

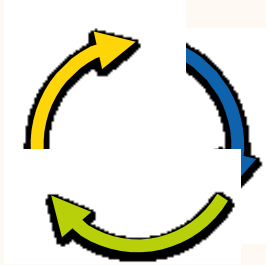
# RESYNTEx



*A New Circular Economy  
Concept*

**Richard Delahay and David Tyler**

# Project Vision



Europe must move towards circular economy to conserve its future environment & society

Innovative recycling & synthesis of expertise needed

1. Better **RE**cycling to generate new secondary raw materials
2. Through **SYN**thesis, project combines various fields
3. **TEX**tile waste – a resource for textiles & chemicals



# Key Information



€11 million research project

€166 billion sector (EU)



Uses industrial symbiosis

Models complete value chain



42 months





National Technical University of Athens



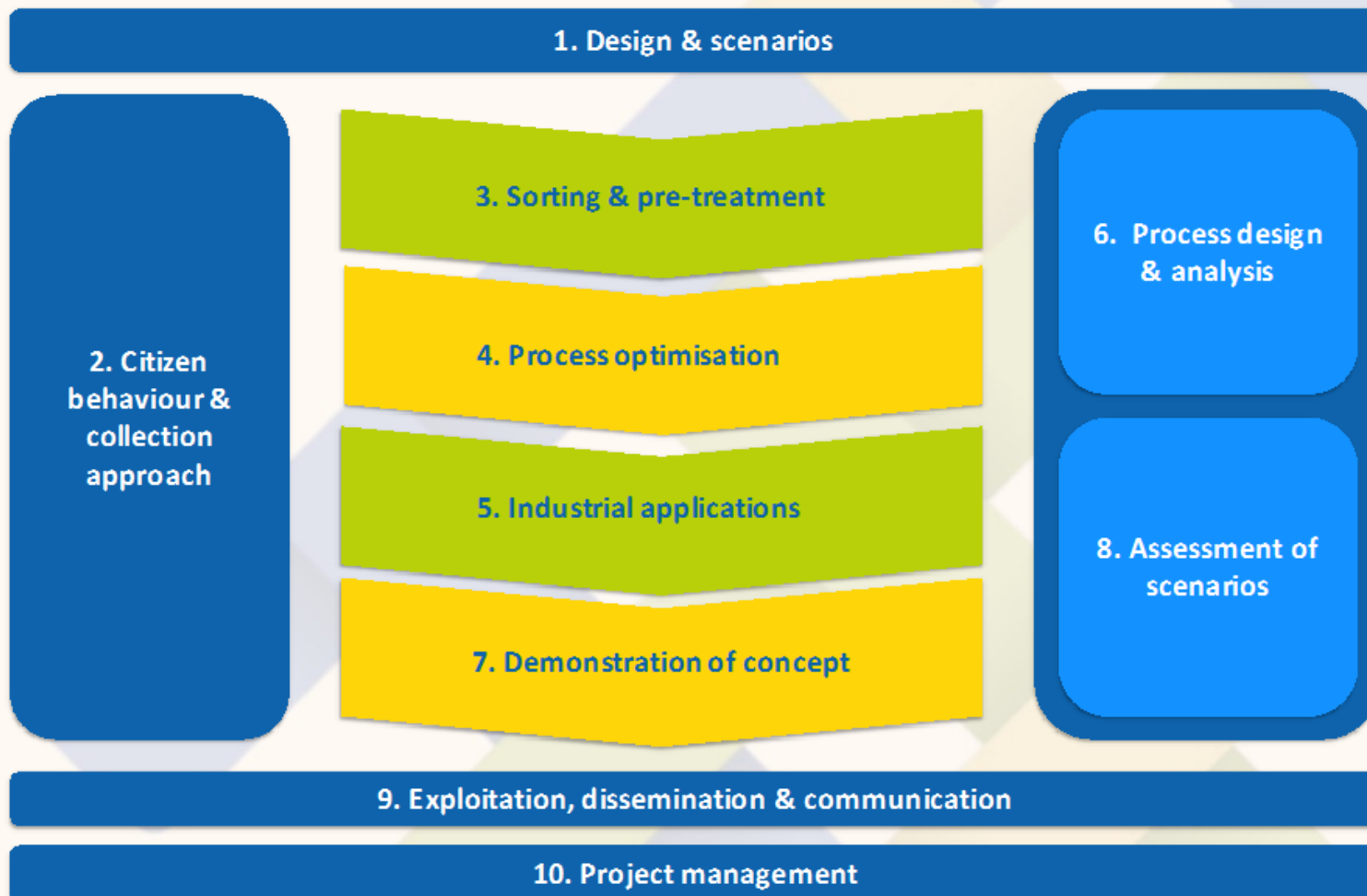
# Project Aims



1. Strategic design for value chain
2. Improve collection approaches & public awareness
3. Enable traceability & credibility of waste processing
4. Innovative business models for chemicals & textiles
5. Demonstrate a complete reprocessing line



