arvi
Material Value Chains

ARVI Program Manager:
Pirjo Kaivos,
Phone: +358 40 540 1796
pirjo.kaivos@cleen.fi
CLEEN Ltd
P. O. Box 10, 00130 Helsinki
FINLAND

Material Value Chains – New business through systemic resource efficiency

Drivers and objectives for ARVI research program

As a result of diminishing natural resources and the related social demands and the needs of business operations, it is necessary to adopt radically more efficient means of recycling materials. The objective of the ARVI research program is to build a strong mutual understanding of future business opportunities related to recycling of materials, as well as required know-how and abilities for their utilisation.

The program will create new knowledge, methods and concepts for the management of material flows and for recovering their value potential by exploring the demands of divergent operating environments on a global scale. In the program, management and recycling of material flows and the related new business models will be approached from the systemic viewpoint.

ARVI's interdisciplinary approach and focus on examining international business ecosystems will enable creation of new concepts for the export market. This will pave the way for a wide multiplier impact on industry and commerce and especially for the entire recycling business among Finnish companies.

ARVI Research areas

- Systemic evolution of business and its local environments
- Improved knowledge of material flows – analyses and foresight
- Systemic resource efficiency – concept building, modelling and optimisation
- Case studies providing material and waste flow specific data for the development of sustainable resource efficient recycling concepts

About ARVI

ARVI program creates data, assessment tools and concepts for the value chain management and processing of materials to enable for the Finnish companies to expand and deepen their knowhow. ARVI aims to find out new technologies, process solutions and services as well as new ways to combine them to meet the requirements of future markets.
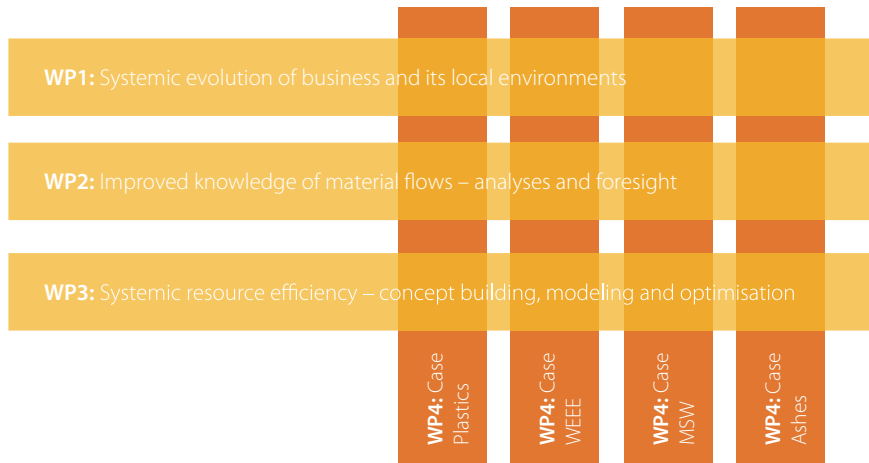
About CLEEN

The ARVI consortium is managed by CLEEN, the strategic research centre for the Energy and Environment Cluster. CLEEN Ltd was founded in 2008. The 46 shareholders are all major actors in the sector, with 28 corporate shareholders and 18 research institutions or university shareholders.

CLEEN
Cluster for Energy and Environment

ARVI research themes

ARVI Program Workpackages

WP1: Systemic evolution of business and its local environments

WP2: Improved knowledge of material flows – analyses and foresight

WP3: Systemic resource efficiency – concept building, modeling and optimisation

WP4: Case Plastics

WP4: Case WEEE

WP4: Case MSW

WP4: Case Ashes

WORK PACKAGES

WP 1 – Systemic evolution of business and its local environments

In the work package, the structures of utilising waste management and sidestreams in various operating environments are examined with respect to both supply and demand, also creating business models for utilising material flows and their value potential.

Legislative steering measures are taken into account in the work package, especially when examining local business models.

