



Met4Tech

NICER PROGRAMME



UK Research
and Innovation

UNRMS Case Study: A Circular and Servitized Approach to Resource Management in the UK

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RESOURCE MANAGEMENT WEEK 2023
ASSURING SUSTAINABILITY IN RESOURCE MANAGEMENT



UNECE

Resources as a Service

Two views of 'sustainable mining'

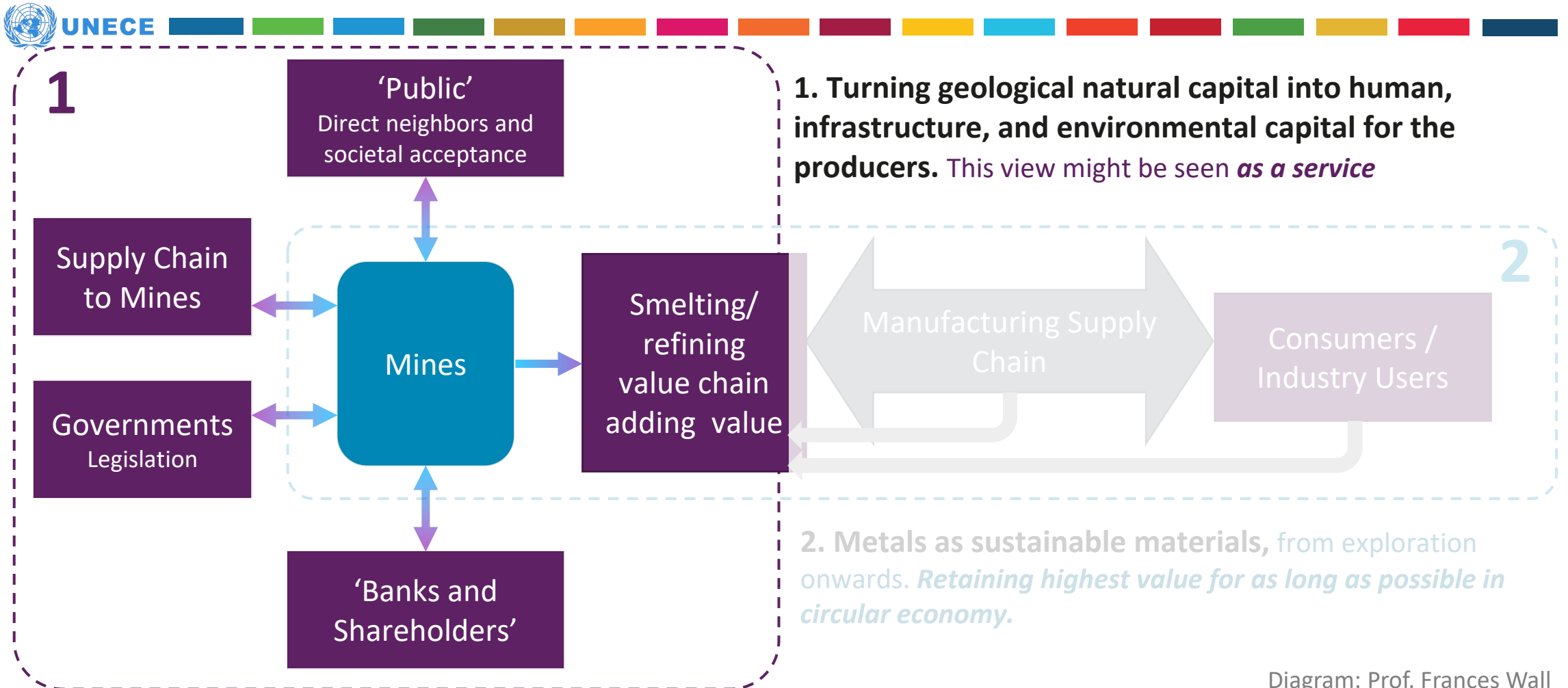
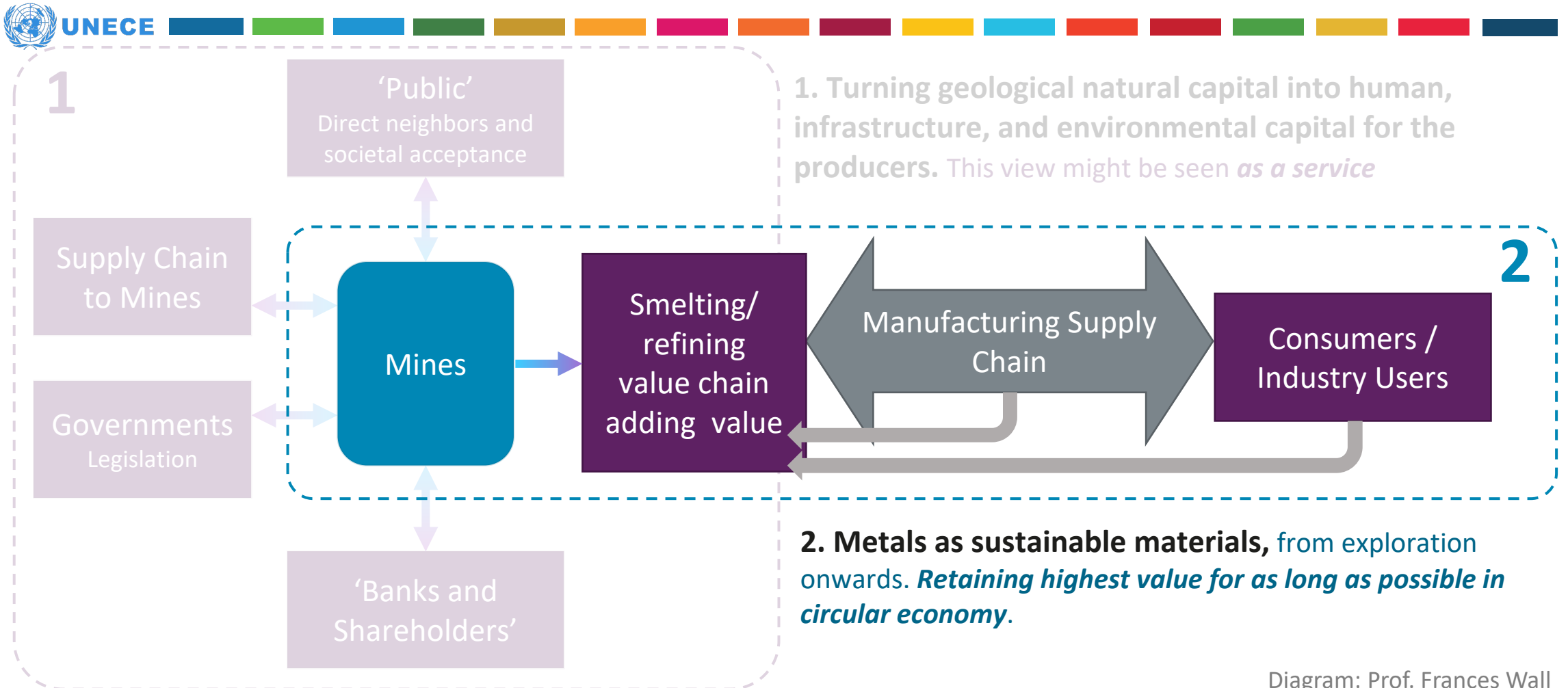


