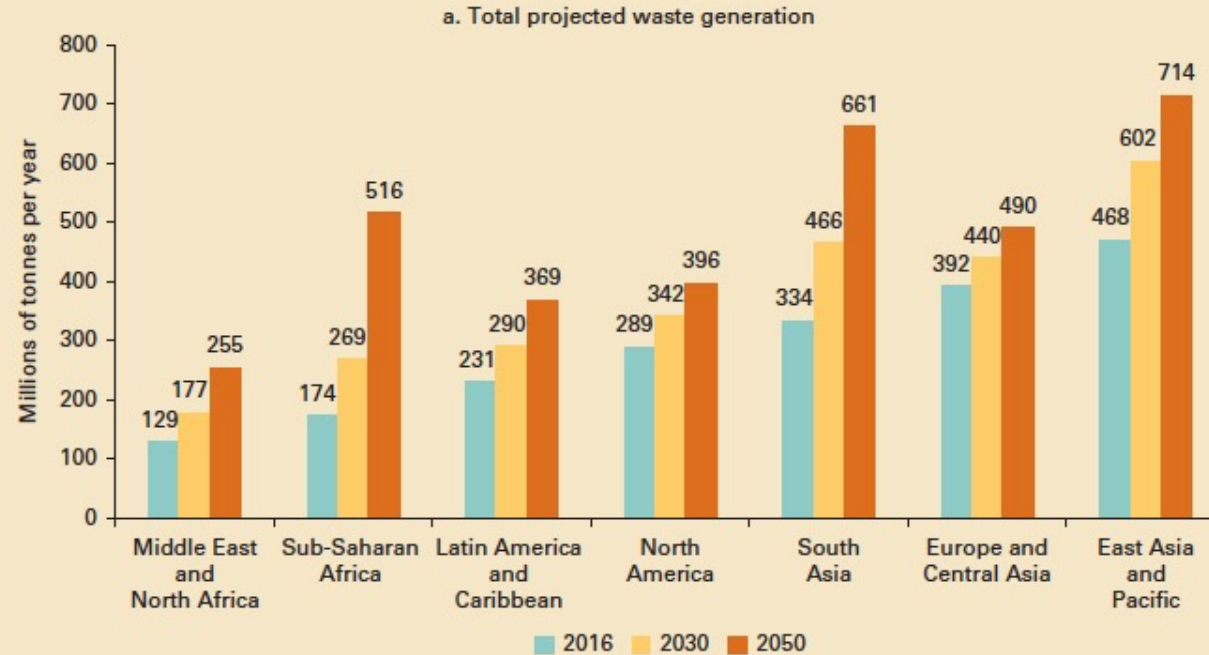
- Cost of uncollected waste \$375/tonne
- Cost of basic waste management systems \$50-100/tonne (World Bank)
- Costs of health impacts from waste – illness and disease caused by pollution
- Taxes on waste and fines on missing waste management targets





# IT'S INCREASING

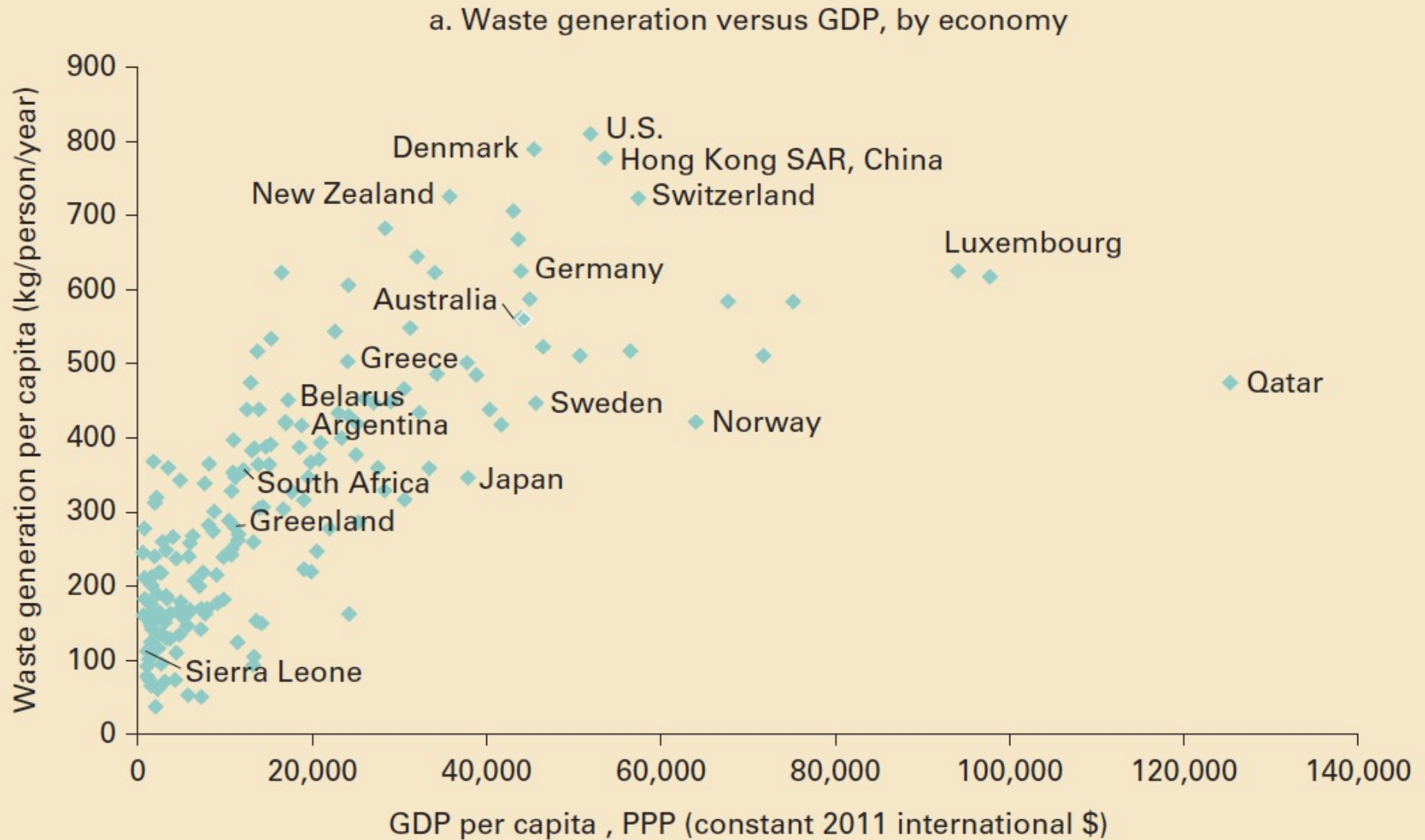
**Figure 2.7 Projected Waste Generation by Region**



