The TO-SYN-FUEL consortium is delighted to introduce its second newsletter edition.

The TO-SYN-FUEL project focuses on the development of an integrated process converting sewage sludge into hydrocarbons, biomethanol, and hydrogen by using thermochemical- and biochemical-based approaches. This newsletter reports the latest developments of the project carried out up to the summer of 2018.

**Research & Development**

The consortium with 12 partner organisations has brought together some of the leading researchers, industrial technology providers and renewable energy experts from across Europe, in a collaborative, committed and dedicated research effort to deliver the overarching ambition. Partners include: Engie Services Netherlands NV, HyGear Technology and Services BV, Slibverwerking Plant Elgro, University of Glasgow, University of Salford, University of Stuttgart, University of Twente, University of the Basque Country UPV/EHU, University of the Basque Country UPV/EHU, University of Technology Graz (TU Graz), and University of Technology Graz (TU Graz).

**Thermo-Catalytic Reforming (TCR)**

This project involves the conversion of sewage sludge into liquid fuel (bio-oil) through thermo-catalytic reforming (TCR) and pressure swing adsorption (PSA) technologies. The bio-oil produced is chemically similar to the lighter distillation fraction of fossil oils and is composed of highly deoxygenated products; its oxygen content is lower than 1 wt%. Due to the low oxygen content and composition, the bio-oil is directly miscible with fossil fuels and would not require additional processes to be mixed. The hydrogen separation through PSA is also a crucial step for the overall TO-SYN-FUEL process, aiming to provide a water-free hydrogen stream from the TCR reformation process. The produced hydrogen can be used as a fuel or as a raw material for the hydrodeoxygenation of the bio-oil.

**Bio-Oil Applications**

Bio-oil derived from sewage sludge can be used as a substitute of fossil crude oil in various energy sectors, e.g., power plants, industrial furnaces, residential heating. The bio-oil can be directly co-fired with fossil crude oil or used as a fuel oil, independently of the power plant design. It has been shown its application is feasible in a large variety of scenarios, also in those where the power plant infrastructure is not modified.

**Bio-Methanol Production**

Bio-methanol is another valuable product that can be produced from the bio-oil. Bio-methanol can be used as a bio-fuel for vehicles or as a substitute for fossil methanol in chemical synthesis. It can also be used as a co-production with the bio-oil as a dual fluid.

**Research & Development Plant**

The project partners visited a research & development plant in Sulzbach-Rosenberg, Germany, on the 25th of June 2018. The plant processes up to 300 kg/h of dried sewage sludge. It is equipped with one of the world’s largest fixed bed reactors, where TCR is performed. Also during the meeting, some samples of TCR oil were shown and their characteristics and properties were discussed.

Additional information on the project can be found on the TO-SYN-FUEL website: [www.tosynfuel.eu](http://www.tosynfuel.eu).

Contact Point ETA-Florence: Ing. Stefano Capaccioli, Project Dissemination Team, Email: stefano.capaccioli@etaflorence.it, phone: +39 055 5002174.