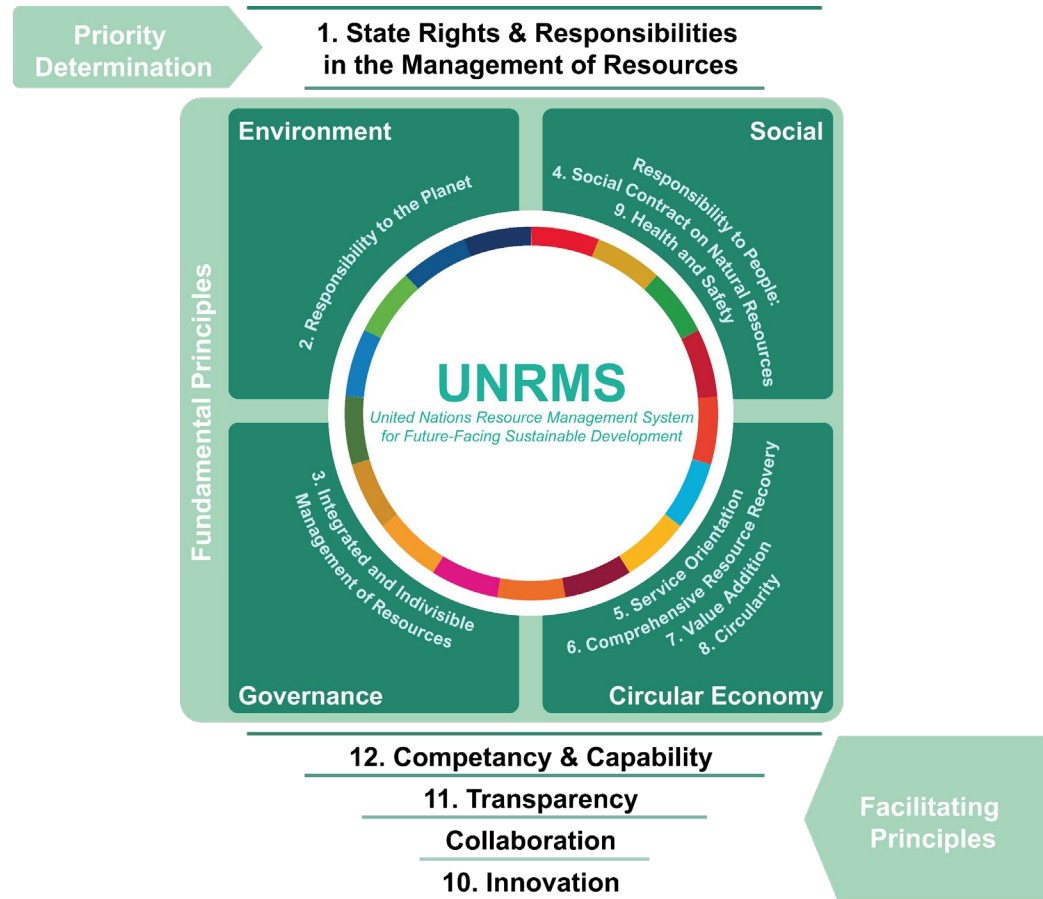
Diagram: Prof. Frances Wall

Resources as a Service

Two views of 'sustainable mining'



Framework for ensuring sustainable development



- Sustainable social, environmental and economic development
- Resources providing services to enable sustainable development
- Net positive impact of activity into perpetuity