# Work Packages



# Why?



Helps industry to reduce its environmental impact

New chemical feedstock & state-of-the-art products



Public demand

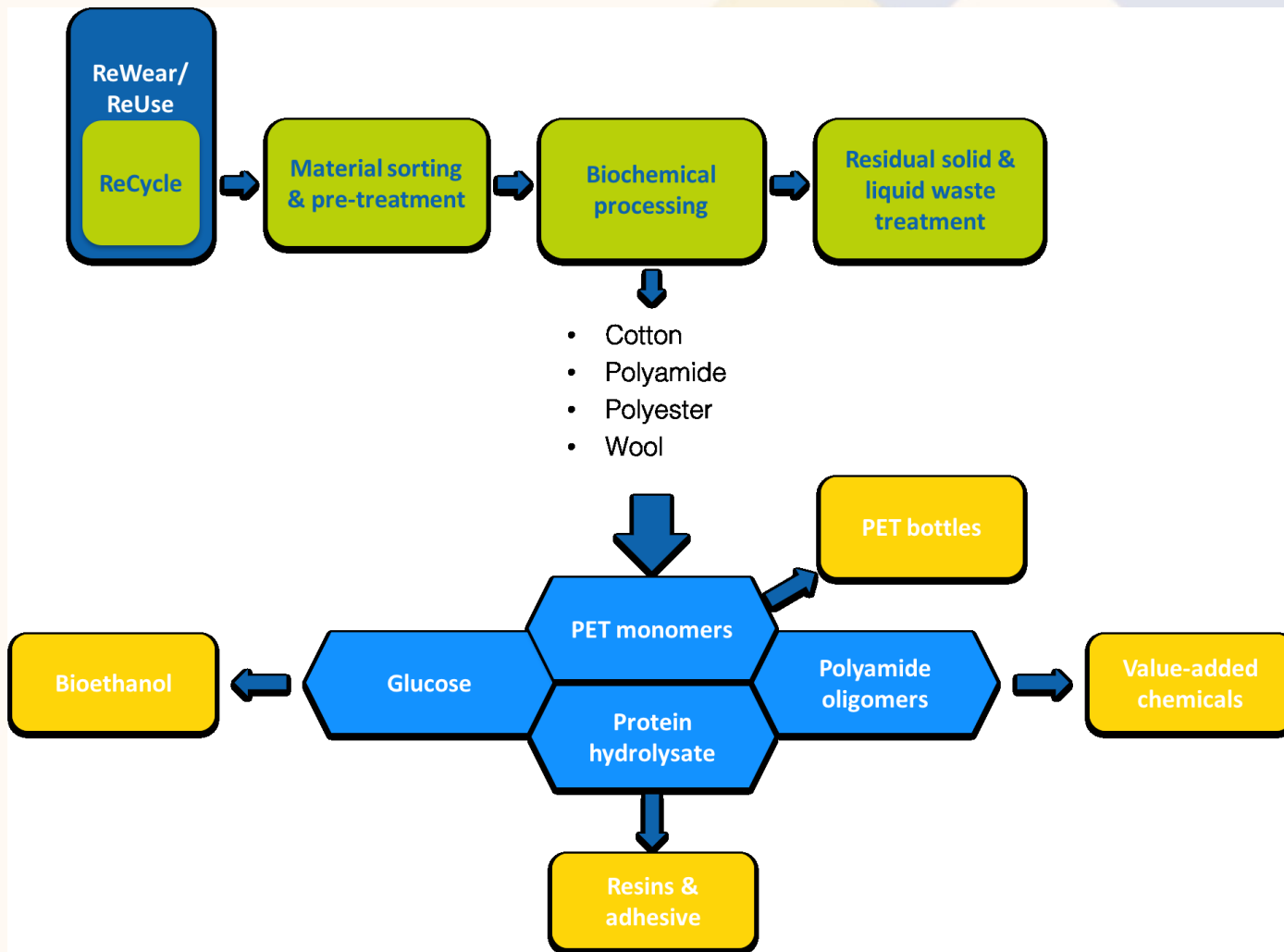
Increases public awareness & enables public to recycle



Informs governing bodies & policymakers on circular economy



# How?





# BIOCORE objectives

From 2010-2014, the EU-funded project BIOCORE looked at the industrial feasibility of a biorefinery concept that allows the conversion of cereal by-products, forestry residues and short rotation woody crops into a wide spectrum of products including 2nd generation biofuels, chemical intermediates, polymers and materials.

