MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

Composite recycling in Finland

KiMuRa Route

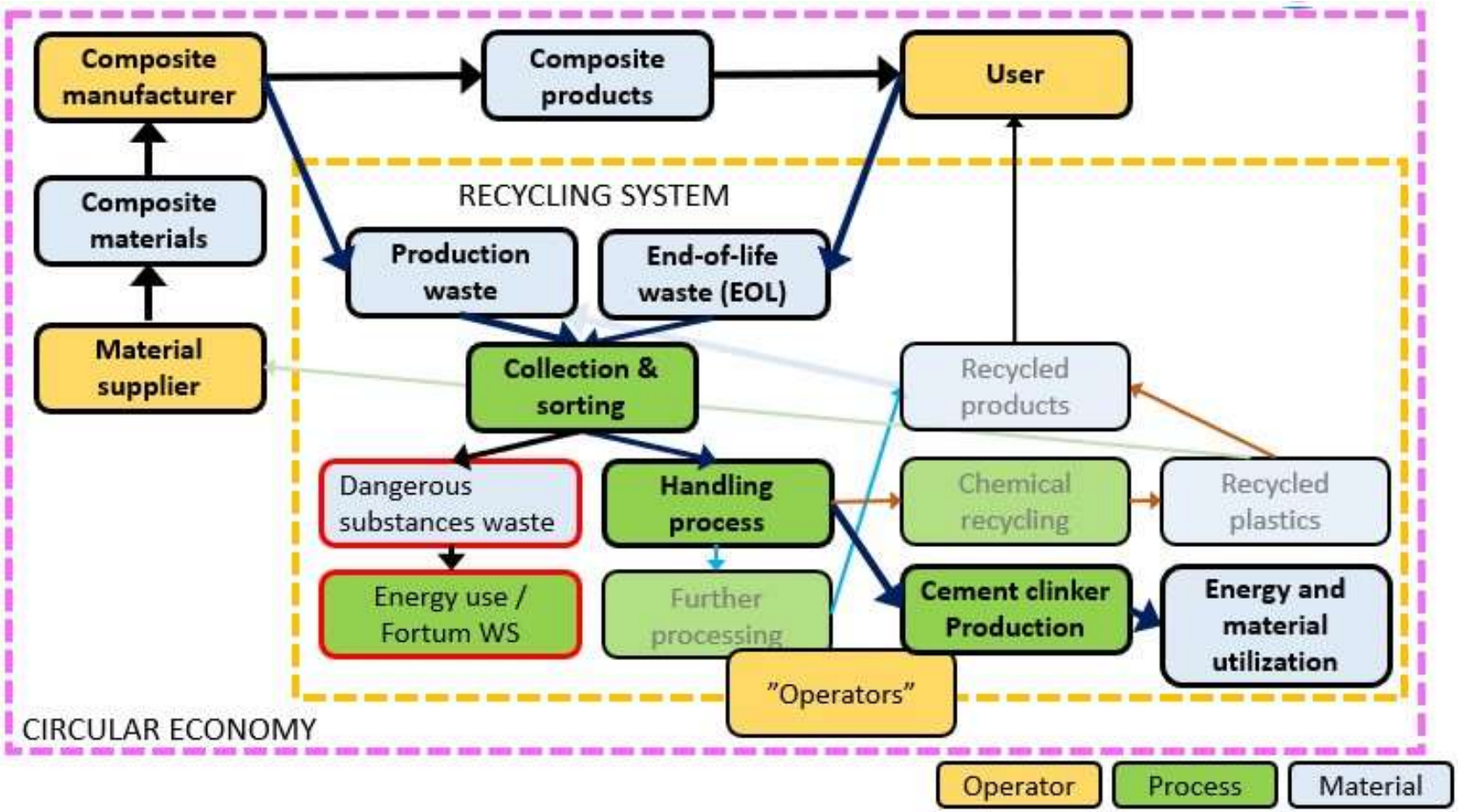
Collected, shredded composite waste
for co-processing in cement industry