Note: kg = kilogram.



**Figure 2.3 Waste Generation and Gross Domestic Product**





**11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

**11.A** Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning



**12.3** By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

**12.4** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

**12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

## SUSTAINABLE DEVELOPMENT GOALS





## 2. POLICIES AND STRATEGIES FOR WASTE

- EC Directives – Regulations and Targets set (with fines)
- DAERA and DfI inc. Planning Policy (RDS, SPPS, PPS 11)
- Local Council – Waste management strategies, waste collection initiatives

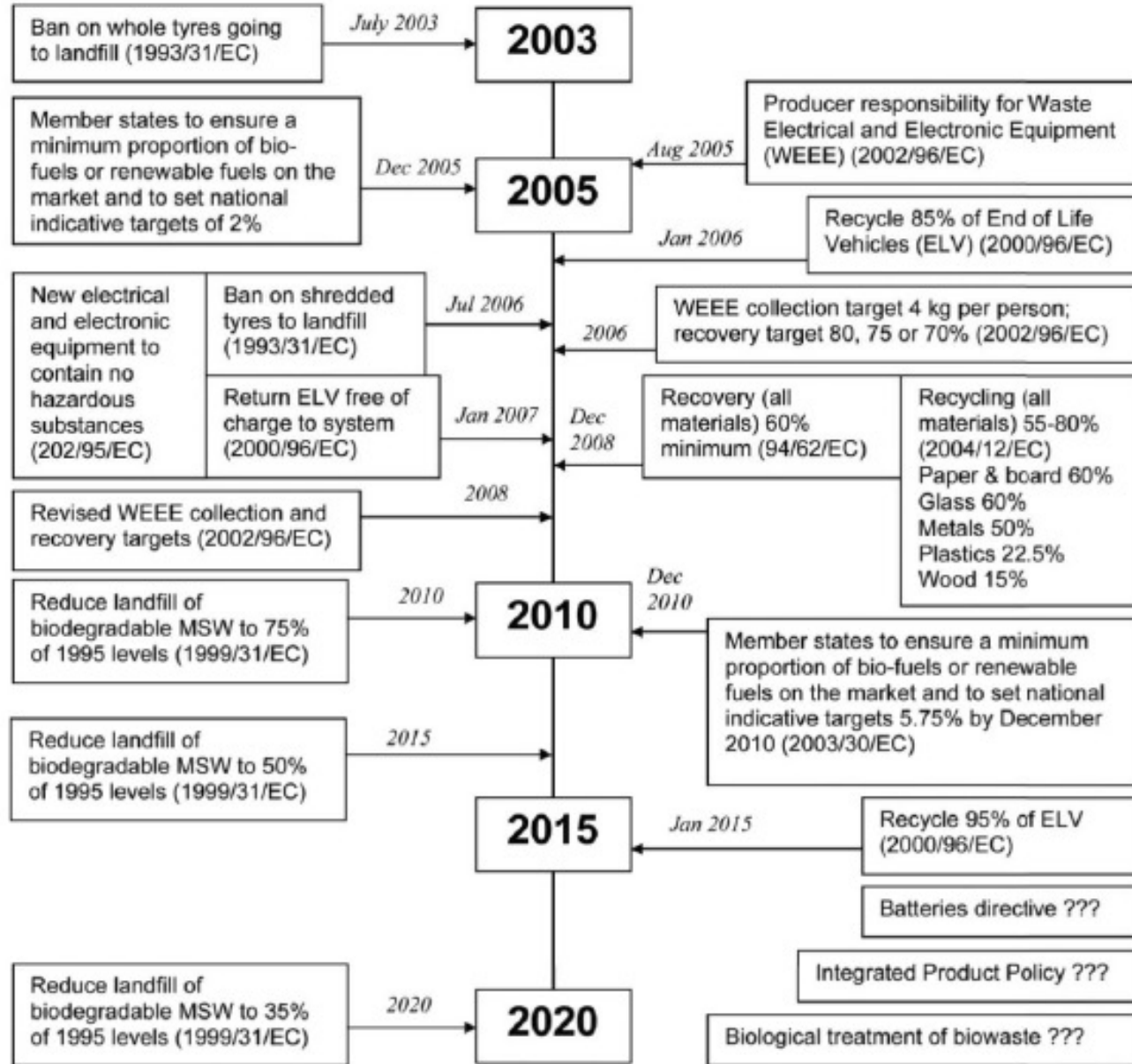
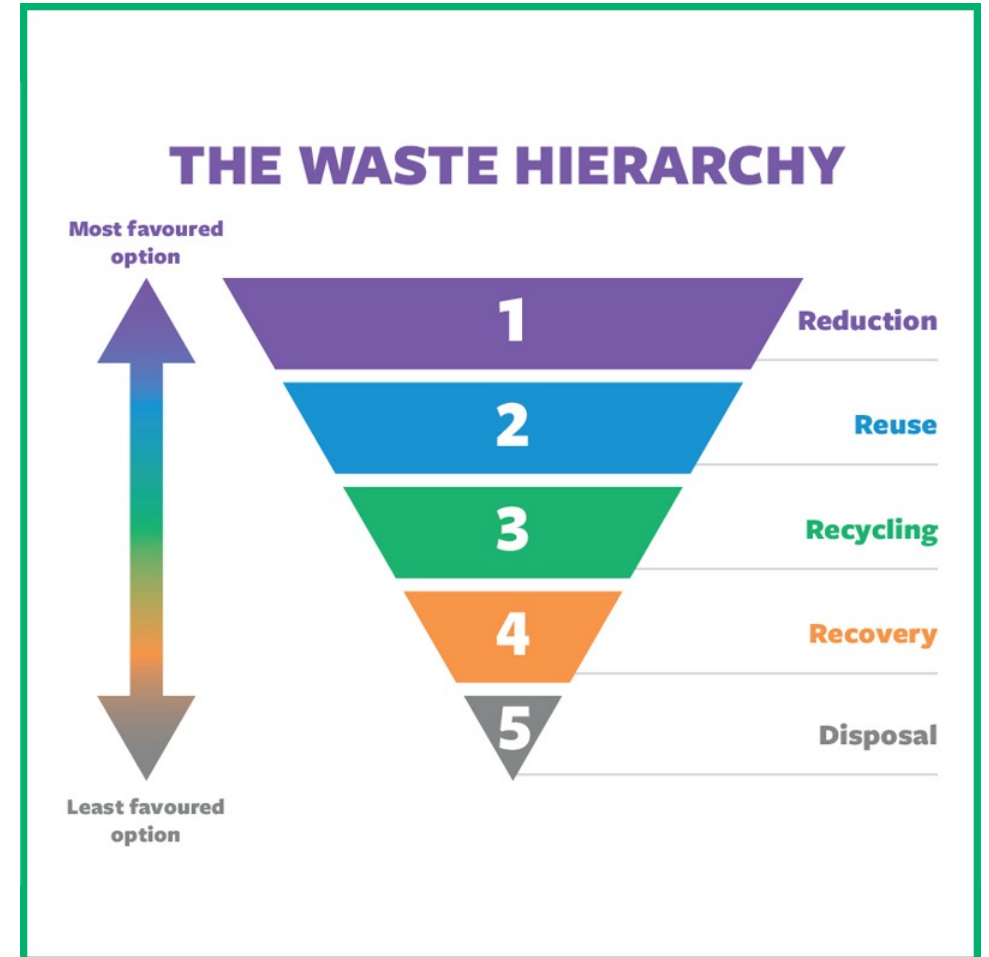