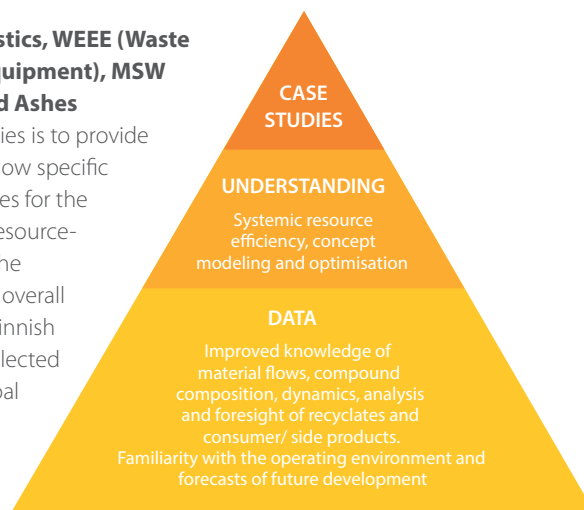### WP 2 – Improved knowledge of material flows – analyses and foresight

In WP2, procedures and methodologies are explored for the identification of the quantity and quality of material flows and for the development of reliable life-cycle inventory data needed in environmental assessment of waste recovery value chains.

WP 3 – Systemic resource efficiency – concept building, modelling and optimisation

WP 3 aims at creating models for the value chains in the waste management business based on the work in WP1. The objective is to develop systemic modelling methods to illustrate resource efficiency and sustainability of different business environments from different aspects of the material flow systems. Another objective is to develop real-time monitoring methods for the sorting at source, management and recycling of waste.

WP 4 – Case studies for Plastics, WEEE (Waste Electrical and Electronic Equipment), MSW (Municipal Solid Waste) and Ashes

The objective of the case studies is to provide in-depth material and waste flow specific data, information and processes for the development of sustainable resource-efficient recycling concepts. The sustainability of the identified overall concepts will be assessed in Finnish conditions, as well as in the selected focus countries. The overall goal is to boost growth and create new international business opportunities.

CASE STUDIES

UNDERSTANDING
Systemic resource efficiency, concept modeling and optimisation

DATA
Improved knowledge of material flows, compound composition, dynamics, analysis and foresight of recyclates and consumer/ side products. Familiarity with the operating environment and forecasts of future development

Competence building model of ARVI

ARVI program volume 16 M€ for 2014 - 2017

ARVI consortium members
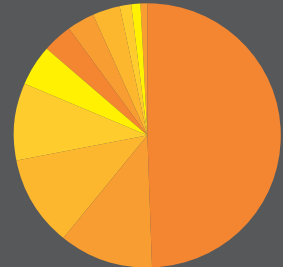
Industrial partners 50.1 %
Kuusakoski 20 %, Outotec 5 %, Ekokem 4 %, Stora Enso Wood Products 4 %, Valmet Power 4 %, Turun Seudun Jätehuolto 2 %, HSY 2 %, BMH Technology 2 %, Stormossen 1 %, Loimi-Hämeen Jätehuolto 1 %, Stena Technoworld 1 %, ÅF-Consult 1.3 %, AMPPC FINLAND 1 %, Rouskis 0.6 %, Kymenlaakson Jäte 0.4 %, Paperra 0.3 %, Borealis 0 % (company do not do any in-kind but fund the program)
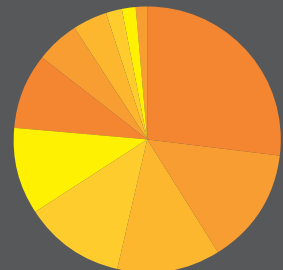
Research Partners 49.9 %
Aalto University 13 %, Tampere University of Technology 7 %, VTT Technical Research Centre of Finland 6 %, Lappeenranta University of Technology 6 %, Åbo Akademi University 5 %, Finnish Environment Institute SYKE 5 %, University of Eastern Finland 3 %, JAMK University of Applied Sciences 2 %, City of Helsinki 1 %, University of Turku 1 %, Arcada 0.7 %

CLEEN
Cluster for Energy and Environment