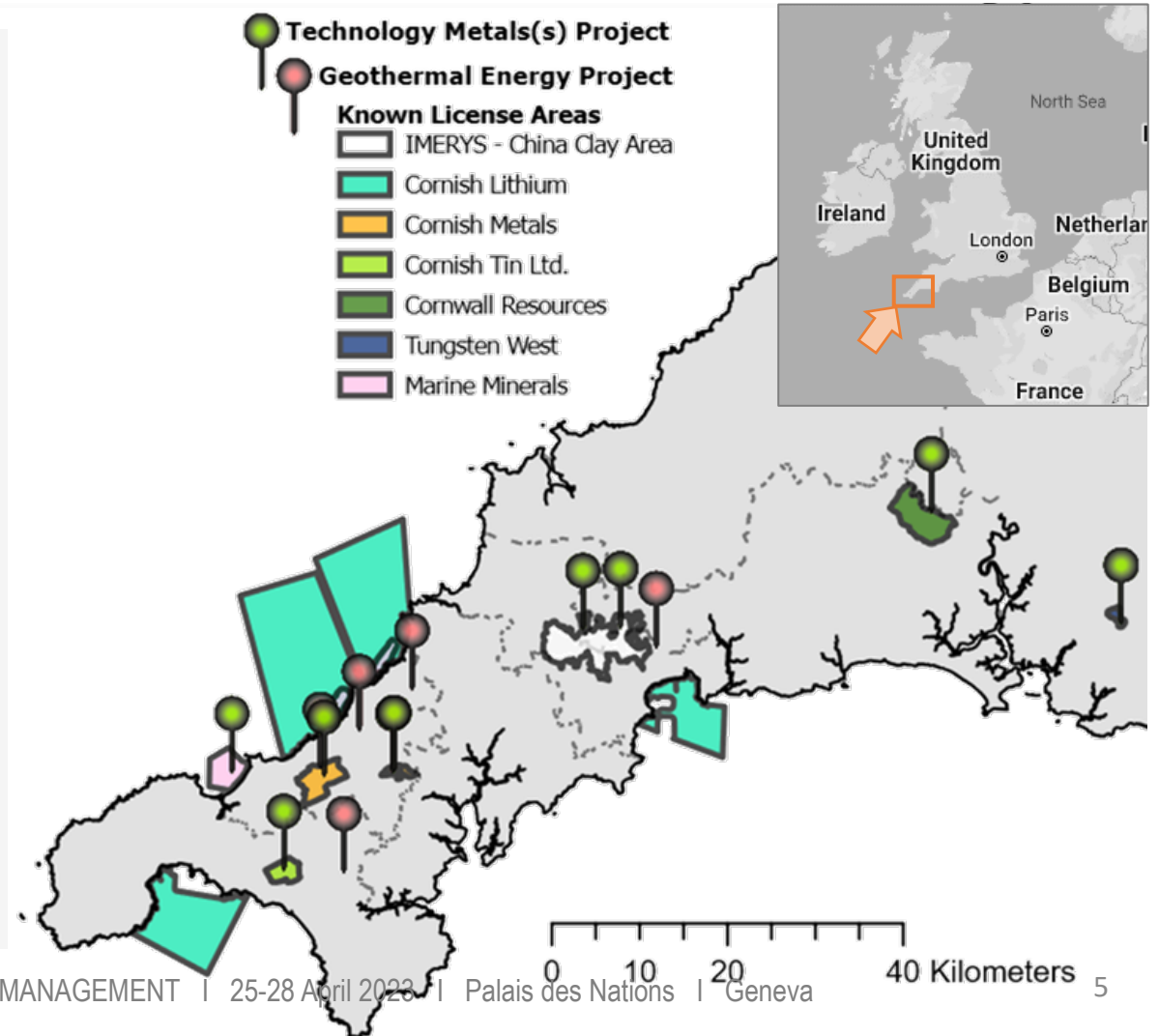
UNRMS adapted for Cornwall Case Study

Past & Present

Case Study: SW England's Critical Metals Industry



- Established kaolin mines
- Renaissance of exploration - technology metals (Li, Sn, W, Cu)
- Geothermal energy (deep & shallow in development)
- Floating offshore wind in development
- Natural environment
- Need well-paid jobs



Past & Present

Case Study: SW England's Critical Metals Industry



Photo Ainsley Cocks

- UNESCO Cornwall and West Devon Mining Landscape World Heritage Site
- 4,000 years mining: Tin, tungsten, copper... (Co, Ni, As, Sb...)
 - 1.6 million tonnes tin
 - 1 million tonnes copper

Where is it now?

Geo-Resources

A Spectrum of Services...



- Diverse set of “Geo-Resources” spanning natural and social capital

Each providing a service to society and the environment

Local Skills and Expertise: Sustainability, Circular Economy, Responsible Mining and Exploration, Mineral Processing, Environment, Social and Governance (ESG), Nature Regeneration, Renewable Energy, Blue and Green Economy

