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#FoundationIndustries



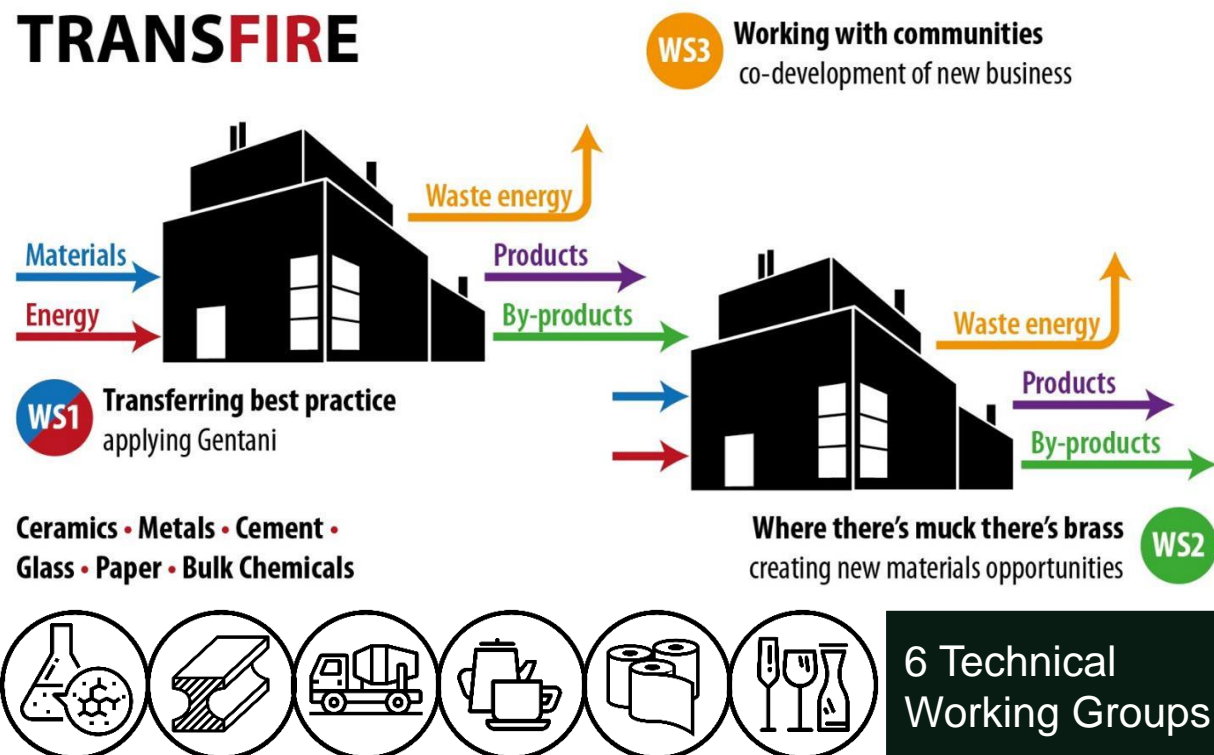
From Reforming to Transforming Foundation Industries with Circular Economy Strategies

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Transforming Foundation Industries Research and Innovation Hub

TRANSFIRE



Find out more: www.transfire-hub.org

£5.9 M (£4.7 FEC) +
matched funding

3 years, 1st July 2021

12 Research
organisations:

Cranfield, Bangor,
British Geological
Survey, Cambridge,
Cardiff, Durham,
Edinburgh, Exeter,
Leeds, Northumbria,
York, Sheffield Hallam

