2019

Engineering and Prototyping Activities
SME - Spike Renewables Srl

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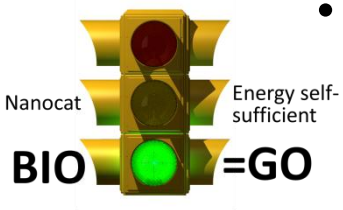
Spike Renewables SrL

Spike Renewables S.r.l. is an Engineering Company focused on system engineering that deals with all aspects of a project from design to construction and integration.

Focus on renewable energies and industrial energy efficiency:

- Heat Recovery and Thermal Storage for high grade waste heat by Molten Salts as Heat Transfer Fluid (Industrial and Geothermal);
- Biomass and bioenergy/biofuels processes and plants Engineering;
- Organic by-products thermochemical conversion by HTL and Flash Pyrolysis Patented Processes;
- Spike is founder member of RE-CORD (Renewable Energy Consortium for Research and Demonstration), University of Florence no profit Spin-off.

Main Research Projects



- **BIOGO-for-production (FP7)** - www.biogo.eu **:**
  Catalytic Partial Oxidation of Bio Gas and Reforming of Pyrolysis Oil (BioOil) for an Autothermal Synthesis Gas Production and Conversion into Fuels.

- **SMARTREC (H2020) - www.smartrec.eu :**
  Developing a standard and modularized solution for flexible and adaptive integration of Heat Recovery and Thermal Storage for high grade waste heat by Molten Salts as Heat Transfer Fluid.

- **GeoSmart (H2020) :**
  Technologies for geothermal to enhance competitiveness in smart and flexible operation.

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Context: Biomass Feedstock Thermochemical Conversion Technologies

In system and energetic engineering, Spike Renewables S.r.l. has most developed sectors with greater technological content such as industrial, energy efficiency:

- Integrated solutions in order to increase the flexible operation and energy efficiency of electricity production plants (Power-to-X-to-Power);

- Development of test rigs in order to assess the thermodynamic operation of heat exchangers for organic and /or highly corrosive fluids;

- Test on engines and microturbines Capstone C30 feed by vegetable pure oils in collaboration with IBT Europe Capstone;

- Underway industrial development of the HTL plant, expanded to plastic waste recovery, in collaboration with BlueBenu, a Danish startup;

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Spike HTL pilot plant description

Design and lab plant prototyping for thermochemical process (pyrolysis, HidroTermal Liquefacion HTL) for bio oil production from organic waste; Patent Pilot Plant for biomass Hydro Thermal Liquefaction (HTL) PROPERTY: Spike Renewables Srl / RE-CORD n. FI2015A000127 date 29.04.2015