Figure 1: targets for existing and future EC directives

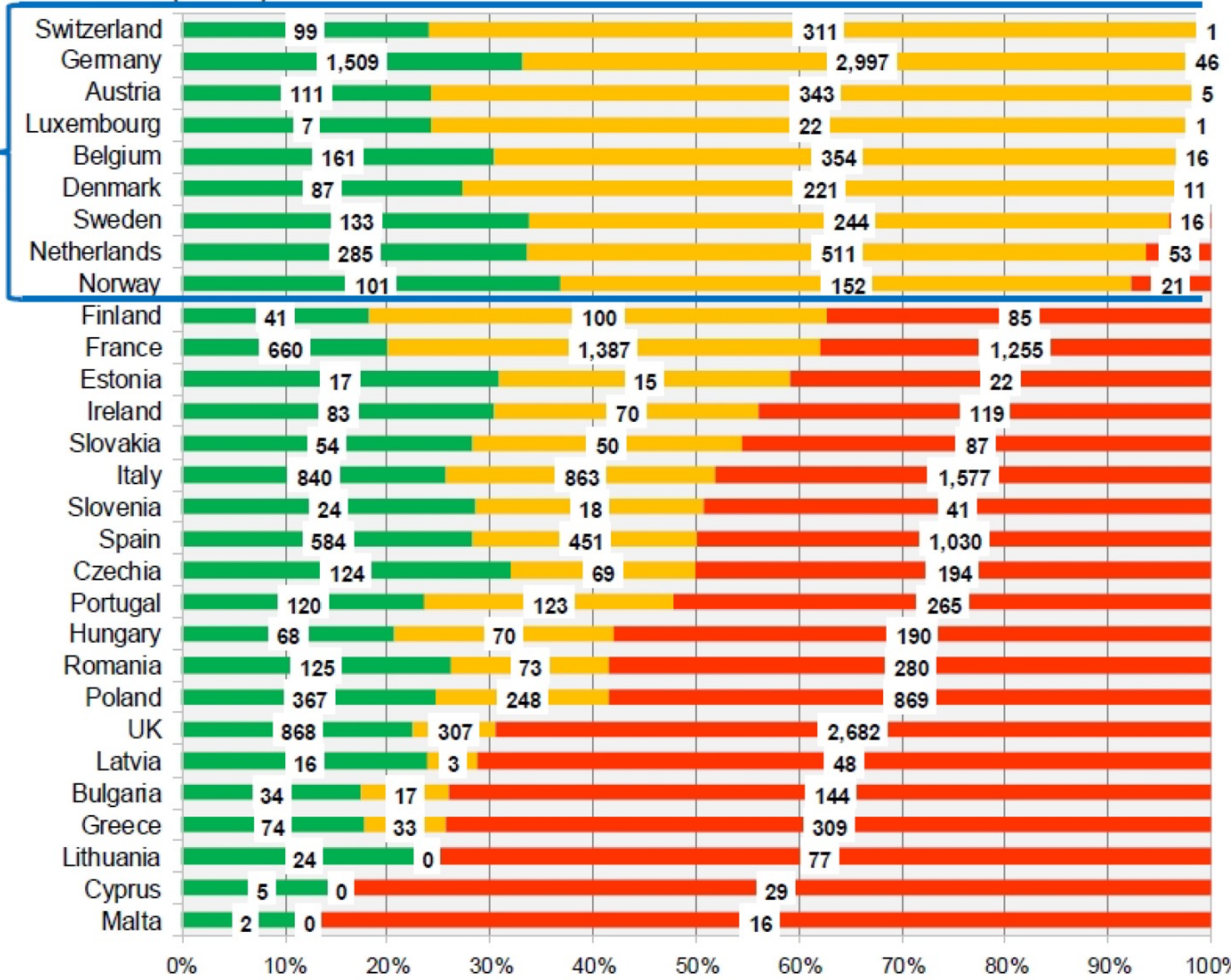


# EC WASTE DIRECTIVE (2008/98/EC)

- Waste hierarchy
- List of Waste (inc. hazardous waste)
- Extended producer responsibility
- Measures for waste prevention
- Recovery of waste
- Preparing for re-use and recycling
- Principles of self-sufficiency and proximity
- Waste Management plans
- Waste prevention programmes
- Public Participation
- Enforcement and penalties



Countries with landfill ban



Source: Consultic, Post-Consumer Plastic Waste Management in European Countries 2012 - EU 27 + 2 Countries

