



# Public waste management as a platform for circularity of textiles

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# Municipal waste management company

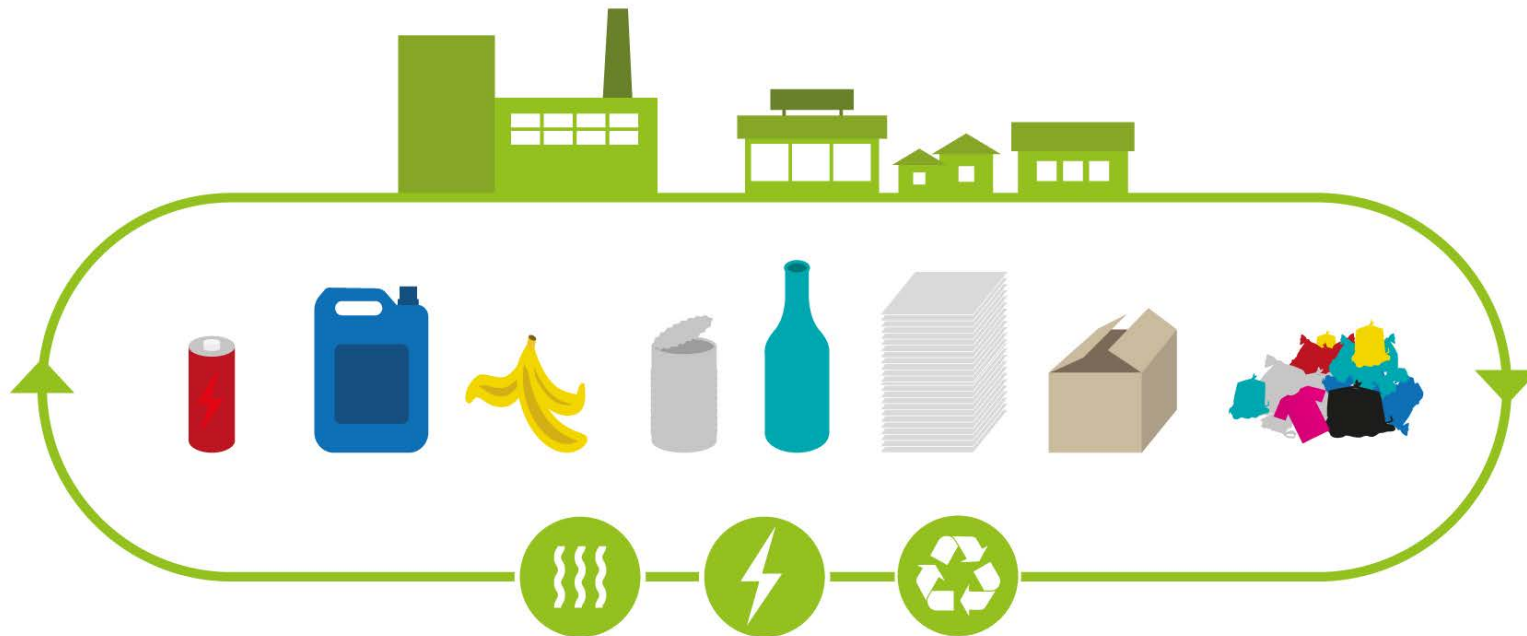
- Located in South-West Finland
- Collecting post-consumer textiles
  - Whole operating region (17 municipalities) since 2016
  - In cooperation with Turku University of Applied Sciences
- Goal is to establish a post-consumer textile refinement plant in the year 2020





# Household waste management

98% of municipal waste is utilised as materials and energy



?



Textile is the only high value fraction left in mixed municipal waste



# Key thoughts

## Municipal waste management companies:

- Are responsible for residual waste - also textile waste
- Guided by waste hierarchy and waste prevention
- Are innovative partners, pioneers and circular economy platforms
- EU requirement for separate collection of textile waste in 2025 (2023 in Finland?)
- National and international cooperation
  - Between public waste management / research / industries