Close to 90 project
partners in industry
and government

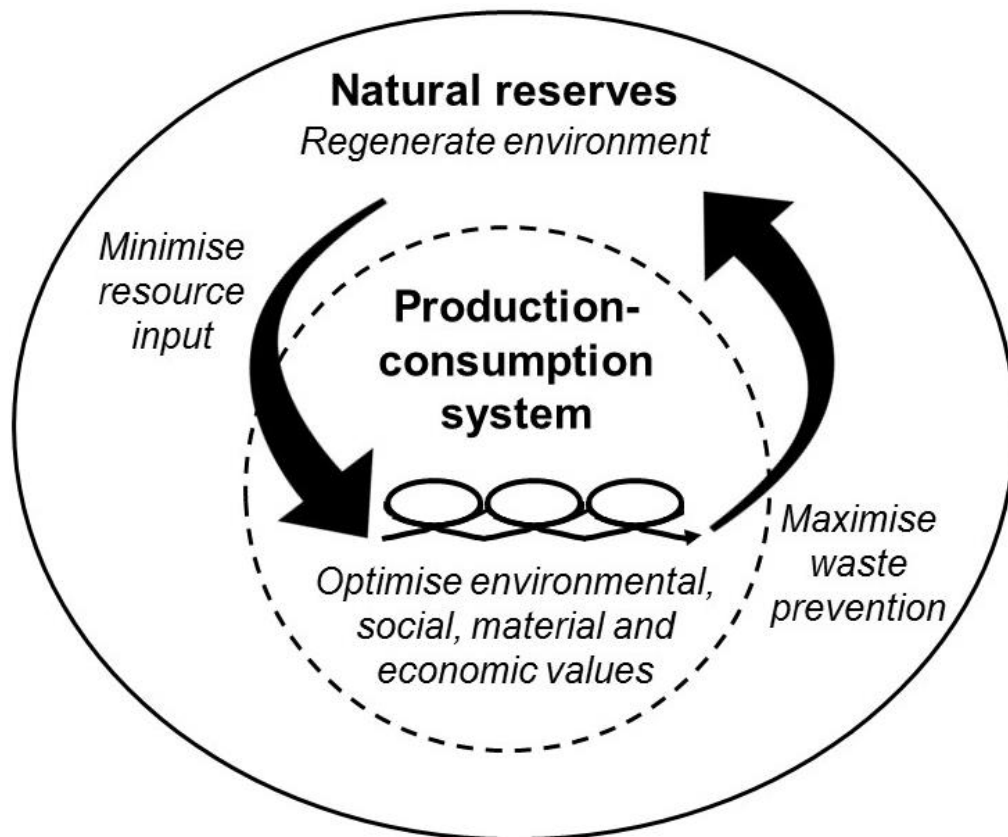
Today

- Briefly introduced TransFIRE
- How circular economy has broadened
- How this opens new opportunities for transformative change in foundation industries



Image: Green City by Nick Pederson
<https://www.behance.net/gallery/14061041/Green-City>

Circular Economy



- Opposite of the linear take-make-use-dispose economy
- Make better use of materials, components and products
- Optimise economic, technical, social and environmental values of materials and products
- Whole system, whole lifecycle approach

Velenturf, A.P.M., Archer, S.A., Gomes, H., Christgen, B., Lag-Brotons, A.J., Purnell, P. (2019) *Circular Economy and the Matter of Integrated Resources*. Science of The Total Environment, Vol. 689: 963-969.

Values of a Sustainable Circular Economy



Social well-being



**Environmental
quality**



**Economic
prosperity**

Velenturf and Purnell (2021) *Principles for a Sustainable Circular Economy*. Sustainable Production and Consumption, Vol. 27: 1437-1457.



Benefits of a Sustainable Circular Economy



Social well-being

Green Alliance (2021) Levelling up through circular economy jobs



Environmental quality

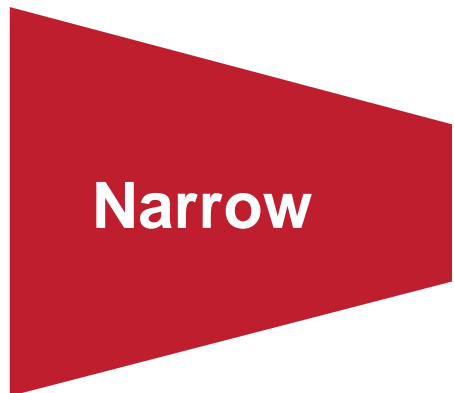
Circle Economy (2019) Circularity Gap Report 2019



Economic prosperity

Lacy and Rutqvist (2016) Waste to wealth: the circular economy advantage.