UNESCO World Heritage Site: Cornwall and West Devon Mining Landscape

Surface Quarrying: Kaolin, Lithium, Tungsten, Rubidium, Caesium, Potassium

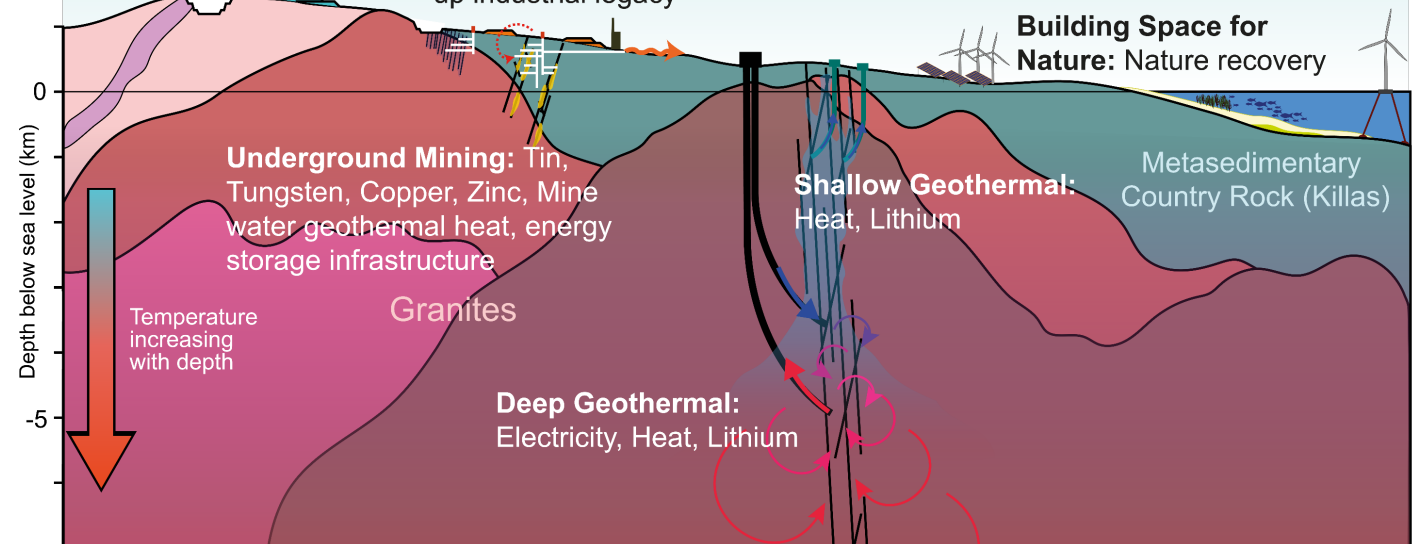
Agri/Aqua-Culture: Sustainable agriculture, aquaculture, and water resourcing practices

Remediation: Value-creation from cleaning up industrial legacy

Exceptional Natural Spaces: 250 km Heritage Coast, 167 SSSI, 12 Special Conservation Areas, 498 County Wildlife Sites, 9 Marine Conservation Areas, 20% UK’s designated bathing beaches

Renewables & Clean Energy: Floating Offshore Wind, Onshore Wind, Solar Photovoltaics, Bio-Methane, Geothermal