■ Recycling  
■ Energy Recovery  
■ Disposal



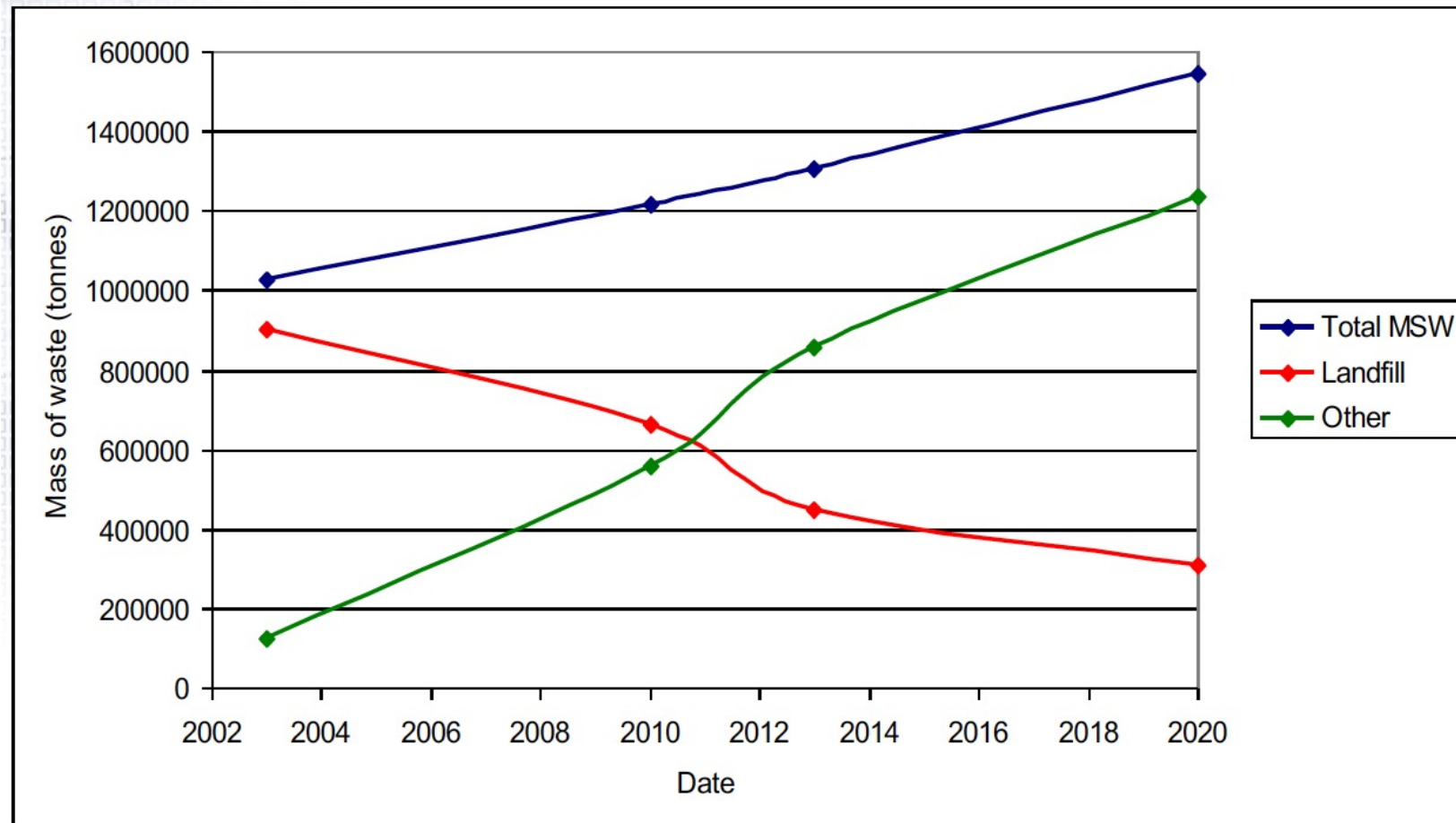
# WASTE TARGETS: NI

- **Landfill Diversion Targets – Reduce Biodegradable Municipal Waste going to landfill as a percentage of 1995 baseline to:**

- 75% by 2010
- 50% by 2013
- 35% by 2020

- **Waste Framework Targets – By 2020 recycle:**

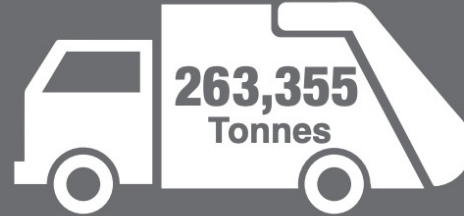
- 50% of household waste
- 55% of Commercial Waste



# Waste Collections by NI Councils

## April to June 2022

Waste collected by  
NI Councils



Recycling



52.8%

up from 52.1% in  
April - June 2021

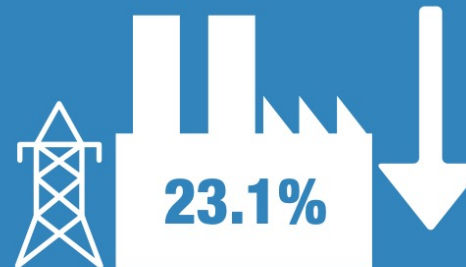
Recycling, energy recovery and landfill  
rates of LAC municipal waste  
April to June 2022  
compared to  
April to June 2021.

Landfill



up from 21.6% in  
April - June 2021

Energy Recovery



down from 23.8% in  
April - June 2021

# DAERA



Department of  
**Agriculture, Environment  
and Rural Affairs**

Sustainability at the heart of a living, working,  
active landscape valued by everyone