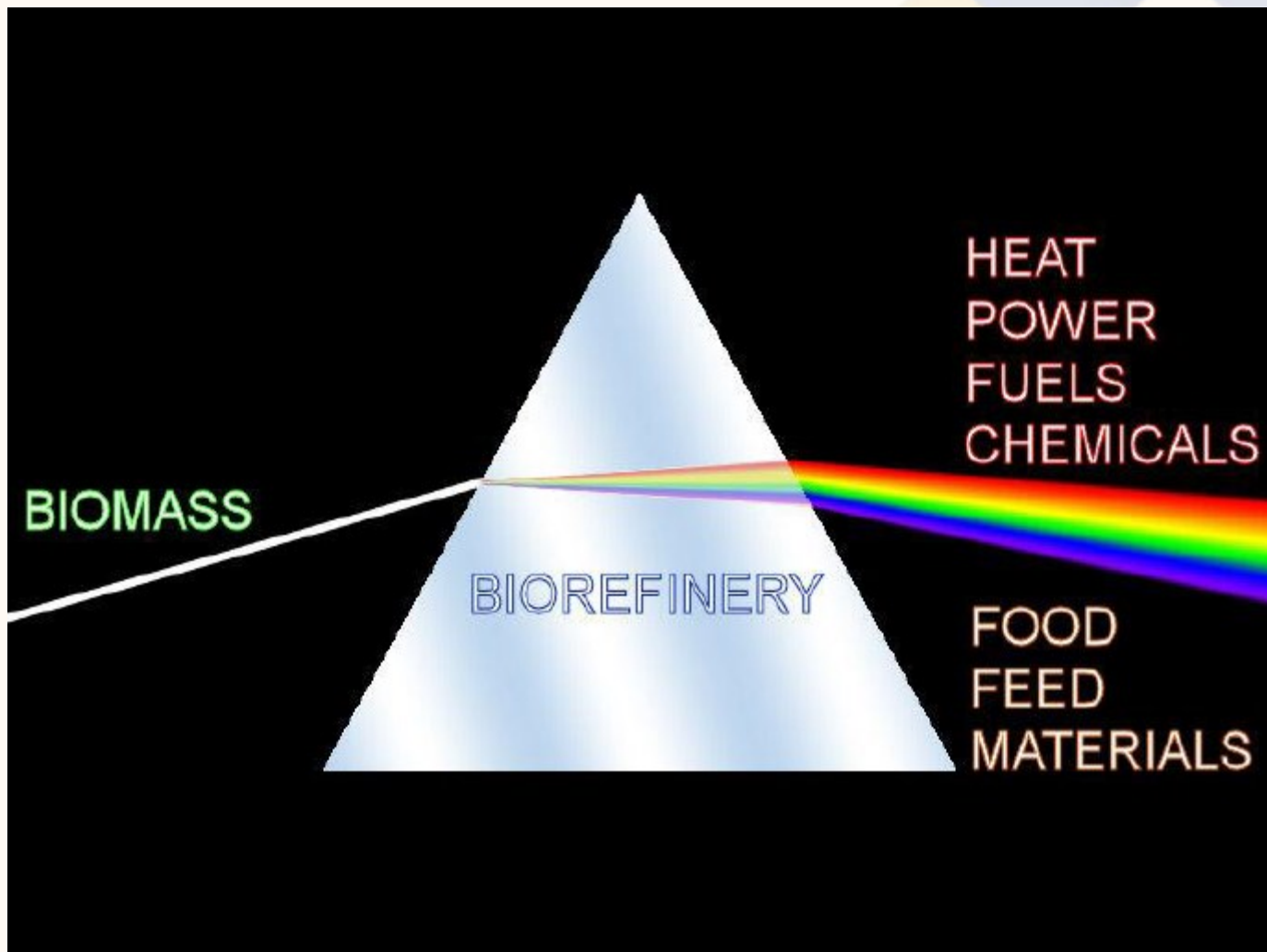
Uses a variety of  
ligno-cellulosic  
biomass  
feedstocks



Produces a  
variety of  
products,  
from chemicals  
to food  
ingredients



# The Biorefinery concept



# Biomass to Ethanol





Crescentino plant, opened October 2013  
PROESA® Pretreatment. 200,000 Mt per year biomass

*Image used with permission*

## PROESA® key features

- ❖ Feedstock flexibility
- ❖ Demonstration at industrial scale of a new proprietary Pretreatment technology
- ❖ High efficiency in viscosity reduction and enzymatic hydrolysis (unique patent process design)
- ❖ Incorporation of innovative Hydrolysis and fermentation steps (simultaneous co-fermentation of C5 and C6 sugars) into bioethanol
- ❖ Production of the co-products lignin as possible base for producing chemical from biomass in addition to energy
- ❖ Low Capital Investment (minimum handling of biomass, simplified flow schemes, no special material for the construction)
- ❖ Low OPEX (conversion of renewables biomass into liquid transportation at cost competitive with petroleum)

# Exploration of options

## The Biorefinery Concept based on PROESA™ Technology

.... on - going R&D work



# Technical and Economic Challenges

- Processing of mixed fibre types
- Diversity of dyestuffs present
- Diversity of residual chemicals present
- Unknown contaminants
- Feedstocks to commercial quality standards
- Feedstock to be at competitive cost



# Summary



Helps EU towards circular economy



Uses innovative recycling & industrial symbiosis



Complete value chains for textiles & chemicals



Global benefits beyond EU





# RESYNTEX



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