Building Space for Nature: Nature recovery

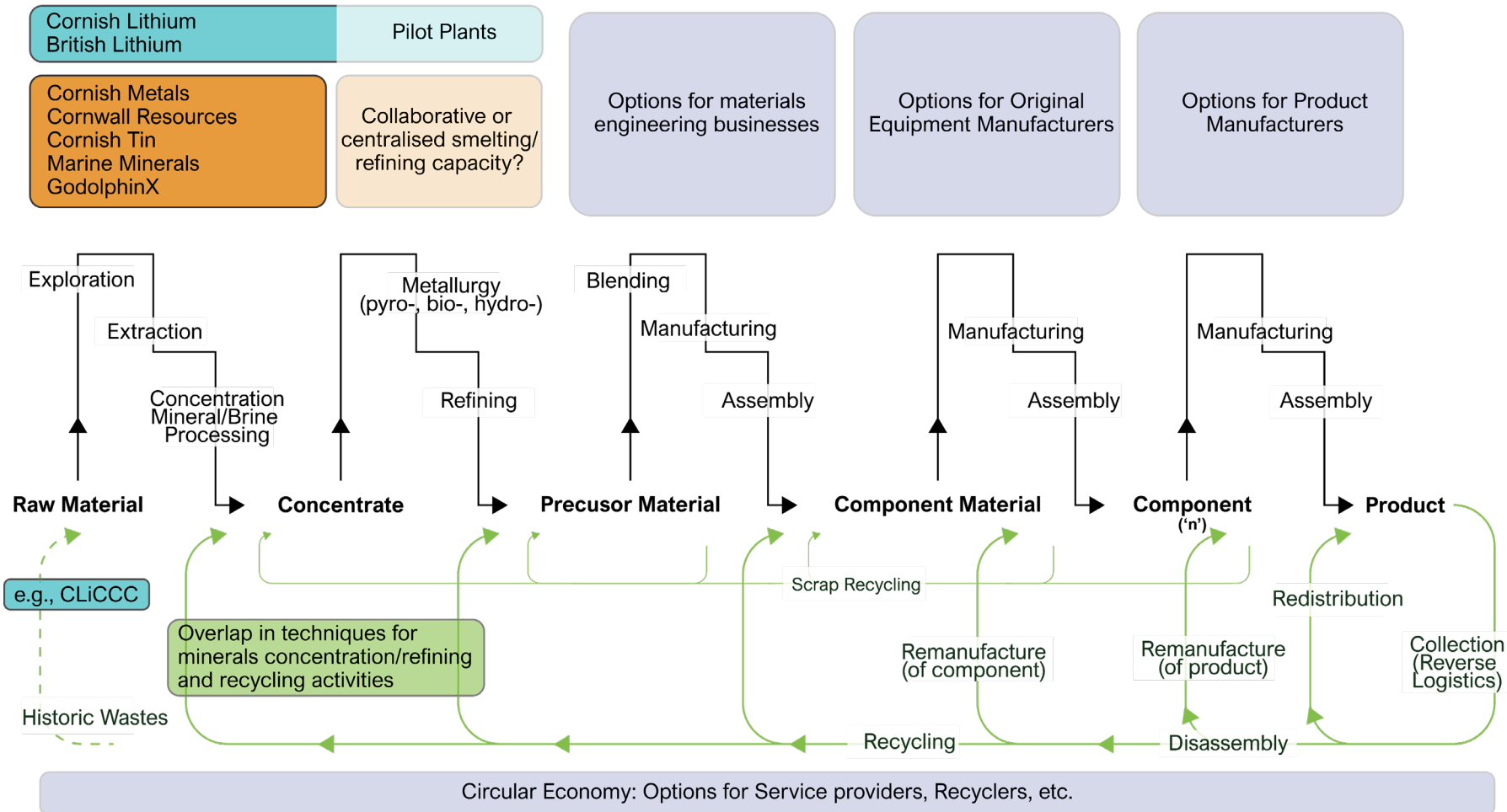


Circular Economy

Where do Critical Metals Fit? Where are the gaps?



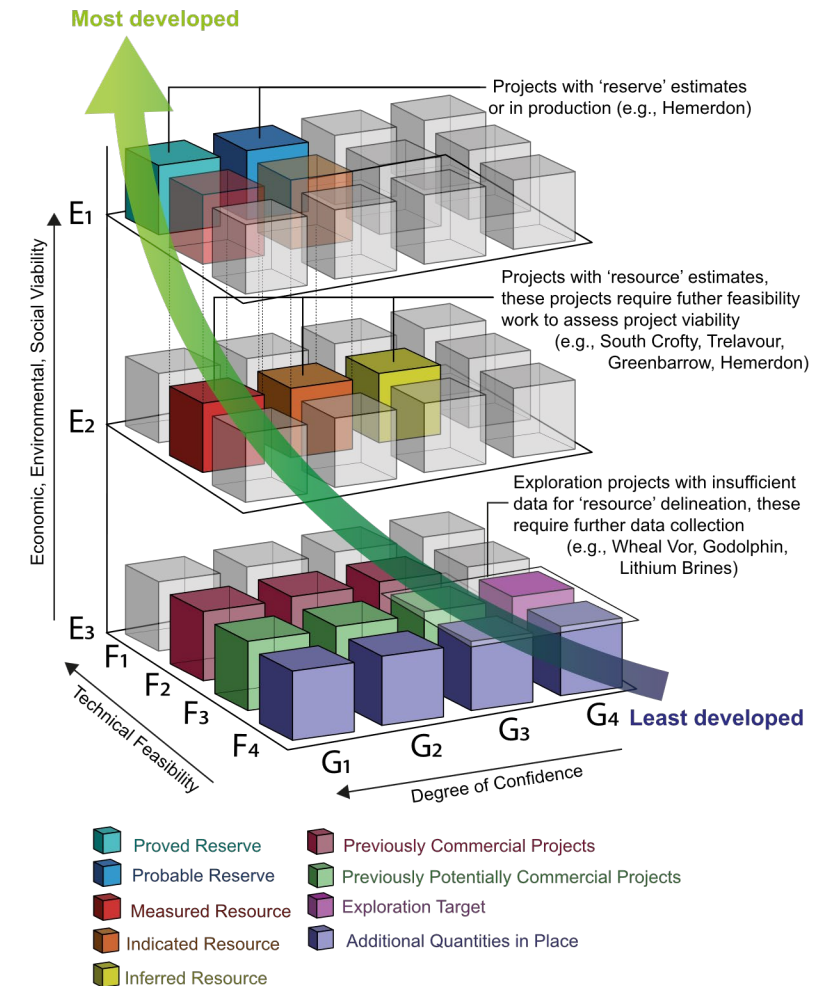
Adapted from: Weimer et al. (2019) Resource Policy 64: 101473



