



LUT

Lappeenranta

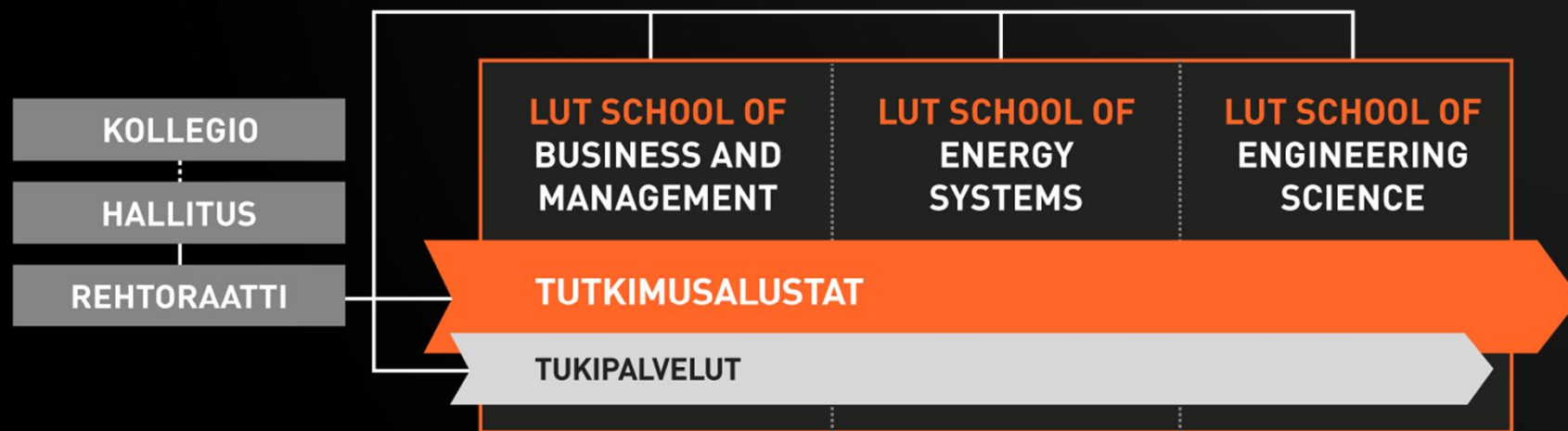
University of Technology



OPEN YOUR MIND

LAPPEENRANNAN
TEKNILLINEN
YLIOPISTO

RATKAISUKESKEINEN YLIOPISTO



ETSIMME VASTAUKSIA **AVAINKYSYMYKSIIN**

Poltammeko
kaiken
loppuun?

Hautaammeko
tulevaisuutemme
jätteiden mukana?

Jätämmekö
ihmiskunnan kärsimään
pilaamastaan vedestä?

Annammeko Euroopan
taantua maailman
takapihaksi?

EMME. **VAIKUTAMME UUDELLA TAVALLA.**

TIETEELLISET RATKAISUT

PUHDAS ENERGIA

- Energiamarkkinat ja aurinkotalous
- Energian muunto- ja varastointiteknologiat
- Kestävyytutkimus

KESTÄVÄ LIIKETOIMINTA JA YRITTÄJYYS

- Innovointi ja kestävä arvonluonti
- PK-yritykset ja kansainvälinen yrittäjyys
- Liiketoiminnan analytiikka ja päätöksenteko
- Yritysten digitalisaatio

KIERTOTALOUS

- Veden puhdistus ja uudelleenkäyttö
- Kierrätetyn ja uusiutuvan raaka-aineen käsittely
- Tuotteet ja elinkaariarviointi

POIKKILEIKKAAVAT TEEMAT

- Digitalisaatio ja datatiede
- Kärkialojen tutkimus Venäjän kontekstissa ja parhaiden venäläiskumppaneiden kanssa

ARVOMME | ROHKEUS MENESTYÄ. INTOHIMO LUODA UUTTA TIETEEN AVULLA. TAHTO RAKENTAA HYVINVOINTIA.