## Landfill

- [Landfill Regulations \(Northern Ireland\) 2003 SR496 \(and various amendments\)](#)
- [The Food Waste Regulations \(Northern Ireland\) 2015](#)
- [The Landfill \(Maximum Landfill Amount\) Regulations 2011 \(NILAS\)](#)
- [Waste and Emissions Trading Act 2003](#)

Waste Infrastructure (3 Area Waste Management Plans)

Waste management strategy

Waste prevention and recycling

# DFI

Regional Development Strategy

SPPS

Planning Policy Statement 11: Waste Management



Department for  
**Infrastructure**

[www.infrastructure-ni.gov.uk](http://www.infrastructure-ni.gov.uk)



# BELFAST CITY COUNCIL



# Belfast City Council

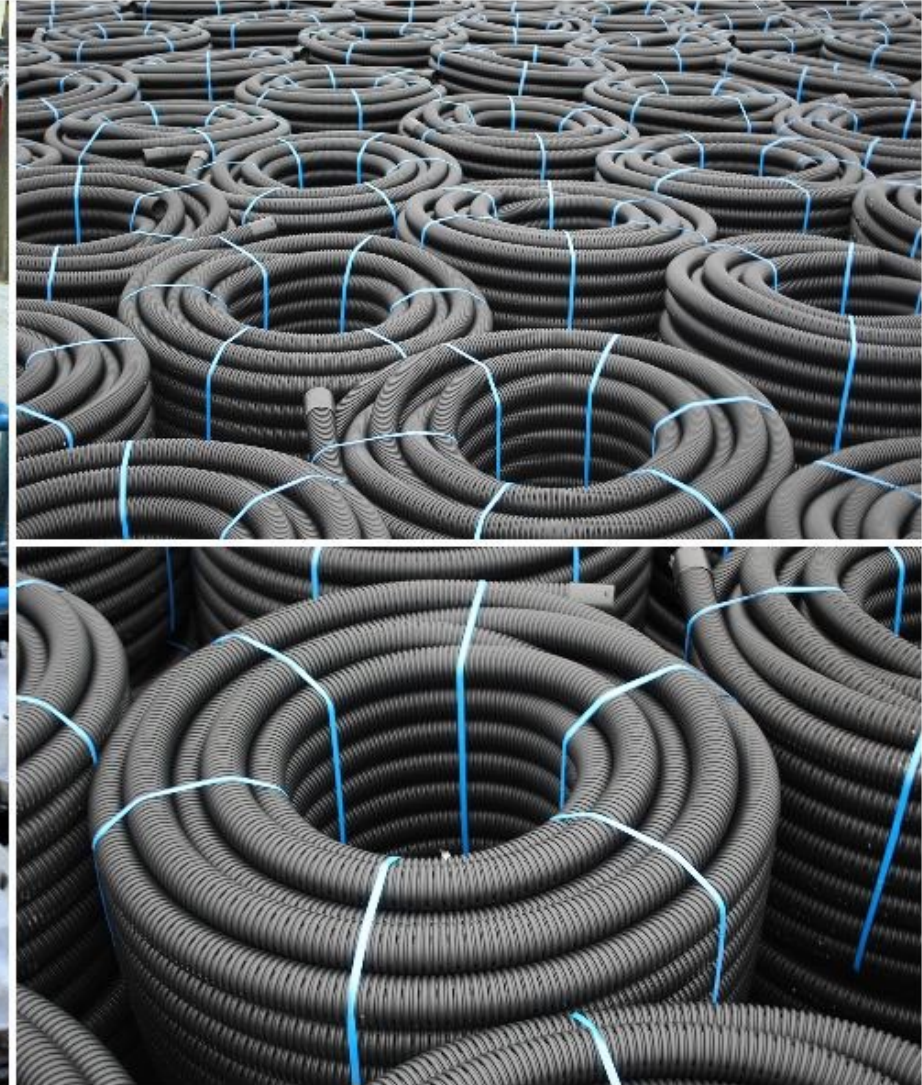
- 1<sup>st</sup> Waste Strategy published in 1992
- New Service established in 2003
- 4 x new Recycling Centres opened
- Closed landfill site
- Recognised communication as key: appropriate budget (~£1 per person per annum)
- New kerbside collection services
- Started with 4% recycling in 2003
- **Achieved 44% recycling in 2015**
- **Jul-Sept 19 – 50% Household Waste Recycling Rate**