Pirjo Pietikäinen
Finnish Plastics Industries Federation
Composites Group

GlassCircle Final Conference
September 26th, 2024
Riga

The Circular Economy Model for Composites Products

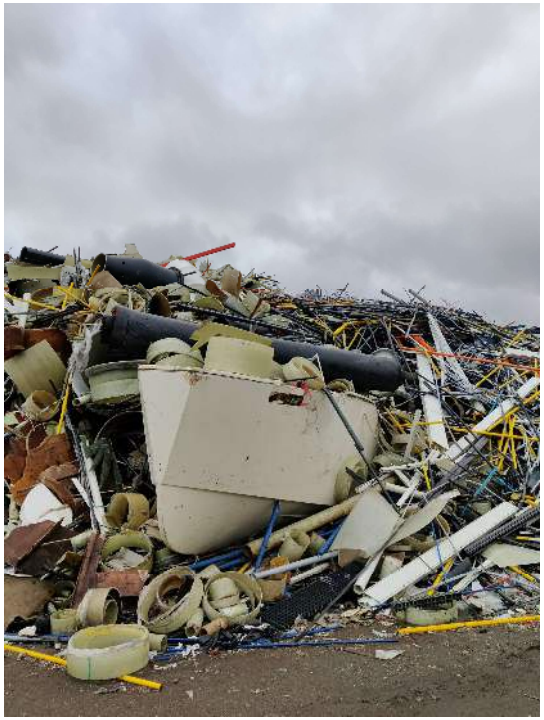
MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation



Development

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

- Initiative form industry 2020
  - Two trials earlier 2012 and 2014
- Landfill ban for organics 2016
- Year 2023 1000 tons waste recycled
  Year 2024 2000 tons expected
- EOL products recycled
  - Windmill blades, boats, process pipelines, gas bottles, skies…



Recycling technologies for Composites

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

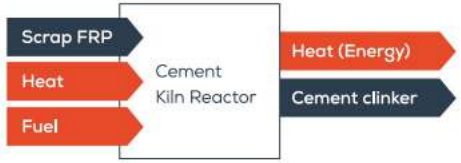
- Mechanical grinding
  - Mixing e.g. with thermoplastics
- Pyrolysis
- Electromechanical treatment
- Solvolysis
- Fluidized bed
- Use in a co-processing in cement production

Cement route
in composite waste recycling

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

- The glass fibre in composite will be mineralized into raw material of clinker
  - Replaces silicates (limestone etc.)
  - On average > 60% in fibre reinforced plastics ≅ Recycling
  - NO ASHES!
- The resin replaces fossil fuels with other SRF

- A good video explaining the cement route
  https://www.youtube.com/watch?v=Oeosm8KeXjw&t=5s



Discussion about the cement route

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

- The amount of composite waste is too small?
  - Finnsementti Oy: It is easy to run composite as side stream
  - Plastic in composite does not play an important part of SRF
- Dust during processing
  - There are technologies to solve this i.e. water mist
- Transporting big parts like windmill blades
  - Mobile cutting systems

Practical advice for companies starting (composite)waste collection

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

- Plan the collection on site
  - Bins inside production area and labs
  - Large dumpsters outside, covered
  - Transportation to recyclers

- Important to involve workers
  - Clear instructions
  - Checking of bins is important in the beginning
  - Developing the procedures

Example of instruction sheet

SORTING OF COMPOSITE PRODUCTION WASTE

Suitable

- laminated waste pieces (containing wood)
- core materials NOT CONTAINING CHLORINE e.g.: Coremat, Gurit Kerdyn Green

IMPORTAT! KEEP ALL THE MATERAL DRY!

Contact the recycler before sending in

glass fibre matt

polymerized resin

Not suitable for recycling

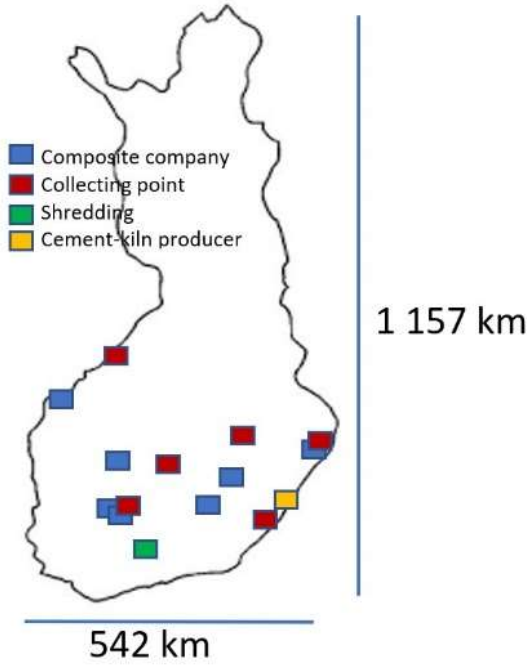
- PVC
- core materials containg chlorine (e.g. Divinycell)
- structures containing chlorine
- metal parts
- inorganic materials, stone, tiles etc.
- wood, carat board, paper
- paint, varnish, glue
- hoses
- shoes, clothing, equipment

KiMuRa: It works out!