LUT RATKAISUKESKEISET PLAFORMIT

SAWE - Safe water for all

DIGI-USER – Smart services for digital infrastructures

REFLEX – recycling carbon in a flexible competitive energy system

RED – Revealing emission discrepancies

SIM – sustainable product processes through simulation

RE-SOURCE- Resource efficient production processes and value chains

LUT PLATFORM



LUT RE-SOURCE

- Resource efficient production processes and value chains

Platformin johtaja, Associate Professor Mari Kallioinen
Mari.Kallioinen@lut.fi, Tel. +358 40 5939 881

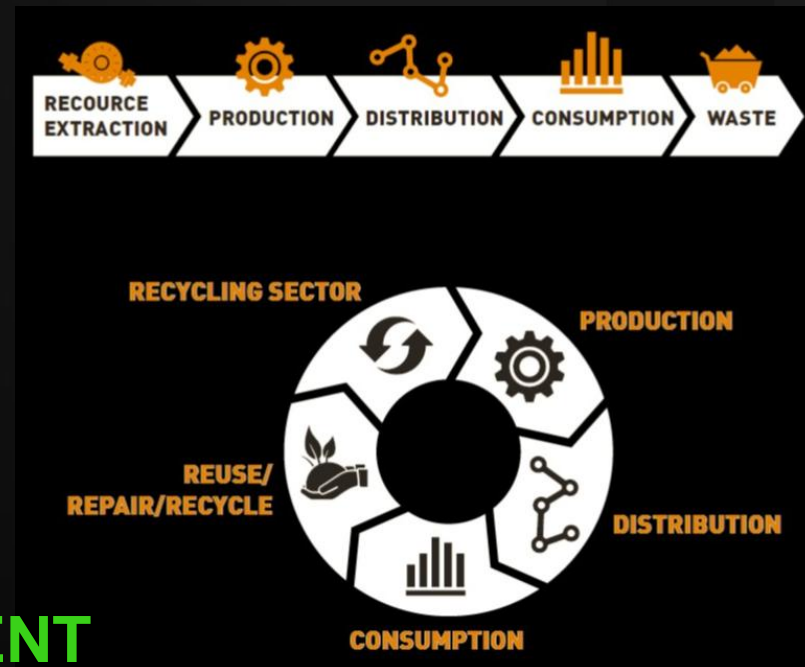
LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

LUT RE-SOURCE

WHY?

From **LINEAR ECONOMY**
to **CIRCULAR ECONOMY**

From **WASTE MANAGEMENT**
to **RESOURCE MANAGEMENT**



LUT RE-SOURCE

SOLUTION

Novel separation and purification processes that achieve new level on

- Raw material efficiency
 - Optimised use of water and energy
- and enable the cost-efficient and sustainable use of waste as a resource



Sustainable business models and understanding on customer needs and market knowledge in the future world

BIOMASS

METALS

NUTRIENTS

WATER

ENERGY

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY



LUT RE-SOURCE platform

BUSINESS & MARKETS

DEVELOPMENT OF SUSTAINABLE TECHNOLOGY

BIOMASS

METALS

NUTRIENTS

- Local or centralized?
- Bottlenecks?
- Customers & Prices?
- Changes in the market situation?

- Non-food processes for the replacement of oil-based polymers and chemicals
- Processes for recycling of high-tech metals

- Under-utilized harvested biomass
- Bio-based sidestreams
- High tech metals

IMPACT ON SOCIETY



Material and energy cost savings Decreased amount of waste discharges Decreasing the risks related to prices New jobs in EU New businesses and SMEs

No downgrading of materials Increased recycling rate Diversified product portfolio New applications for processes

IMPROVEMENT OF RESOURCE EFFICIENCY

Research areas and goals

KNOWLEDGE & DEVELOPMENT IS NEEDED

Politics, laws, rules, regulation NOVEL TECHNOLOGY (LUT) BUSINESS DEVELOPMENT (LUT) Safety of the novel materials and processes

Customer behaviour, development of society SUSTAINABILITY SCIENCE (LUT) Available resources, new material sources

The Team



Docent, Assoc. Professor
Dr Mari Kallioinen
Platform Leader



Docent, Assoc. Professor
Dr Jutta Nuortila-Jokinen
Sustainable business through
resource-efficient processes and
value chains



