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Building the Blue Bioeconomy



Bioresources & Scotland's Circular Economy

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EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future

- **Zero Waste Scotland**
- **Scotland's Circular (Bio) Economy**
- **Scale of the opportunity**
- **Biological resource mapping**
- **Example projects**
- **Funding and Support**



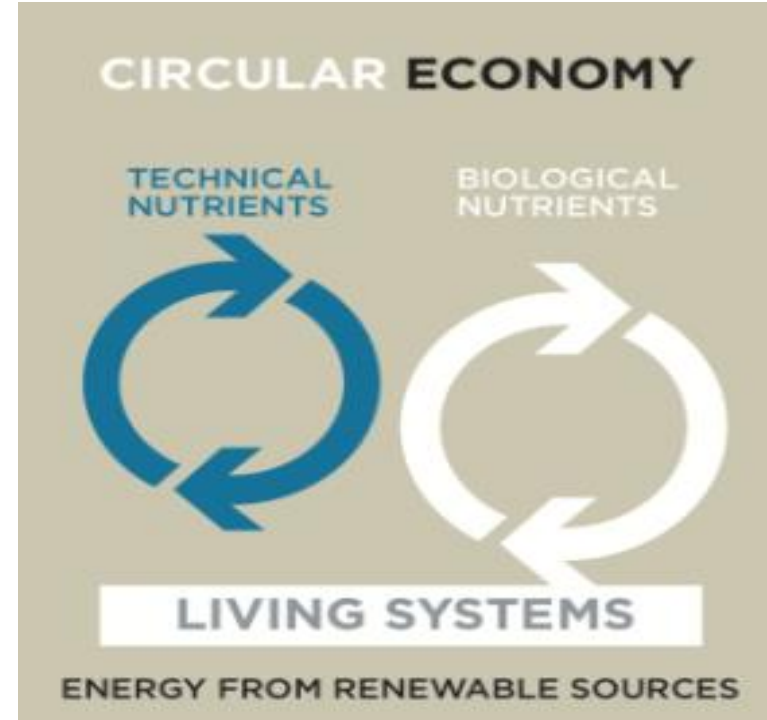
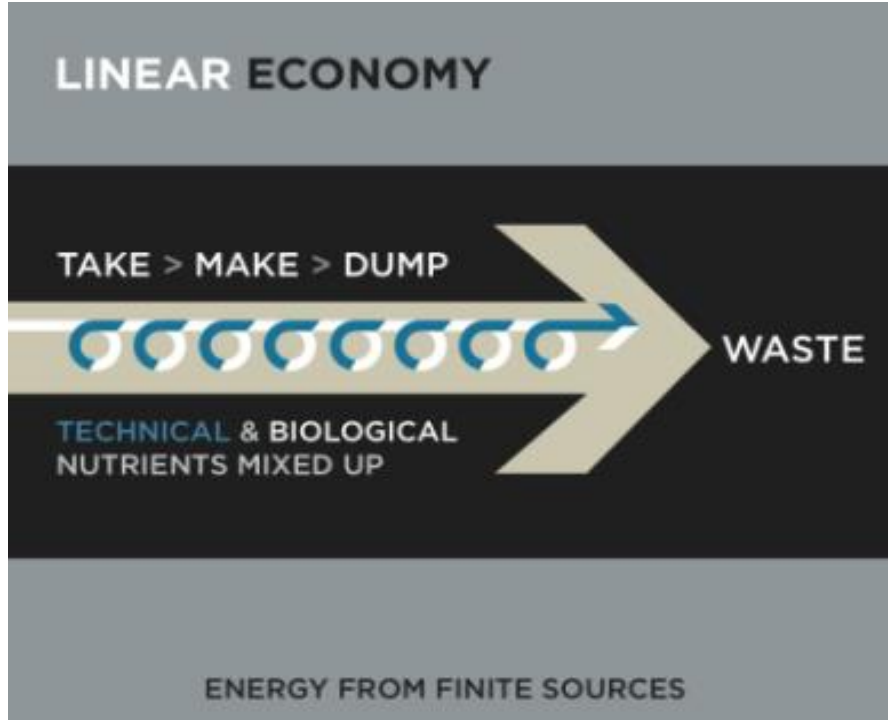
Zero Waste Scotland

We exist to create a society where resources are valued and nothing is wasted.

Our goal is to help Scotland realise the economic, environmental and social benefits of making best use of the world's limited natural resources.

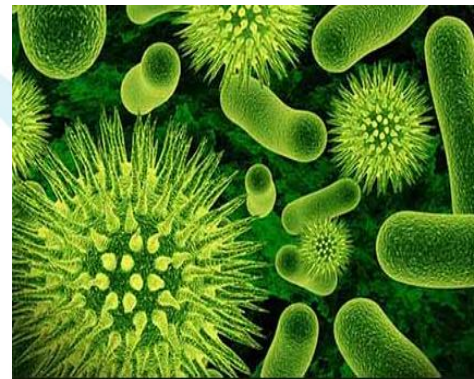
Circular Economy

An economic system where resources and materials are kept in as high a value as possible and in circulation for as long as possible to extract maximum value from them.