HP HT Filters

Cooling section

Biomass and water

Bio oil tank, non cond. gases and waste water

HP electric pump

Pre-heating

Reactor

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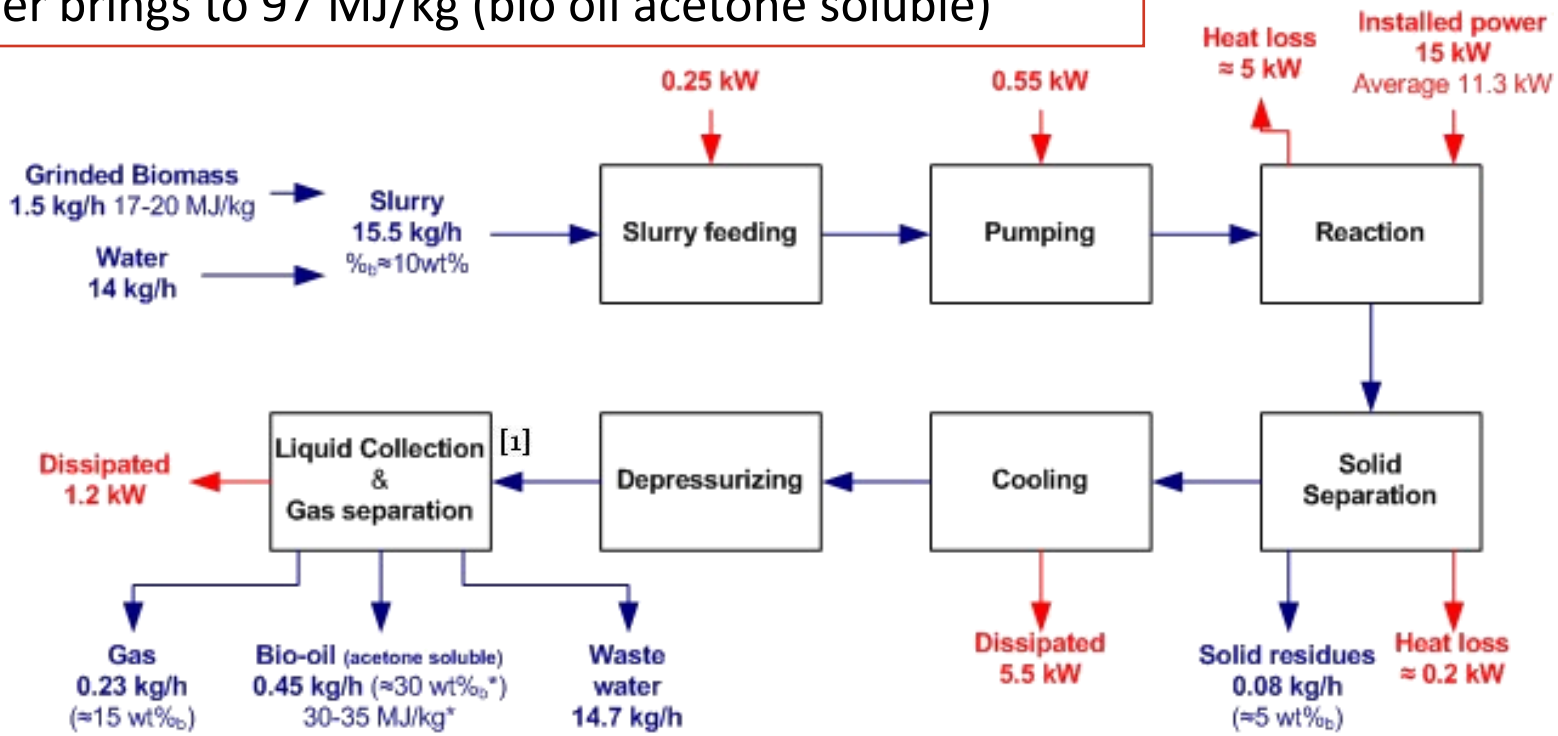
SEVENTH FRAMEWORK PROGRAMME

Spike HTL plant balance

Lab plant is not a reference for energy balance; use of char and heat recovery may increase overall efficiency.

Specific energy consumption based on design installed power brings to 97 MJ/kg (bio oil acetone soluble)



[1] Toor, Rosendahl, Rudolf – 2011 – Hydrothermal liquefaction of biomass A review of subcritical water technologies

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MSTP Molten Salts Test Plant

Design and prototyping of a lab scale system for Heat Recovery at high temperature to define the standards for a modularized and flexible solution for industrial applications;

A **Molten Salt Test lab Plant** (MSTP) has been designed and will be assembled to test different molten salts under real operational conditions and therefore understand critical issues and technological problems before moving to full demonstration scale.

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Conclusions

- Spike Renewables Srl is an Engineering Company (SME) founder member of RE-CORD Consortium (University of Florence), with specific activities on innovative pilot plant design and construction.
- In system and energetic engineering, Spike Renewables S.r.l. has most developed sectors with greater technological content such as industrial, energy efficiency and renewables.

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Thanks for your attention!

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