Dr Ikenna Anugwom
Biomass compounds
for novel applications



Dr Anne Vuorema
Project manager.
Expert in Research Services and
LUT Brussels Representative

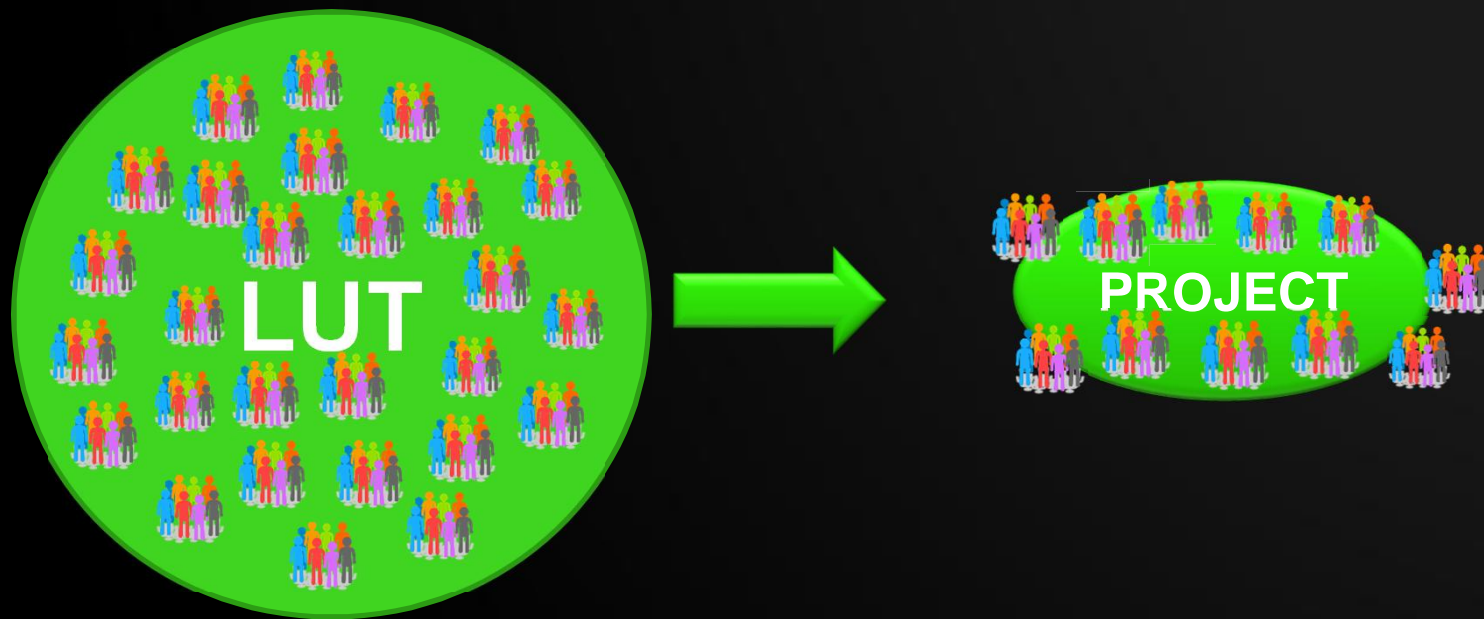


Dr Ville Lahtela
Mechanical recycling
technologies



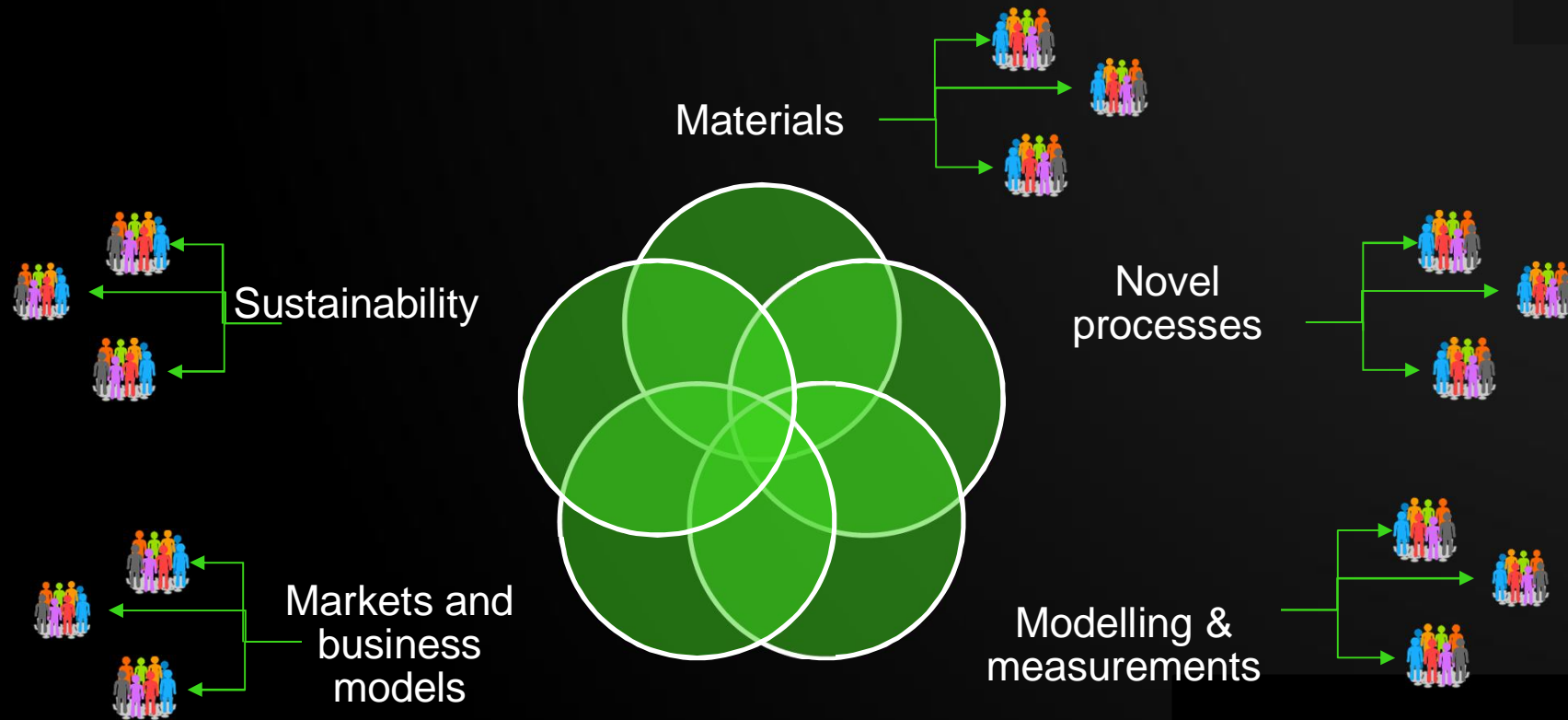
LUT RE-SOURCE platform

Internal way of working