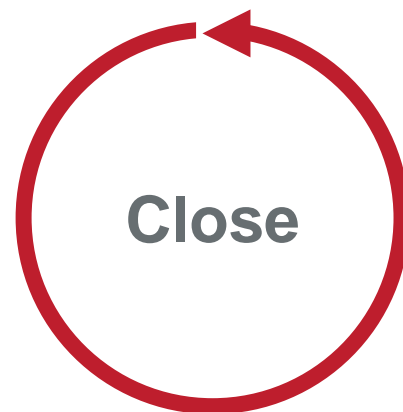
Circular economy strategies



Design (modular, less materials), lease, share.



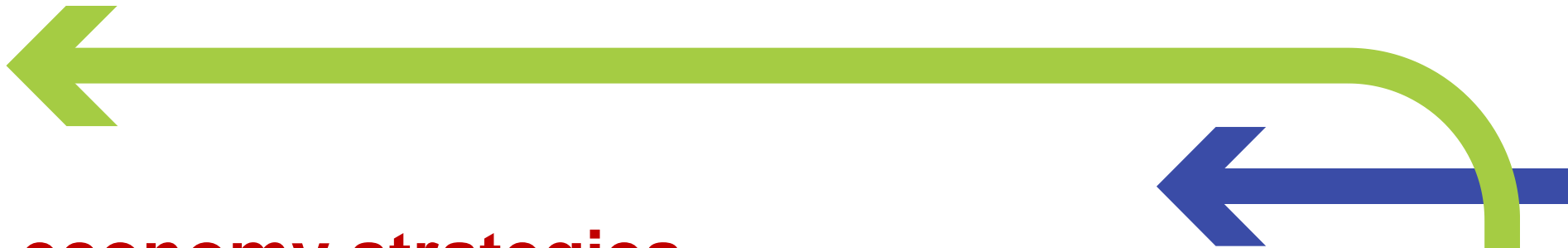
Component reuse, repair, remanufacture.



Recycle materials. Industrial symbiosis.




E.g. controlled landfill with recovery.



Bocken et al (2016) *Product design and business model strategies for a circular economy*. Journal of Industrial and Production Engineering, Vol. 33 (5): 308-320.

Velenturf et al (2019) *Circular Economy and the Matter of Integrated Resources*. Science of The Total Environment, Vol. 689: 963-969.



Recycling economy

Resource efficiency

Technology will save us

Production and consumption
patterns largely unchanged

Progress = Green growth

Weak sustainability

Reformative



Sustainable circularity

Halve average material use p.p.