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

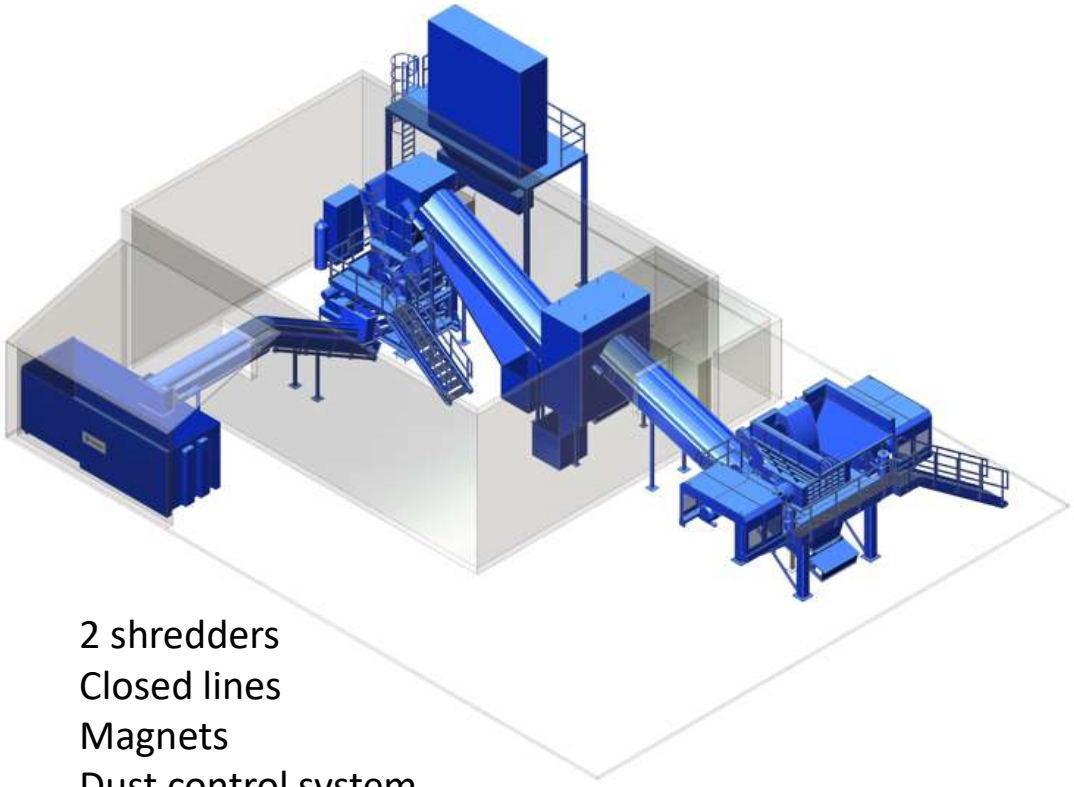
- Compsite companies
  - Collect their waste as advised
    - The cement industry sets the rules
  - Organize the transportation of composite wase
    - Might be different location that the mixed waste
  - The largest ones are delivering to KiMuRa
- Kuusakoski Oy
  - All 17 locations ready to take composite waste
  - Optimises the shredding and logistics
- Finnsementti Oy
  - Runs co-processing as usual
- The first trials with windmill blades, summer 2022
  - In Finland larger amounts of windmills will come to EoL in 2030's
- BUT: System for collecting from consumers is missing

