UK ICE-SRM
The Circular Economy
Delivering a sustainable future

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RESOURCE MANAGEMENT WEEK 2024
Philosophy: Sustainable Energy

Carbon emissions are the rate limiter

- **Priorities**: Carbon & GHG emissions, natural capital usage, resource use

- **Short term. Downstream**: Reducing the need for energy by promoting low carbon recycling - circular materials.

- **Mid-term. Core**: Supporting green transition by developing the sustainable supply of critical minerals.

- **Long-term. Upstream**: Reducing the need for energy through ‘keeping products in circulation for longer at their highest value point’. Reuse and repair – the circular economy.
Exeter Circular Economy (CE) Data Observatory. Delivering live, consistent, reproducible data streams mapping the flow of products & materials (Lysaght, Zils, Hopkinson)

Swansea: Enhanced metal sorting to promote circularity of existing material and thereby spare the earths existing resources (Pleydell-Pearce).

Brunel: Improving the durability metals and developing repair technology that will keep metal components in circulation at their highest value point for longer (Cantor, Fan).

UCL: Tracking the lifecycle of materials in construction and thereby highlight areas where reuse can occur (Stegemann).

British Geological Survey: Identification of critical and priority minerals across there complete life cycle, from extraction to reuse, recovery to disposal (Bide).

Exeter Critical Minerals Centre: Sustainable primary extraction and secondary circulation of critical minerals to support green transition (Ward).
UK ICE-SRM: Delivery

Diffusion of Innovation

- Key centres are experienced in data, innovation, policy.
- Supporting UK transition to sustainable resource use.
- Key outputs directly applicable to the UK, EU, UNECE and beyond.
- Waste management is a global business, cross boundary shipments. Solutions are global.
- UNECE ideal delivery mechanism to enhance uptake of innovation across the region.
- Quantifying the ‘missing link’.
- Supporting UNRMS
  - Information framework and methodology
  - Developing the system and delivering the innovation to manage the life cycle of resources
Example: Brunel (Brain Cantor, Zhongyun Fan)

Innovation: Keeping products in circulation

- Extruded austenitic stainless steel 316L
- Low cycle fatigue.
  - 3000 cycles
- Electrical pulse treatment (EPT)

- Experimental stress in stainless steel producing hairline fractures.
- Repair by electrical pulse treatment.
- Potential to repair steel components in situ.
The UK, EU and UNECE situation

Applications

- Commitments in the UK Resources & Waste Strategy
  - Double in resource productivity by 2050
  - Can help us move towards zero avoidable waste by 2050
  - Can help us move towards zero avoidable plastic waste by 2042
  - Eliminate waste crime and high risk illegal waste sites by 2042

- UK challenges are also EU & UNECE challenges

The UK, EU and UNECE situation

Delivery

- Appointment of 6 fellows to support delivery of a Circular Economy Data Observatory.
  - Data collection critical.
  - Waste is a business, if business can see a waste feedstock they will capitalise, rPET, paper/card, glass, WEEE, batteries, textiles.
  - Data allows us to model the impact of policy tools prior to introduction, plastic tax, EPR (paper, card, glass)
  - Data allows us to measure the success of policy: pre policy then post policy introduction
  - Solutions for the UK waste environment directly transposable to the EU and UNECE regions.
  - Waste companies operating in the UK also operate across the UNECE region.
Example: Exeter Data Observatory (Hopkinson, Zils, Lysaght)

Circular Plastics

- Application of system dynamics
- At multiple levels:
  - County
  - Regional
  - National
- Identifying
  - Material type
  - Product type
### Aggregating: Leaked plastic streams with annual leakage Value

- **£75 Million potential lost value**

### Visibility gives opportunity

- **Start up business already capitalising**

### Supporting UNRMS

#### Example: Exeter Data Observatory (Hopkinson, Zils, Lysaght) **Circular Plastics**

<table>
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<tr>
<th>Material</th>
<th>Annual Flow Quantity (t)</th>
<th>Material Price in £/t</th>
<th>Total material value (Mio £)</th>
<th>Leakage ratio (%)</th>
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**Total:** 124,000 t/y  
**£87 Million**  
**£75 Million**
Conclusion

- Holistic view of sustainable energy
- Change demands upstream and downstream modifications
- Short, long, mid term solutions across a range of material flows
- Delivery of innovation, data collection, policy recommendations.
- Application of UNFC and UNRMS to enable regional and global quantification

If they can see the opportunity they will come
Thank you!

THE VIEWS EXPRESSED ARE THOSE OF MACINNES & BLAKE AND DO NOT NECESSARILY REFLECT THE VIEWS OF THE UNITED NATIONS.