# Development approaches

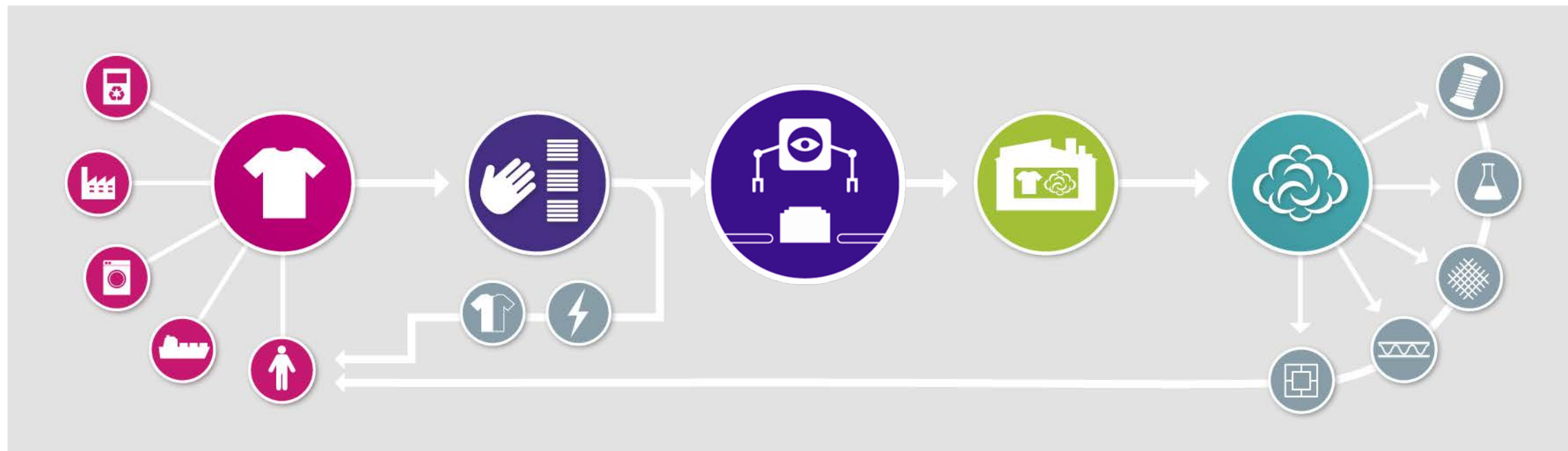
## Simultaneous development:

1. Separate collection and pre-sorting of post-consumer textile
2. Sorting and refinement plant
3. Cooperation with stakeholders and industrial partners





# Comprehensive solution



COLLECTION

PRE-SORTING

OPTICAL  
MATERIAL  
IDENTIFICATION  
AND SORTING

REFINEMENT  
PLANT

FROM FIBERS  
TO FINAL  
PRODUCTS



# Nationwide operating model

- mutual practices in collection

- Collection at waste treatment centers / sorting stations
- Supplementary collection schemes:
  - Flea markets
  - Supermarkets / shopping centers
  - Clothing stores
    - take-back models in cooperation with the local MWMC or directly with LSJH?
- Handling services for businesses





# Nationwide operating model

- mutual practices in sorting operations

- Regional pre-sorting with local partners (non-governmental organizations)
  - All textiles to be sorted with same instructions
- Sorted textiles are transported to the pilot refinement plant in Turku
  - Handling contracts and shared costs between MWMC's
- Development of collection and presorting is synchronized to the refinement plant schedule
  - Expansion to nationwide textile collection is to be organized in phases by 2023





# Optical material identification



- Hand-held NIR devices to supplement manual sorting
  - Development with Finnish technology partner Spectral Engines
- Able to separate monomaterials from blended textiles
  - ✓ purity requirements for recycling technologies
- Schedule:
  - 2019: development, testing and validation of results
    - Evaluation for operational suitability
  - 2020: operational test phase
    - Devices shared with partners in multiple locations