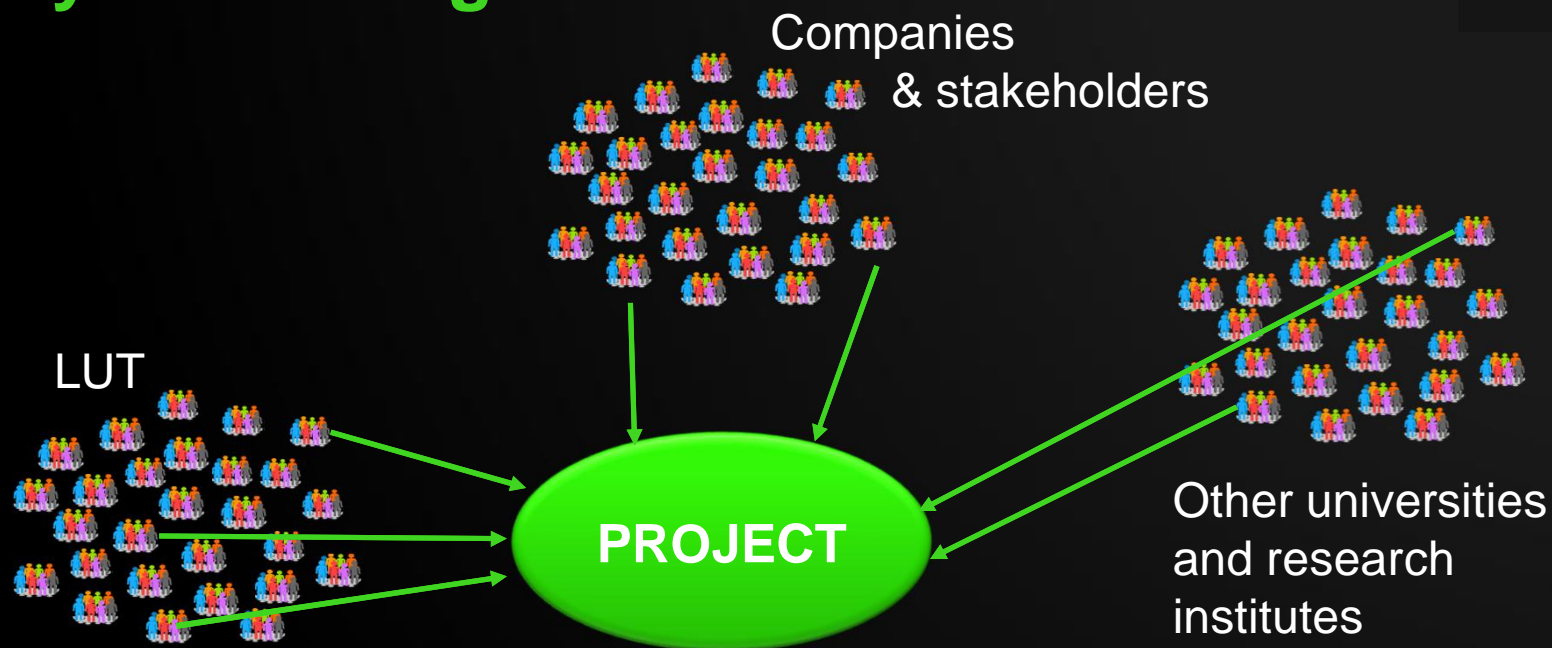


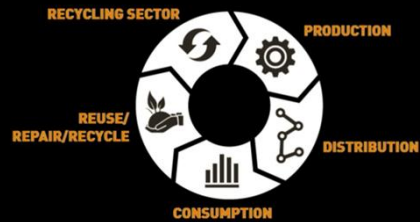
Research teams

consist of 19 research groups working in LUT



LUT RE-SOURCE platform
Way of working





RE-SOURCE platform in action

RAKENTAMINEN | Jukka Lukkari 11.10. klo 10:02

Lappeenranta kehittää betonille vähemmän saastuttavaa korvaajaa – EU:lta 3,4 miljoonan rahoitus

Rakennuslehti | 11.10.2017 klo 14:48 | Ei kommentteja

KOULUTUS JA TUTKIMUS

Nyt etsitään betonille korvaajaa – Lappeenrantaan miljoonapotti EU-rahaa

Lappeenrannan kaupunki ja teknillinen yliopisto ovat saaneet miljoonarahoituksen tuotekehitysprojektiin, jossa kehitetään uudenlaista rakennusmateriaalia ja kaupunkikuvaa.