Bioeconomy

Parts of the economy that use **renewable biological resources** from land and sea (crops, forests, fish, animals and micro-organisms) and converts them into food, feed, materials and energy.



New and existing biomass



RENEWABLE
RAW
MATERIALS

Mechanical, chemical or
biological processing

DESIGN FOR
EFFICIENCY
AND RECOVERY



Mechanical, chemical or
biological processing



PRODUCTS AND
SERVICES

Nutrient recycling

WASTE AND
BY-PRODUCTS



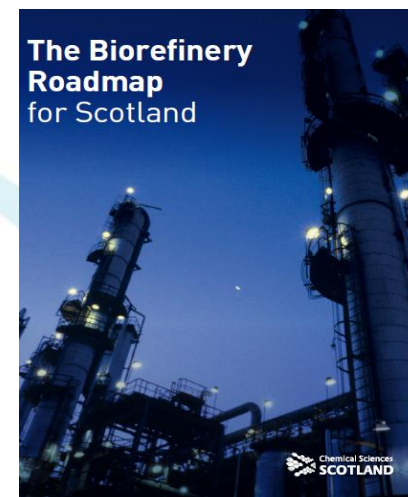
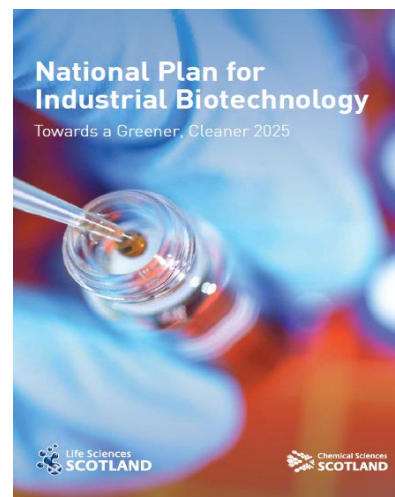
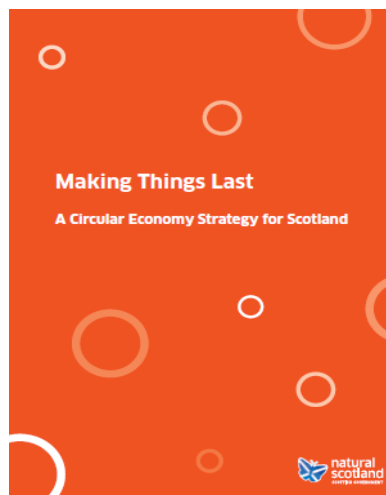
Scale of the opportunity for Scotland

- [Beer, Whisky, Fish report, 2015:](#)
 - £500m/year for Scotland's economy using food & drink by-products
- [Biorefinery Potential report, 2017:](#)
 - > 27m tonnes waste/by-product bioresources arising in Scotland/year
- Strong food and drink sectors
- Research and academic capabilities
- SMEs looking to develop innovative bio-capabilities
- Support of Scottish Government and agencies to develop opportunities



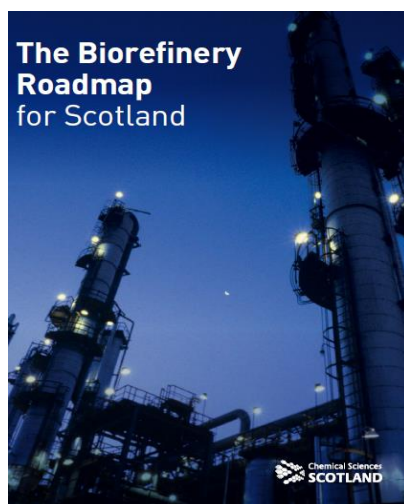
Scotland – the policy context

- **Circular Economy Strategy:** Food, drink & bioeconomy are key focus
- **Food Waste Reduction Target:** By 33% by 2025
- **Industrial Biotechnology Plan:** Grow turnover £189m (2012)- £900m (2025)
- **Biorefinery Roadmap:** Develop capabilities to build biorefineries by 2025