## Key areas of work

1. Improve recycling collection services for householders (more materials, better services) 
2. Increase recycling through our network of recycling centres 
3. Extend business recycling services 
4. Use treatment facilities to separate recyclables from waste before it goes to landfill 
5. Develop new recycling campaigns and community based recycling initiatives 
6. Increase the amount of recyclables collected from existing waste collections 
7. Collect recyclables from the cityscape (such as markets and events) 
8. Increase blue bin capacity and "slim" black bins 



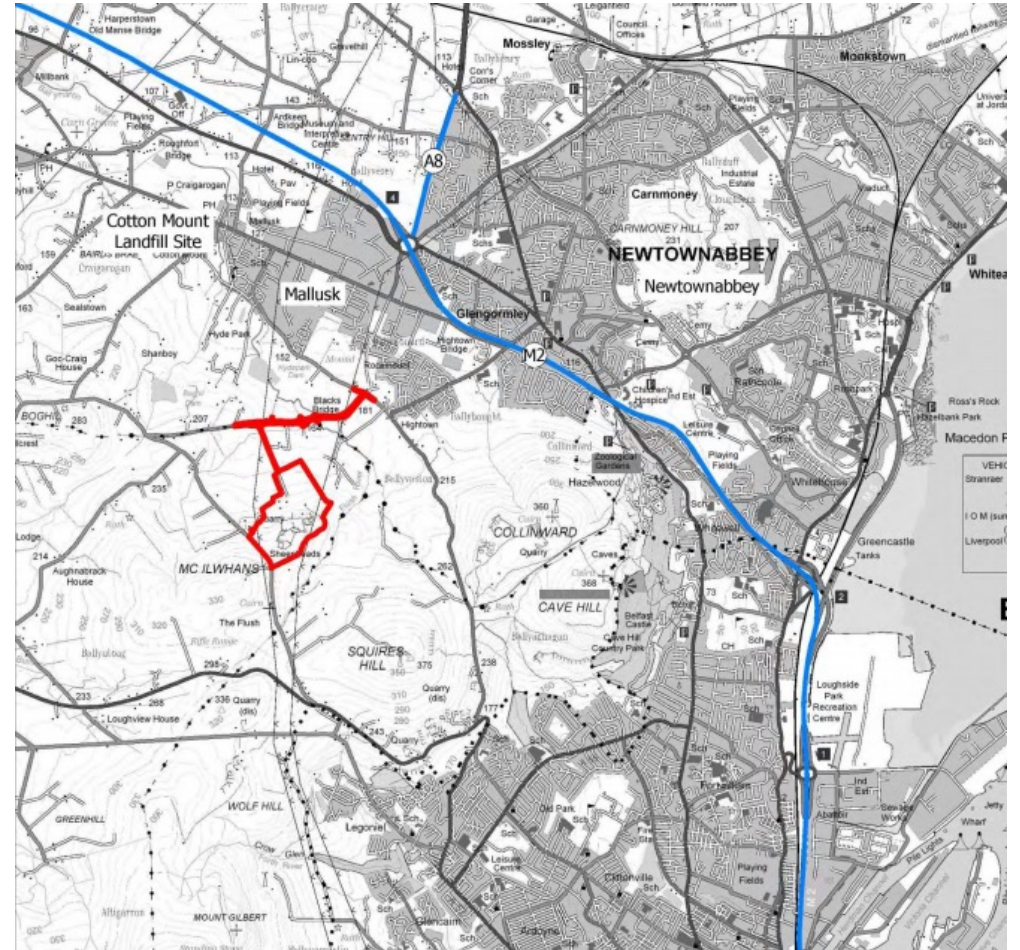


Huhtamaki, and Cherry Pipe, Lurgan, both using 100% recycled local waste in the creation of their products, supporting local economy



# ARC 21 – ENERGY RECOVERY PLANT PROPOSAL

- Process 300,000 tonnes of residual unrecyclable waste per annum
- Generate 100,000MWh/annum electricity – would power 30,000 homes
- Visitor/education centre
- A step up the waste hierarchy from landfill
- Proximity principle applied for Belfast and ARC21 Waste Management Area







IBA Treatment

MBT

RDF Bale Store

EFW

Visitors Centre

Weigh Bridge



# PLANNING PROCESS

Over 4000 letters of objection from neighbouring communities – argued that the proposal was outdated and no longer sustainable

Years of legal challenges and governmental complications

Case and proposal eventually dropped







## Mallon welcomes decision not to appeal Incinerator ruling



Posted on 30/07/2018  
by [Nichola Mallon MLA](#)

SDLP Deputy Leader Nichola Mallon MLA has welcomed the decision by the Department for Infrastructure not to further appeal Court rulings overturning its decision to grant planning permission for a waste incinerator in Hightown.