United Nations Resource Classification Framework



- Good understanding of development of primary resource projects...
- Further work necessary on the value chain and secondary resources for Circular Economy Development



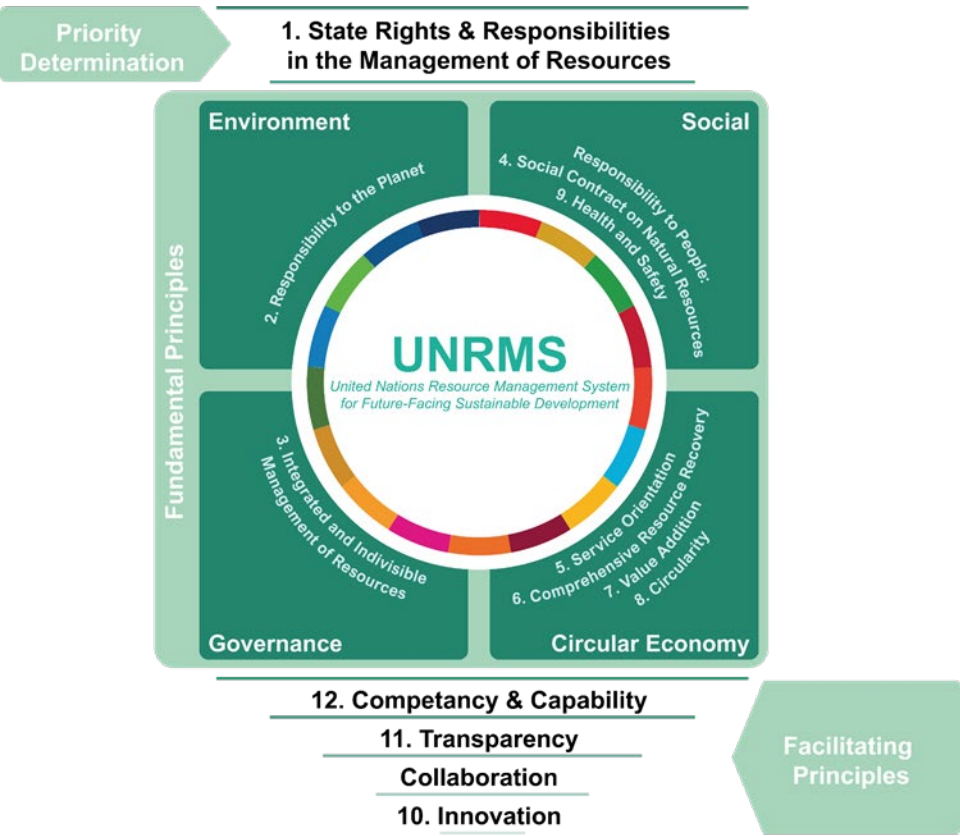
Priority Determination



Cornwall and Isles of Scilly Industrial Strategy Vision: "In 2030 the Cornwall and Isles of Scilly creative and carbon-neutral economy will be realising opportunities for its people, communities and businesses to thrive, benefiting the environment and providing an outstanding quality of life for all."

Next steps

...for a sustainable Critical Metals ecosystem



- Application of the UNRMS as matrix to highlight gaps in provisioning/knowledge for sustainable development
- Such as:
 - **Shared infrastructure** planning
 - **Central reporting/data** provisioning
 - **Strategic Environmental Assessments** for combined impact of resource projects
 - **Talent pipeline development** for local content

Pump-prime funding; cluster-development; education pathways; enabling good-practice; Best Available Technique (BAT) development; R&D opportunities etc.

Facilitating Actions



Further Work



More Circular Economy research into:

- Up- and down-stream value chain adaptations for circular/servitized business ecosystems
- Skills and capacity building for implementation
- System/Regional development impact modelling (environmental/social)

... next installment in Session 4: Empowering Sustainable Development, Friday 28th April, 10:00-11:00.

Prof. Frances Wall “A Proposal for Advancing Circular Economy, Resource Servitization and International Collaboration”





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Thank you!

Eva Marquis

Research Fellow – Met4Tech

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