Resource sufficiency + efficiency

Behaviour change + technology

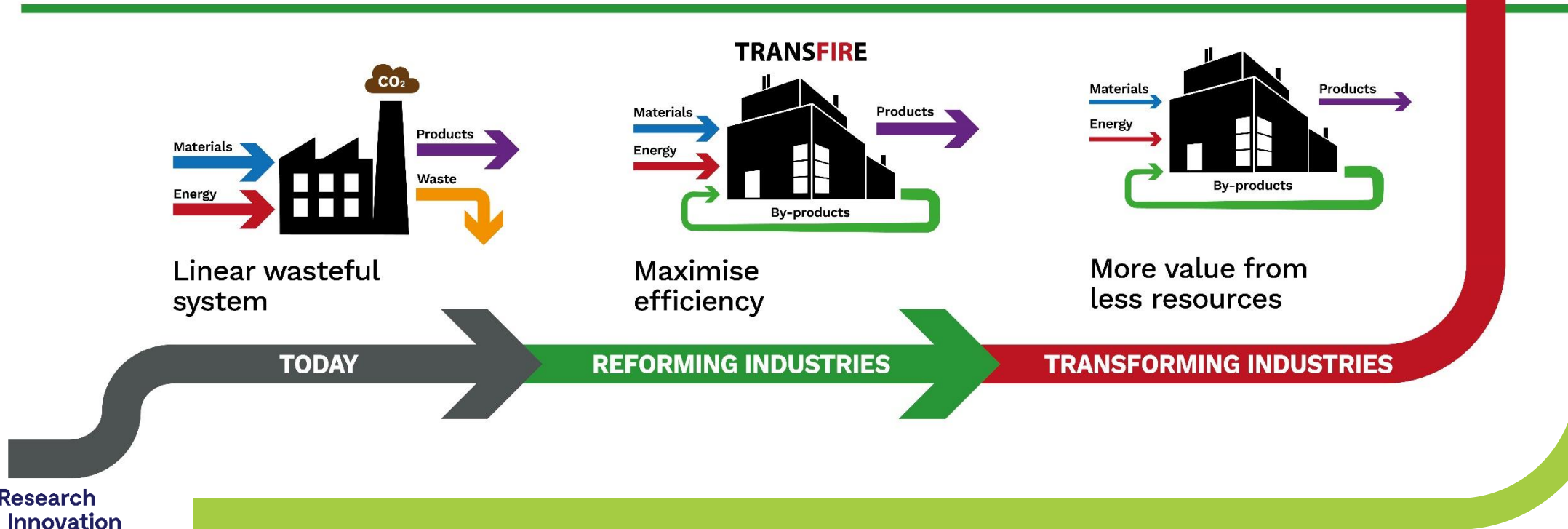
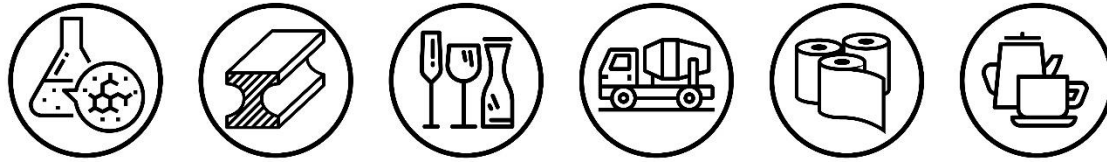
Progress = Social, environmental and
economic