The North Belfast MLA said:

"A huge amount of public money has already been wasted trying to defend the indefensible. This incinerator should never have been approved in the first place. It is right that the Department for Infrastructure has decided not to pursue this case further.

"I want to pay tribute to the No Arc 21 Committee and local residents in North Belfast and South Antrim who have tirelessly fought against this unneeded, unsustainable and unviable facility.

# Arc21 boss: Northern Ireland is 'drifting into a waste crisis'

By [Conor Macauley](#)  
BBC NI Agriculture & Environment Correspondent

🕒 3 December 2020

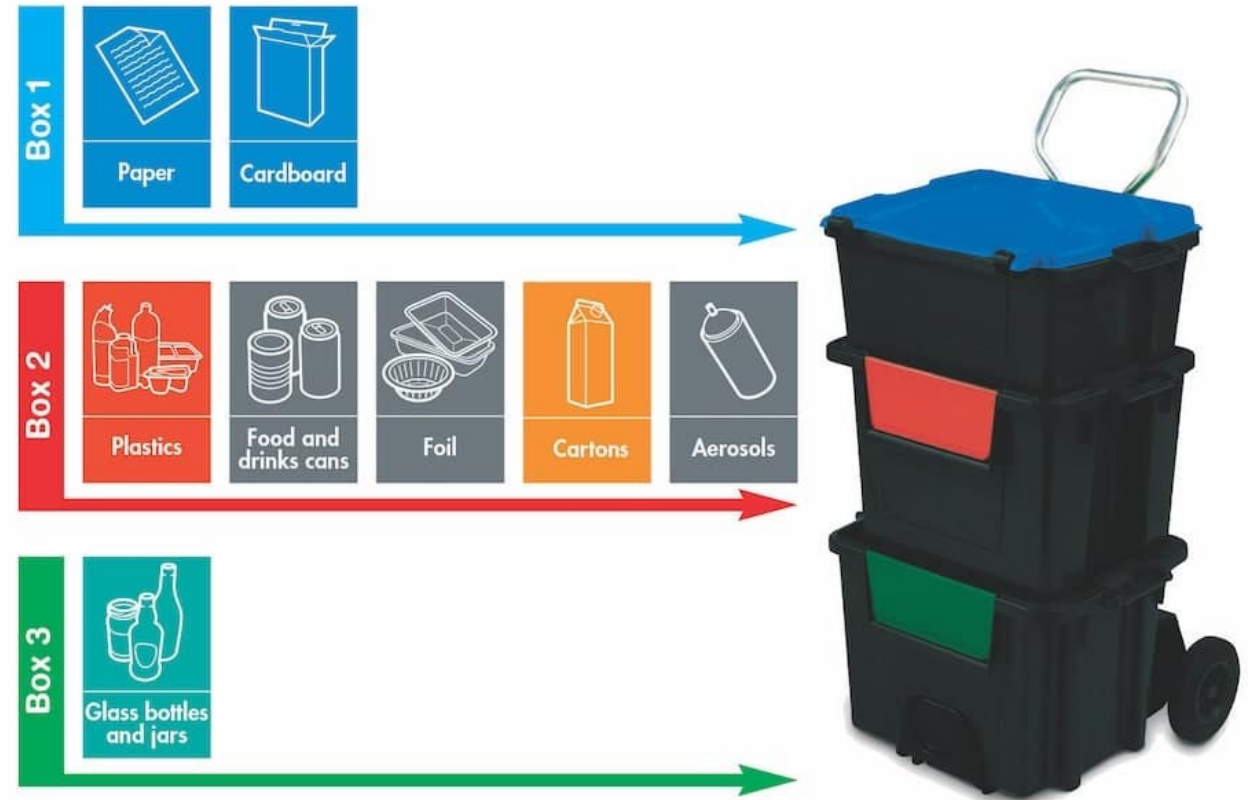




# 3. INNOVATIONS FOR WASTE MANAGEMENT

## New Collection Methods

- Bins & boxes
- Alternate weekly collections
- Garden waste collection
- New Recycling Centres
- Recycling Points
- Street Litter Recycling Bins
- Additional separate collections (kitchen waste, glass, WEEE, batteries)



# AUTOMATED VACUUM COLLECTION (AVAC)



Hammarby Sjostad, Stockholm





# SMART TECH

**Photo 6.1** Solar-Powered Waste Compaction Bins in the Czech Republic



## Box 6.4 Mr. Trash Wheel

Mr. Trash Wheel is a trash interceptor in Baltimore, Maryland, United States, that picks up litter floating in the Inner Harbor of Baltimore (Waterfront Partnership of Baltimore n.d.). Its remarkable visual appearance builds public awareness of proper waste management. The instrument's rotor is powered by water and solar energy, and it deposits floating waste into a dumpster behind the vessel using a moving conveyer belt.