PAIKALLISET

Lappeenrannalle merkittävä rahoitus: EU myönsi rahaa betonin korvaajalle

Colourbox



Urban City 2050

Urban Infra Revolution - UIR

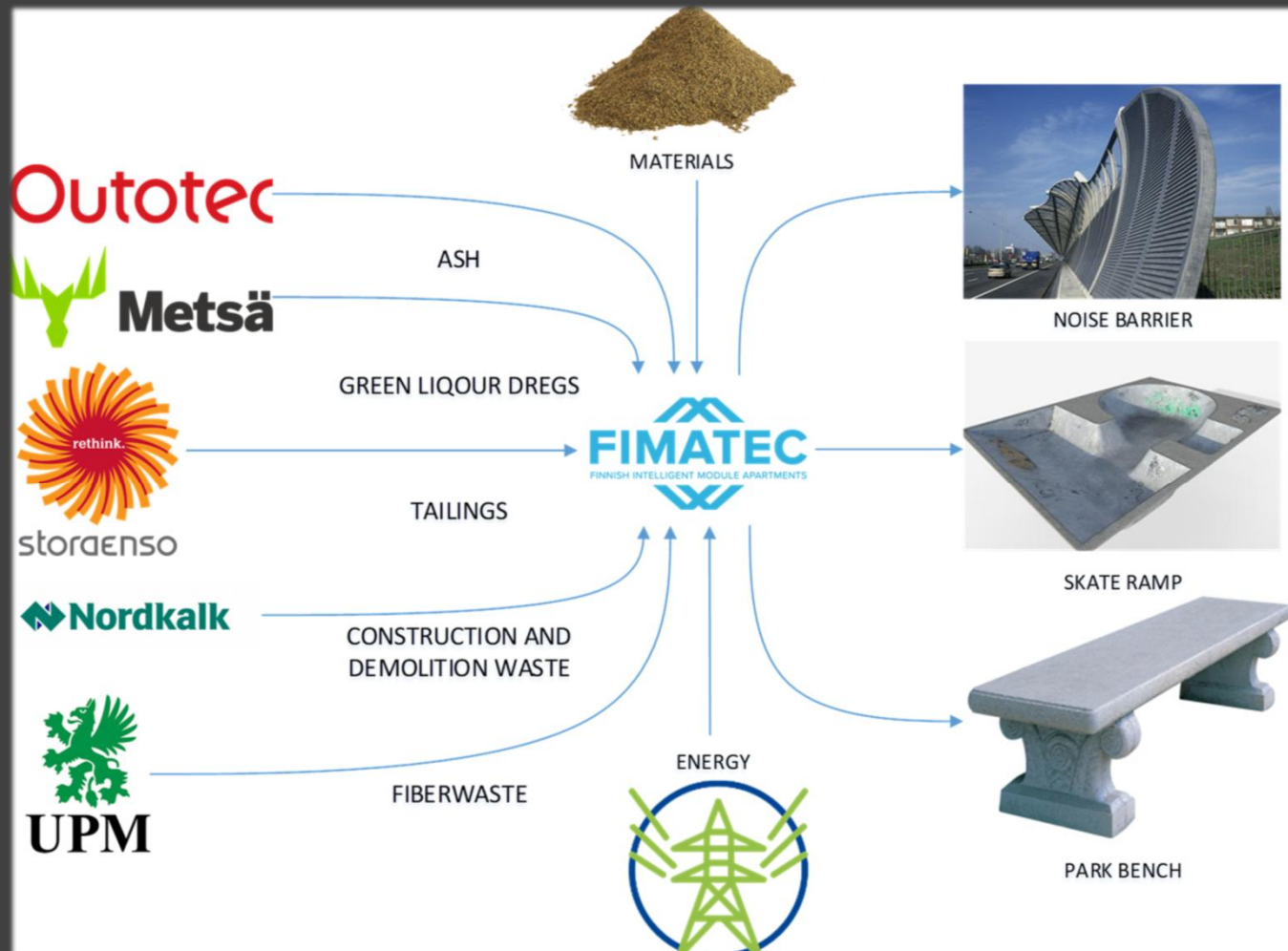
1.11.2017-31.10.2020




Urban Infra Revolution (UIR) project is co-financed by the European Regional Development Fund through the Urban Innovative Actions Initiative



