

## **THE SUSTAINABLE WASTE**

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Our aim is to recycle all waste materials from agricultural holdings, in particular wine and oil wastes through an innovative integrated gasification-ORC cycle (organic Rankine cycle), exploiting recent innovations in the field of thermal fluids and materials, combining with these ones scientific skills and capabilities of innovation in the framework of a system with greater efficiency, with an aerobic hybrid cycle. The objective of the project is to investigate the actual potential (yields, emissions, filtration capacity, nature of ashes according to biofuels) of thermal and electrical cogeneration based on the integration of a fluid-bed gasification, a boiler and a RCE unit.

With the RCE cycle, organic thermal fluids allow better efficiencies than water cycle in a turbine both full and partial load and the RCE combined with micro cogeneration systems is cheaper than water: it allows the expansion of the vapor in its saturated and overheated state, without any damage to the turbine due to erosion.

The thermoelectric cogeneration cycle starts from noble and less noble biofuels and transforms biological different residues, which currently represent a potential environmental and economic problem that we can solve for energy purposes.

The recovery and energy enhancement of wine and olive-oil chain wastes permits the transformation of scrap materials into energy products, allowing the production of renewable energy without the use of agricultural land for

energy purposes, creating the so-called smart grid. The system, which generates an

interaction with the Rankine cycle, uses the division of Organic and inorganic substance, delineing also an ad hoc line for water, with the exploitation of the cycle, bringing the substances to high molecular weights and generating a working fluid that modifies the substance first for established purposes. The jumps are of enthalpy nature and recover processes and generate biomass cogeneration.



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