



# NO-WASTE

1.4.2013-31.3.2017

## UTILIZATION OF INDUSTRIAL BY-PRODUCTS IN ENVIRONMENTAL PROTECTION



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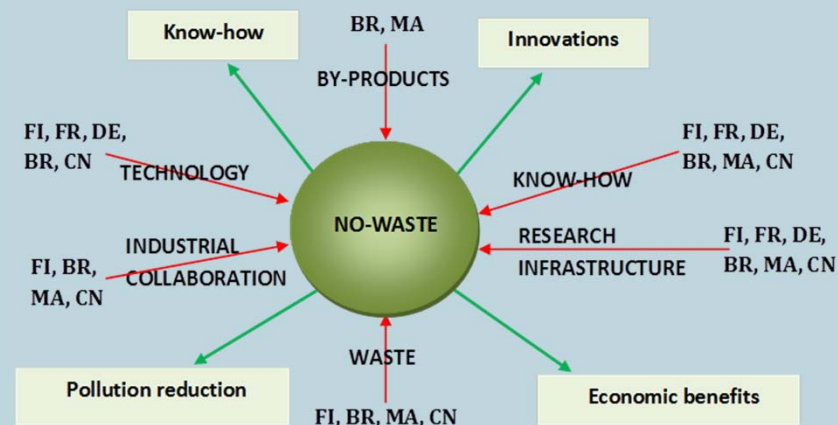
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Environmental pollution is a global problem. Unsustainable production of goods, improper treatment of waste, emissions to air and water, and inadequate legislation cause growing problems to human beings and nature. **The urgent need for reducing environmental load coming from industry, agriculture and communities demands for novel ways of thinking.** NO-WASTE collaboration will attack to this current problem by developing environmentally sound and sustainable possibilities to utilize and valorise different wastes and emissions. The aim is to **create valuable new products and renewable energy to minimize the waste as well as emissions to air and water.** As a tool to achieve this aim, catalysis plays an important role. In addition, the sustainability of each planned utilisation case will be evaluated. The cases are related to hydrogen and synthesis gas production from waste, utilization of CO<sub>2</sub>, organic gases and agricultural waste, and development of new products created by optimized hydrothermal carbonization processes. This ambitious aim and wide operational area demand for extensive collaboration, but also form a great possibility to widen the network after NO-WASTE. The exchange months during this four years program grows up to 205 months and the planned transnational network brings together experts of different disciplines from Finland, France, Germany, Brazil, Morocco and China. During the collaboration a solid basis for further collaboration will be established.

The frame of operation of NO-WASTE allows a great number of green chemistry-related possibilities to create networks of knowledge between the scientists of different fields (science, engineering, economy, health) in different countries.





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**WP 1 Hydrogen and synthesis gas production from waste**



**WP 2 Valorisation of wastes from olive and argan production**



**WP 3 Production of valuable chemicals from CO<sub>2</sub> and organic gases**



**WP 4 R&D on the HTC technology to valorize industrial by-products and wastes**



**WP 5 Utilisation of methane originating from coal mining**



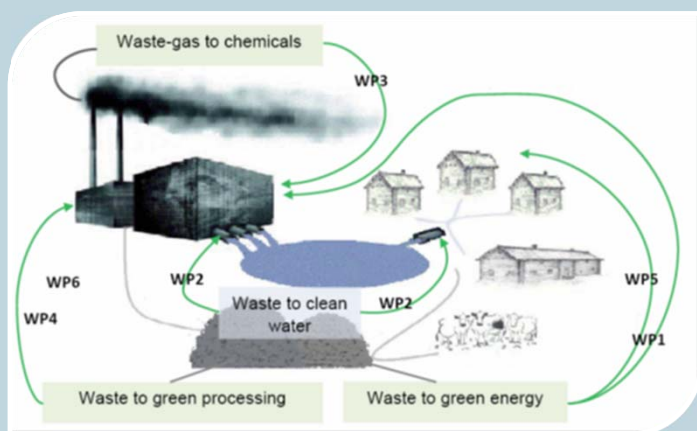
**WP 6 Research on the HTC process: Product design**

**Sustainable production** is one of the key issues of the production technologies today. In addition to the modifications of processing technologies that make production more environmentally friendly, intensive research is needed in valorisation and utilization of different by-products and wastes produced by industry. In addition to industry, wastes are created by communities and agriculture. The exploitation of these wastes is important, since the amount of the waste is continuously increasing and the treatment of this waste is not adequate even today. **Finding the new ways to utilize industrial, communal and agricultural waste and by-products, and transferring those to valuable products, is the goal of NO-WASTE. We are especially aiming at to identify and develop technologies that are potential to be used by the industry so that the reduction of the emissions and waste becomes also economically interesting and is not just due to legislation and reputation of the company.**

In general, **waste** is a mixture of several components, only in some cases waste is pure and therefore a perfect subject for recycling and utilization. In most cases valuable or harmful components are highly diluted in the waste. Thus specific procedures and low cost technologies are required in order to transform waste into useful products.

**Air pollution** is a major threat to our health, environment and our quality of life. In spite of remarkable reductions in air emissions during the past few years in the European level, more actions are needed to decrease air pollution further. One new approach to reduce air emissions is to transform the treatment of the emissions to more industrially interesting actions, namely, utilization of the gaseous emissions in the production of chemicals with economic value and/or in production of energy.

The release of toxic **wastewaters** in the ecosystem is a significant source of pollution, eutrophication and perturbations of aquatic life. The polluted water causes major problems also to humans. 1.1 billion people in the world have no access to clean water and 2.6 billion people live without proper sanitation. 20% of deaths of children younger than 14 years in the world are related to water pollution. Effective techniques for treating hazardous, toxic and highly polluted wastewaters are a necessity of today. NO-WASTE aims to decrease also water pollution by utilizing the waste-based products in water purification purposes.



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