Strong sustainability

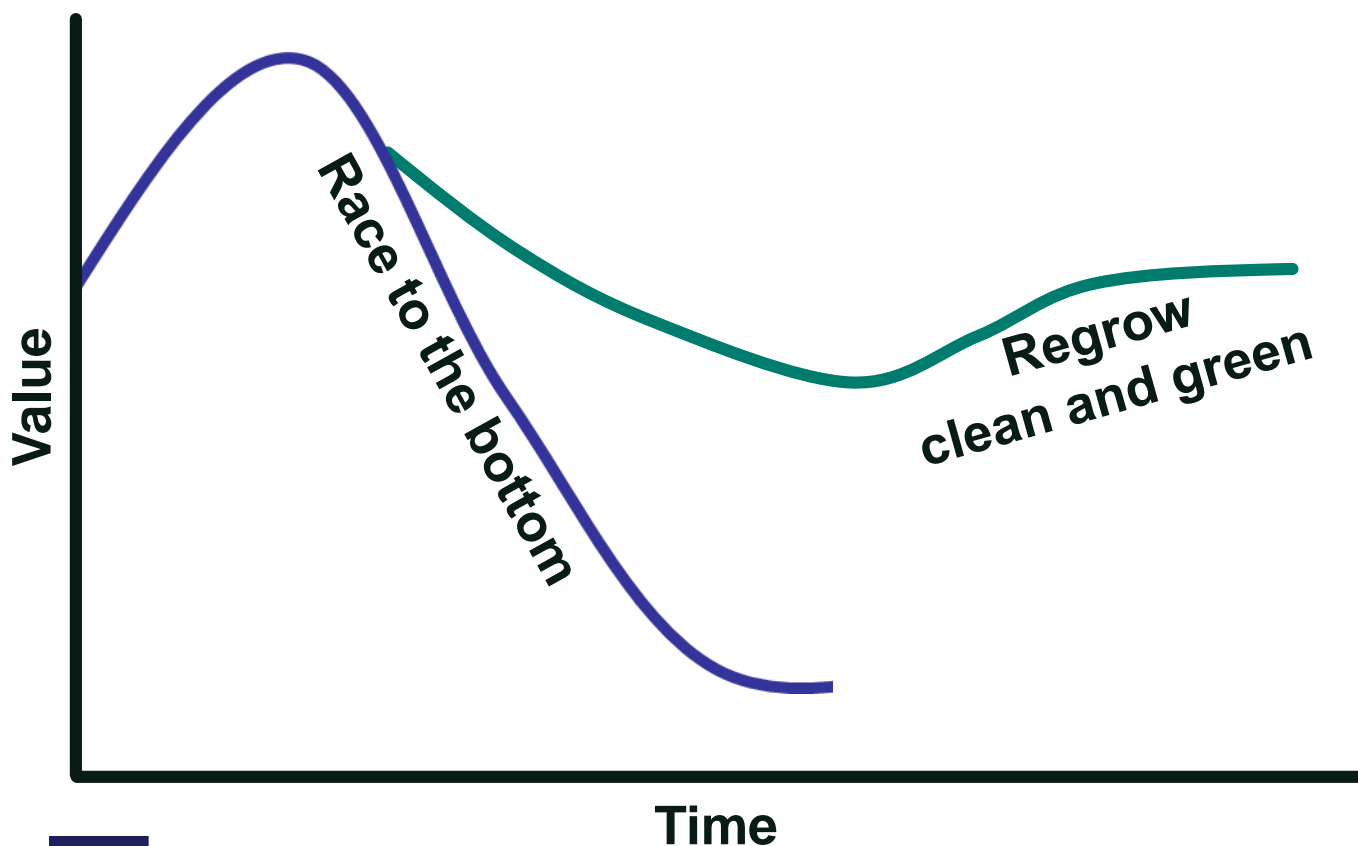
Transformative

Recycling ≠ Circular economy

From reforming to transforming



Investment strategies



Perfect storm against UK investment:

- Sites are often foreign-owned
- Old sites with low productivity
- High costs, small margins
- Extreme global competition
- Limited capital
- Uncertain trade arrangements
- Uncertain viability new technologies

Buy time with retrofit
Collaborate to reduce cost
and risk
Leapfrog to sustainable
circularity