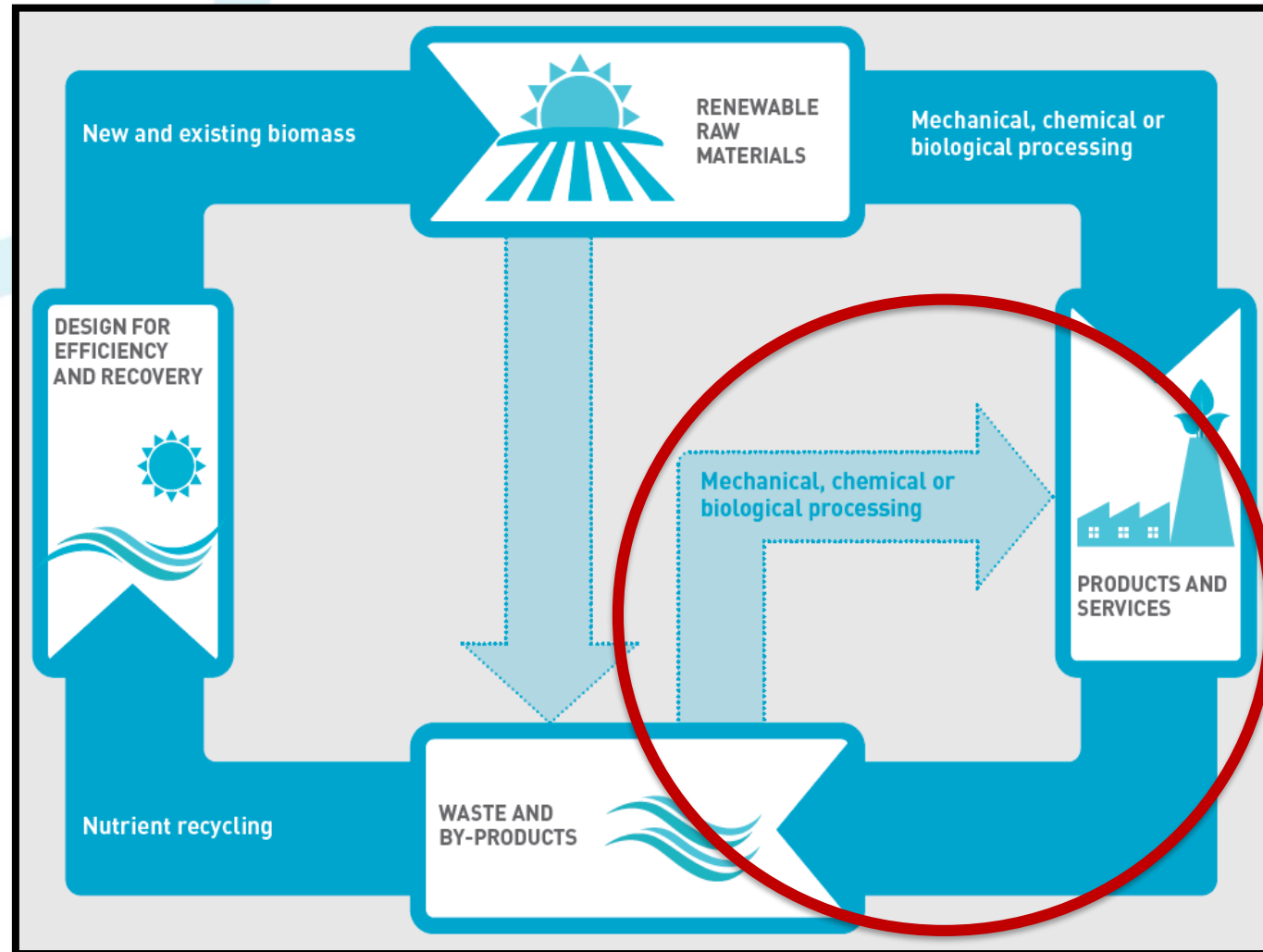


Biological Resource Mapping

- **Action of Roadmap:** Establish scale of Biorefinery opportunity for Scotland
- **Materials:** wastes, by-products, agricultural residues, wastewater sludge
- **Mapped characteristics:** location, quantity, composition, availability, influences
- **Bioresources:** *at least* 27m tonnes arising each year in Scotland
- **Potential products:** High value chemicals, biofuels, renewable products
- **Examples:** projects that could be/are being developed in Scotland



By-products to new products



By-products to new products

BY-PRODUCT	PROCESS	NEW PRODUCT / INGREDIENT
Pot ale	Algae	Fish feed, Nutraceuticals
Crustacean shells	Extraction	Chitin, Bioplastic, Pharma
Seaweed cellulose	Processing	Bioplastic, Fabric
Fish mortalities & processing	Oil extraction	Biofuel
Vegetables	Fly farming	Fish feed (& Fertiliser)
Fish Skins	Tanning	Fish Leather
Fish faeces	IMTA	Nutrients, Shellfish
Scallop shells	Milling	Chicken grit



Accelerating Scotland's Circular Economy

Focus:

- Evidence. Innovative. Transformative. Whole value chain.

Support:

- [Resource Efficient Scotland](#) & [Circular Economy Business Support](#)

Funding:

- [Circular Economy Investment Fund](#) & [Waste Prevention Fund](#)

Partnership & Collaboration:

- [Scottish Circular Economy Business Network](#)





Thank you

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