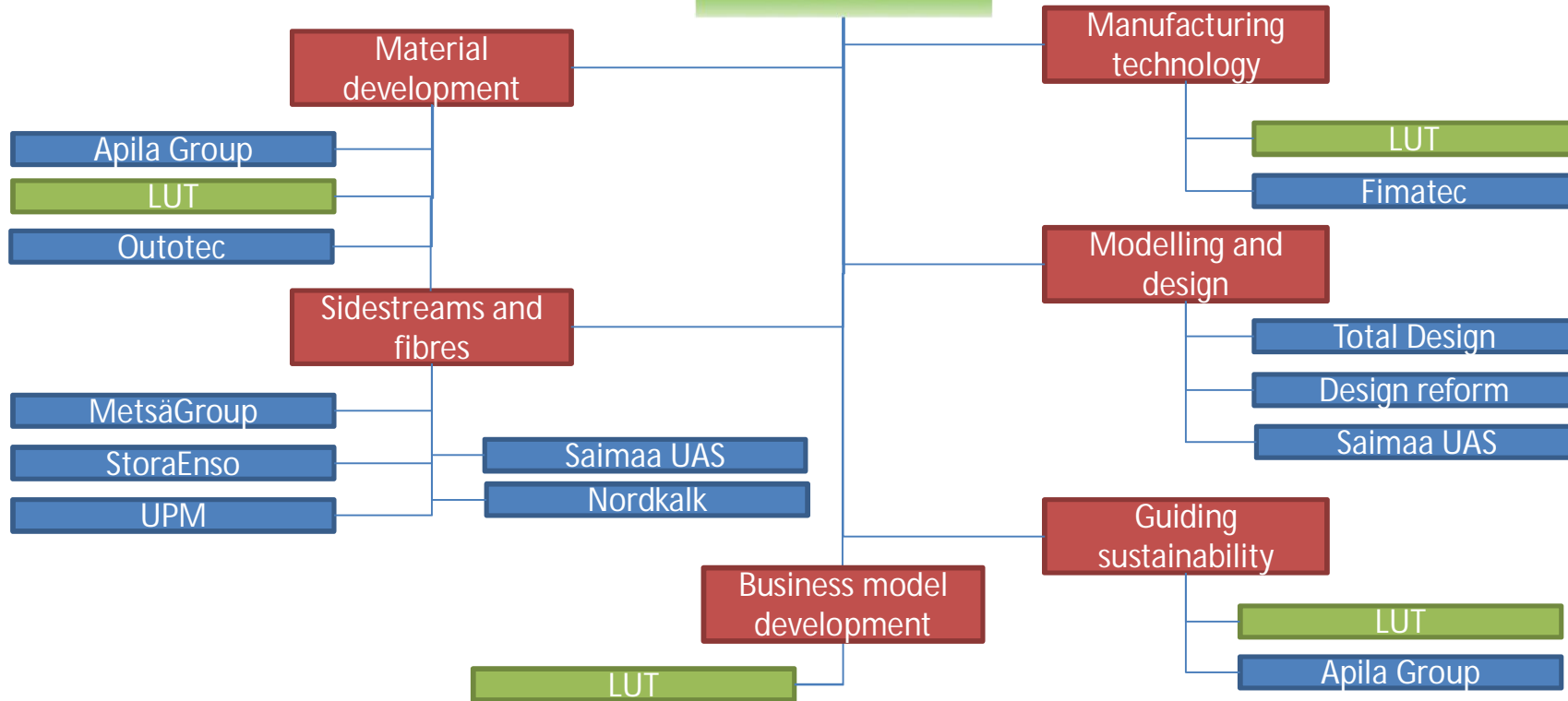
Urban Infra Revolution



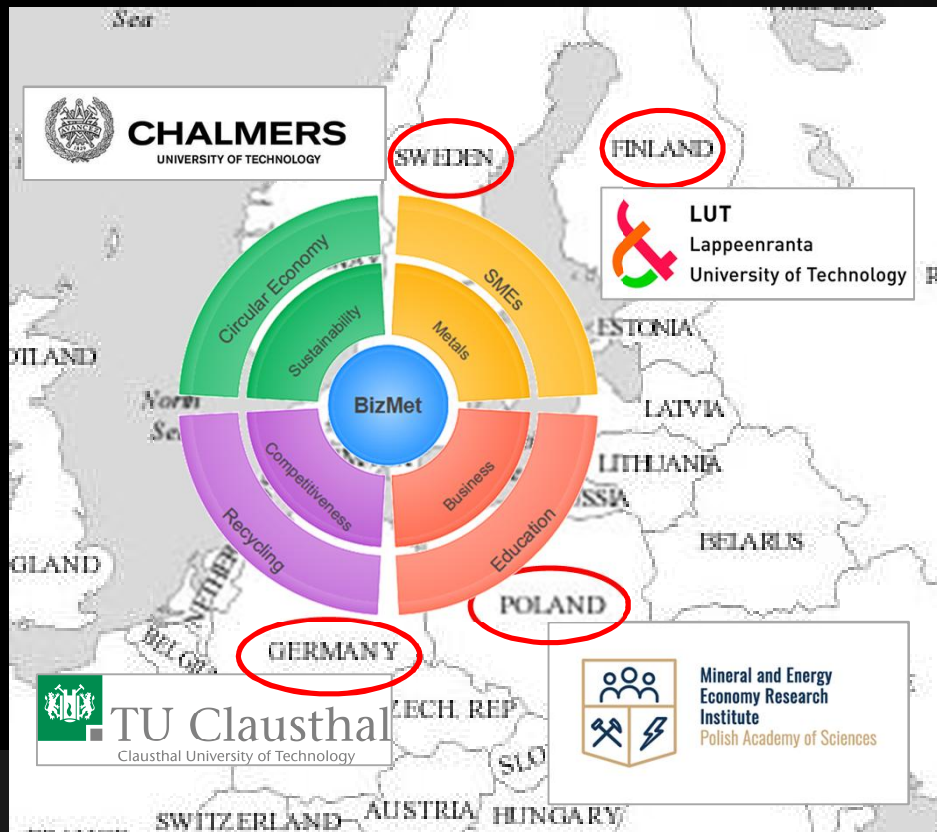
Clean
Low-carbon



Quiet
Durable



COMPETITIVE SUSTAINABLE BUSINESS FROM METAL RECYCLING - BizMet



BizMet -programme is to promote ecosystemical change into circular economy, industrial symbiosis as well as new sustainable technology and business model approaches in EU by

- accelerating knowledge transfer and adoption between SMEs and universities/research institutes through active co-operation and learning
- educating MSc and PhD students as well as industrial professionals through a dedicated doctoral level course with experts from both academia and industry

- EIT Raw Material KAVA education project
- A 2-year programme, implementation 2018-2019
- Programme combines life long education and PhD education in a novel way
- Total budget c. 300 k€