*Source:* Photo courtesy of Waterfront Partnership of Baltimore; additional permission required for reuse.



Building colour key:  
 Houses, offices, factories producing waste   
 Waste management facility

Waste   
 Processed Output

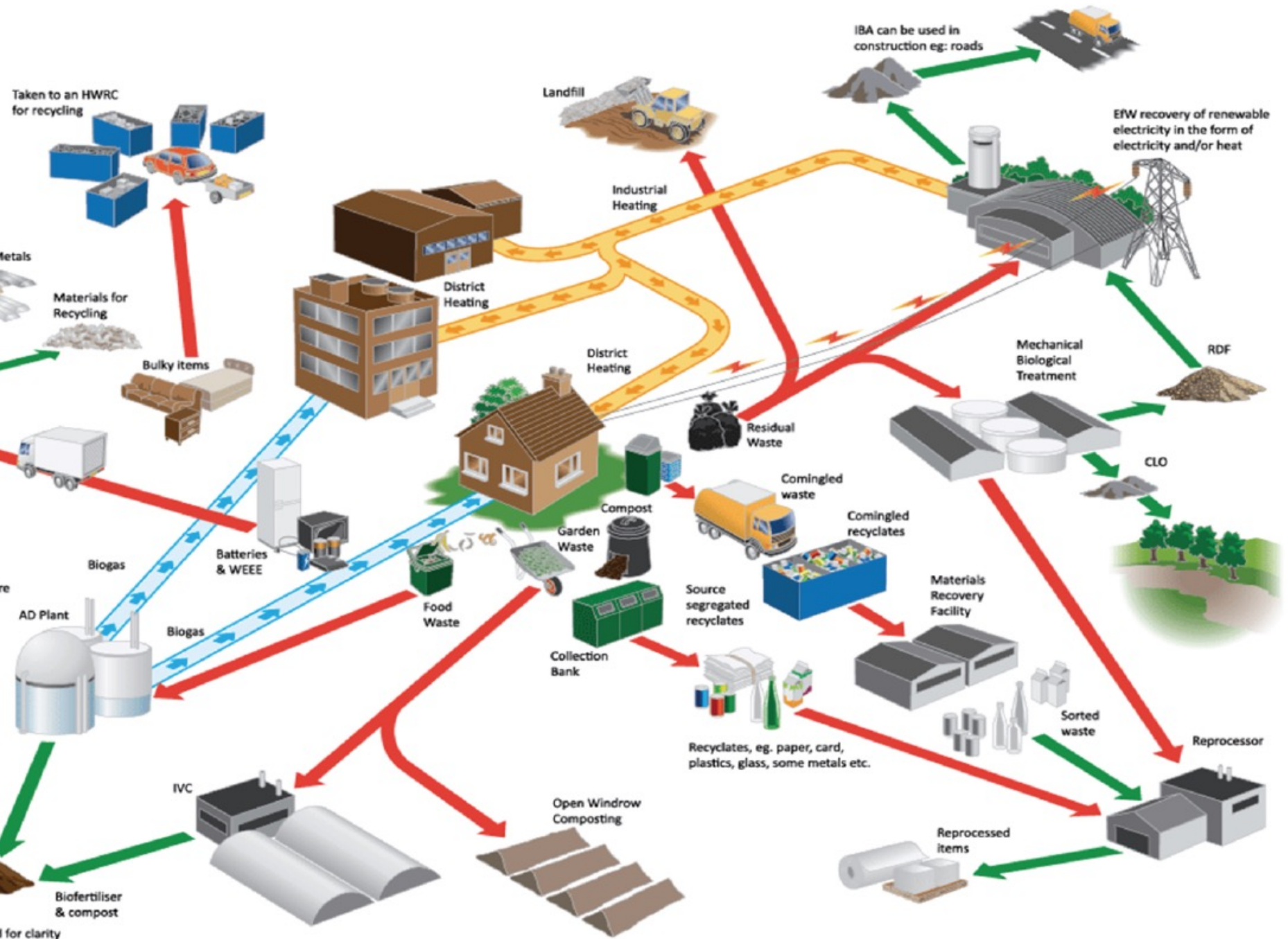
Precious Metals   
 Materials for Recycling   
 Bulky items

Dismantled, reprocessed and safe disposal

Acronym key:  
 AD: Anaerobic Digestion  
 CLO: Compost-like Output  
 EFW: Energy from Waste  
 HWRC: Household Waste & Recycling Centre  
 IBA: Incinerator Bottom Ash  
 IVC: In-Vessel Composting  
 RDF: Refuse Derived Fuel  
 WEEE: Waste Electrical & Electronic Equipment



Note: This diagram should be seen as illustrative; some relationships and processes have been simplified/omitted for clarity





# THE FUTURE? CIRCULAR ECONOMY

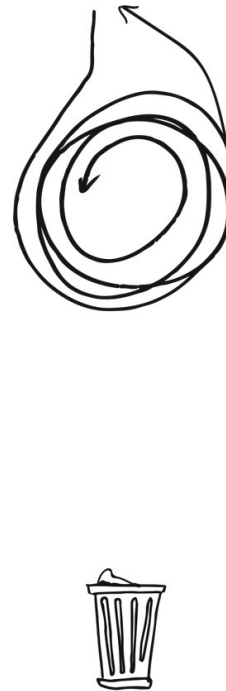
LINEAR ECONOMY



RECYCLING ECONOMY



CIRCULAR ECONOMY



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# THANK YOU 😊

Please add any questions to the Q&A chat box

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