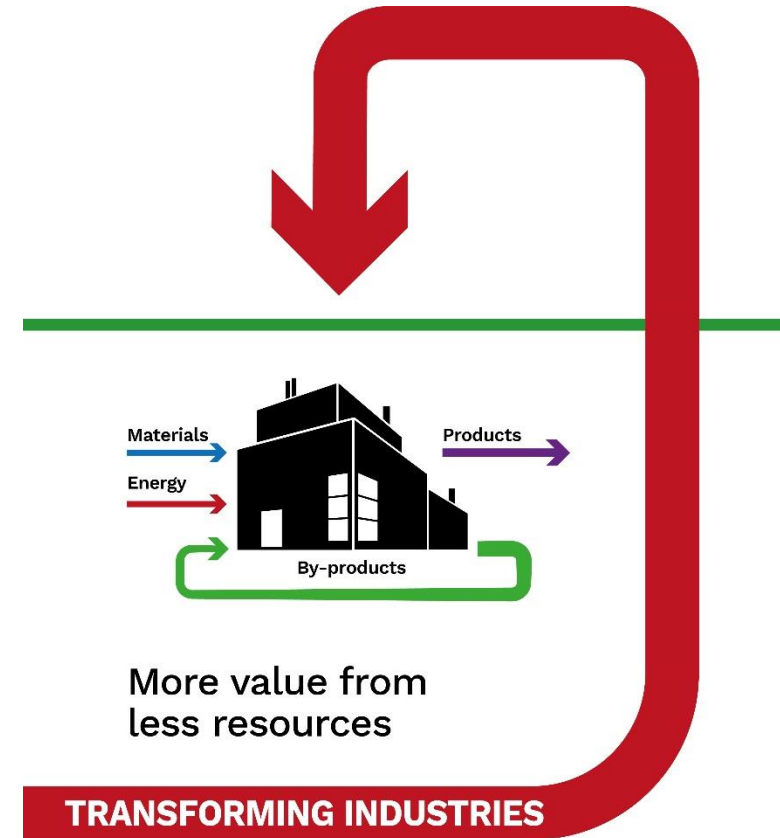


Opportunities to diversify with transformative circular business models

Durable modular design for reuse,
repair, remanufacturing

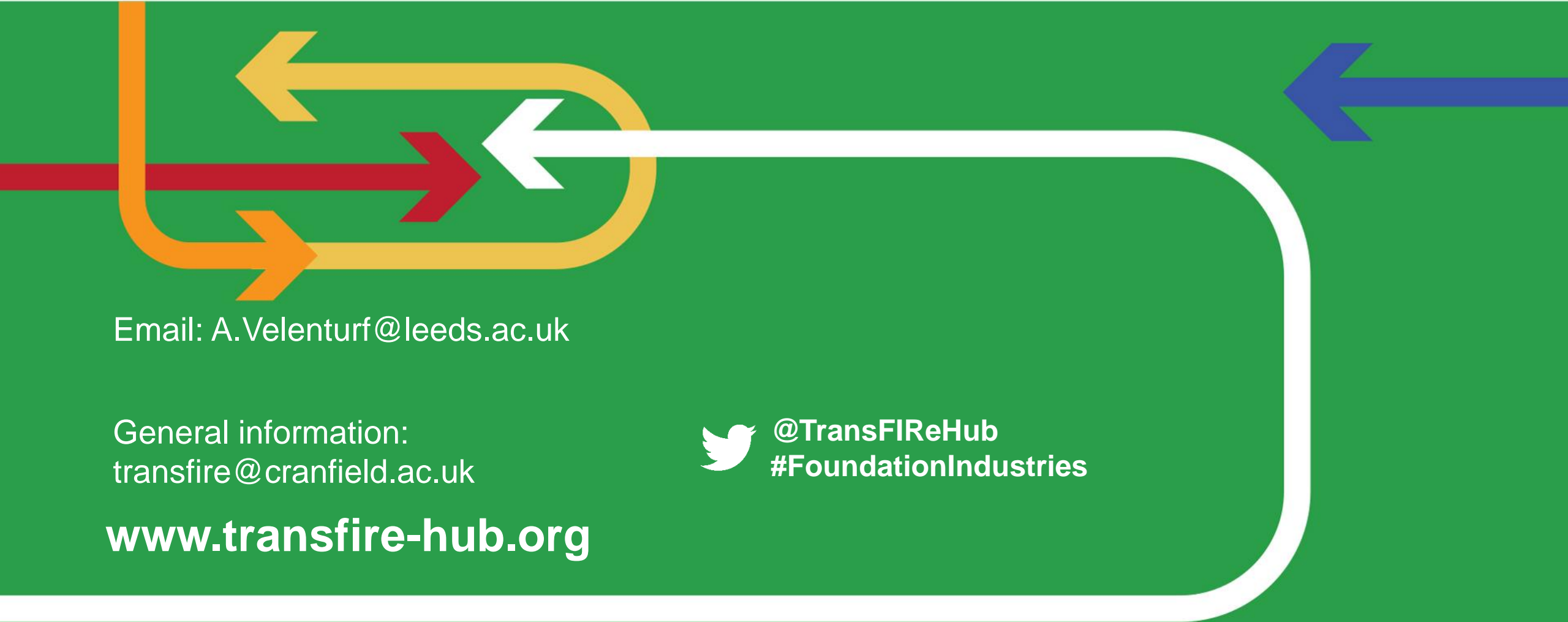
Data systems to enable quality
assurances ** recertification **

Disassembly





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