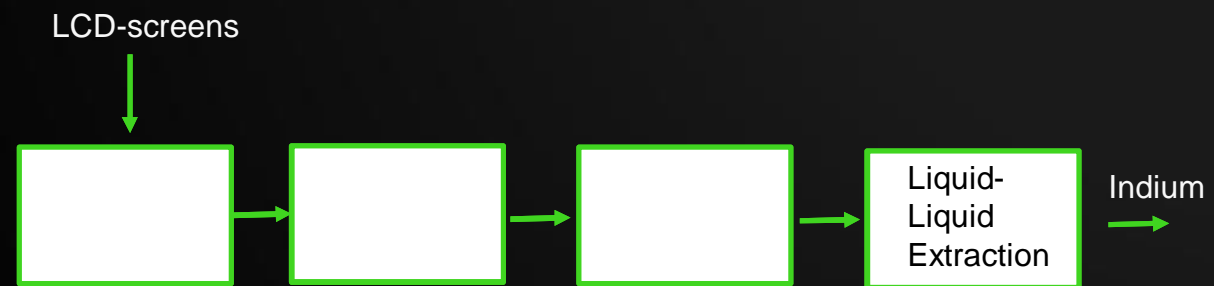
Sustainable and cost-efficient recycling processes for urban mining



Example: Different approaches for recovery of Indium from LCD screens



Photo: Tuomo Sainio



Development of novel DES based fractionation process for wood biomass



- Cellulose, hemicellulose and lignin fractions for further use & novel products from them (*separation matrices*)
- Novel Solvents & Waste as a resource
- Purity & characteristics of the produced biocompounds
- Simple and "greener" process compared to the traditional ones, recycling of solvents

Chance in recycling fiber materials – novel technologies and business models to enable their efficient reuse

PURASU – Value from Saw dust for Finland



- 3.9.3018-31.12.2020
- EAKR-funding
- Demonstration of PURASU-process and preparation of commercialization of the process in South-Carelia