Situation in the beginning of KiMuRa



Development steps

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

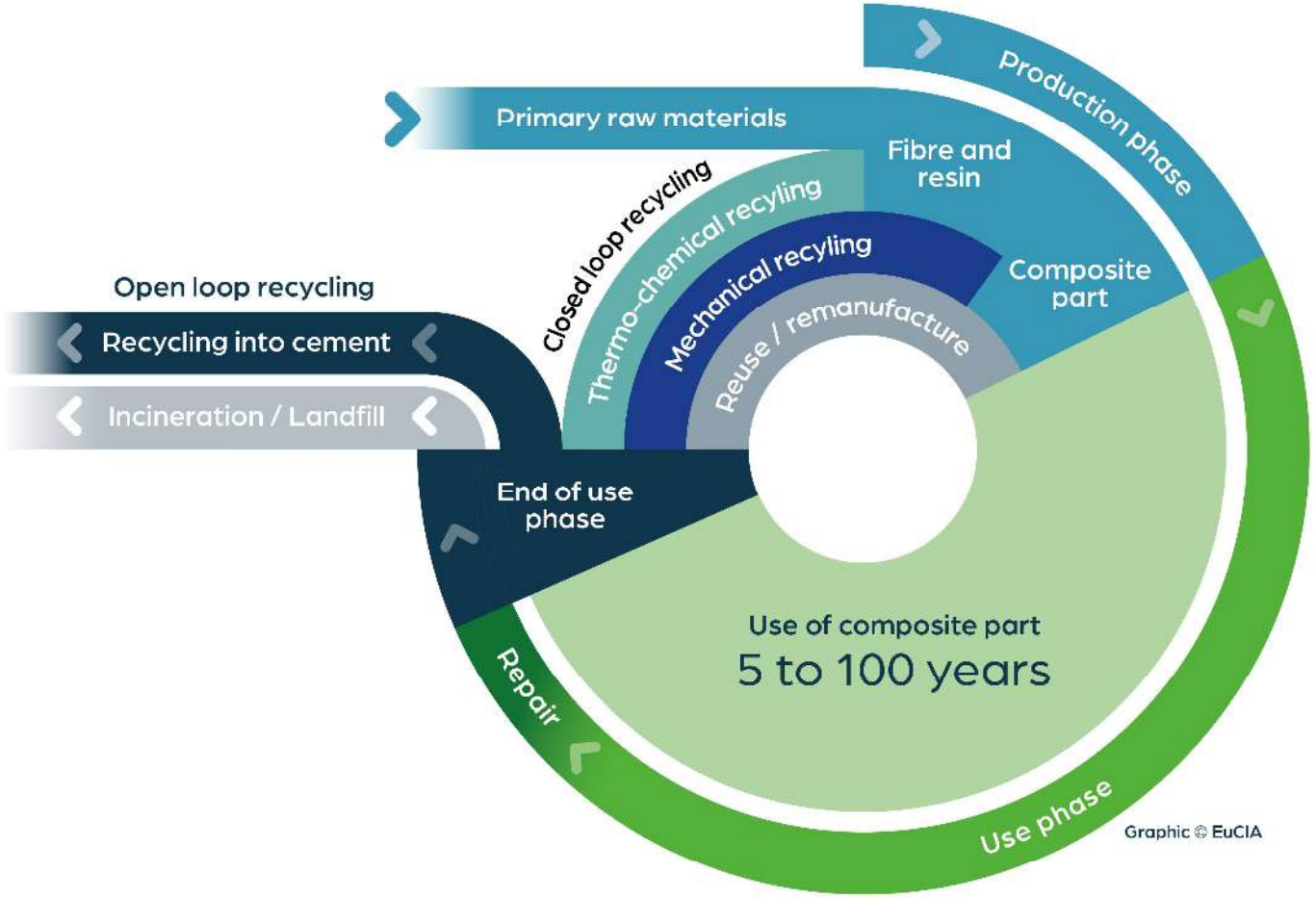


2 shredders
Closed lines
Magnets
Dust control system

- The recycling company has built a new shredding process
  - Financial support from BF 35 %
  - New technology
  - Possibility to increase the capacity up to 10 000 tons
  - Test runs in July 2024
  - Full capacity ready in September 2024
- 50 % of composite companies are using KiMuRa-route
  - All the big ones are in

https://eucia.eu/

MUOVITEOLLISUUS RY
KOMPOSIITTIJAOSTO



Information and contact

MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

- https://www.plastics.fi/kimura/(in Finnish)
- https://www.plastics.fi/kimuraeng/

- Pirjo Pietikäinen
  Finnish Plastics Industries Federation
  Composite Group
  pirjo.pietikainen@plastics.fi