# Refinement plant



Sorting



Cutting



Hard parts removal



Opening the fibers

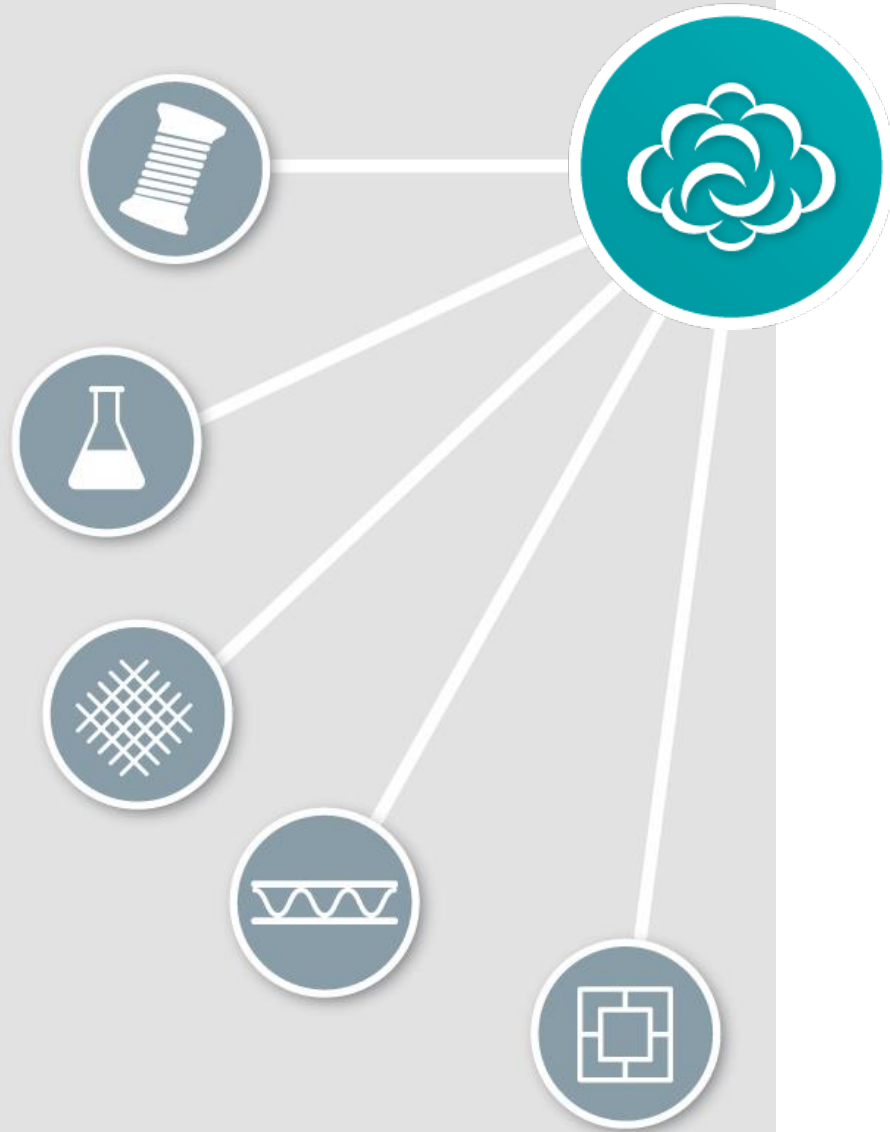




# Schedule and possibilities

- Pilot plant 2019 - 2021
  - Funding granted by Business Finland and Ministry of Economic Affairs and Employment
  - Co-funding by 29 public waste management companies
  - Capacity from 1 000 up to 5 000 Tpa
- 2021- 2024 Finnish full scale refinement plant
  - Capacity to match national textile volumes and needs
  - Capacity from 5 000 up to 20 000 Tpa
  - Nordic co-operation - interests and needs
- 2024 - Nordic/Baltic refinement plant?
  - Services for Baltic Sea region
  - Capacity increase from 20 000 up to 100 000 Tpa?





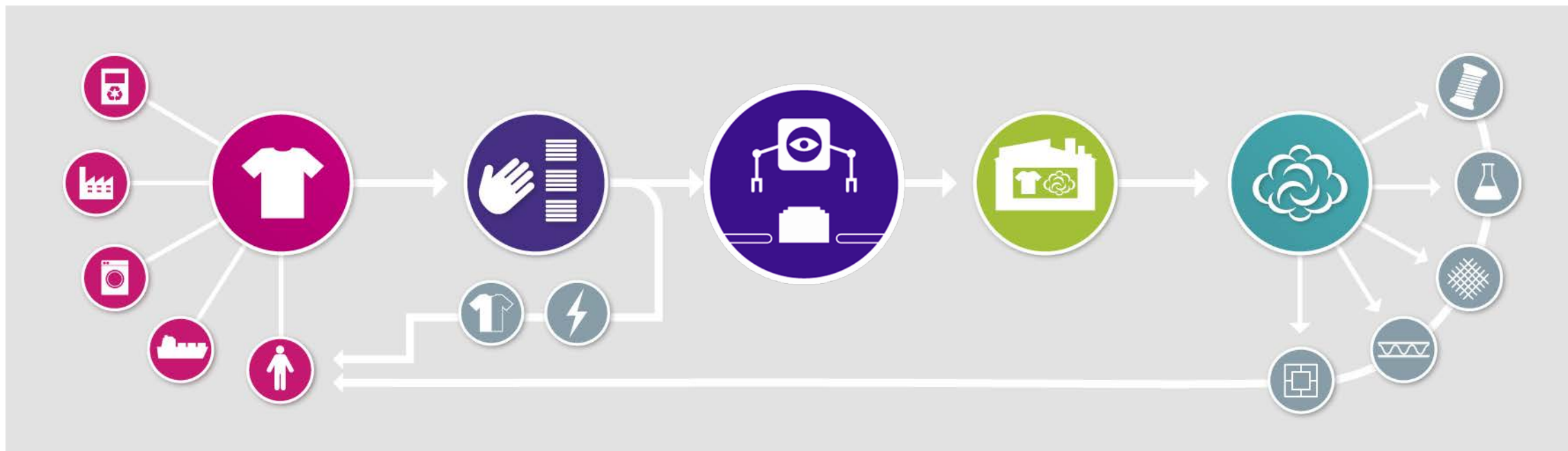
# Industrial partnerships

- Sorted textiles to be mechanically refined into recycled fibers
  - ▶ Yarn, non-wovens, composites, chemical refinement...
- High added value ensured by high quality sorting systems
- Ability to supply the textile industry with recycled raw material
  - Process and product development in cooperation with customers/partners





# Comprehensive solution



Found yourself? Come and meet us!



# Thank you!

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