



## **Production of Synthetic Fuels from electricity**

### *A Technology Breakthrough*

GSYF, Equipamentos para Energia, a Portuguese SME recently established, announces that has been reached the production of SynGas (H<sub>2</sub>, CO<sub>2</sub> and CO) in an electrolyser with graphite electrodes. The tests were performed by LNEG using an experimental electrolyser (50 W) manufactured by GSYF. Small amounts of Methane and other hydrocarbons were also detected. SynGas composition is adequate to the production of Natural Gas and Methanol.

**SynGas composition**

Pr (bar)	H <sub>2</sub> (%)	O <sub>2</sub> (%)	CO (%)	CO <sub>2</sub> (%)	CH <sub>4</sub> (ppm)	C <sub>2</sub> H <sub>4</sub> (ppm)	C <sub>2</sub> H <sub>6</sub> (ppm)
0	72.4	3.08	1.81	17.60	158	10.6	101.4
0,75	75.5	2.98	1.53	13.94	424	47.8	137.5

SynGas is the raw material to produce synthetic hydrocarbons. Depending on the catalyst and operational parameters (temperature and pressure) Methane, Methanol, Diesel, DME or any other fuel can be obtained. These are well known and experimented processes for which adequate catalysts are commercial available.

The technology aims to huge and established markets embracing electrical energy storage, grids stabilization, synthetic fuels (competing with biofuels) or electrification of isolated off-grid locations contributing to an maximization of penetration of renewable sources and elimination of the dependence of fossil fuels. Economic evaluations point out the competitiveness of the technology compared with current market solutions.

The technology, patented by GSYF, is an innovative pathway to produce SynGas converting electrical energy and carbon in hydrocarbons (liquid or gas), and has the potential to become a technology breakthrough contributing to a new energy paradigm based on intensive use of renewable sources. Low Carbon Plan objectives can be easier achieved or even anticipated.

This proprietary technology is being developed by a consortium embracing two SME *GSYF, Equipamentos para Energia*, and *ACR Energia, SA*, supported by several research groups from *LNEG, ISQ, FEUP* and *ISEL*. The project has been approved and financed by COMPETE/QREN. The ongoing tasks embrace the experimental production of Natural Gas and Methane and the scale-up of the electrolyser to 1kW model. The technology shall be presented at Munich exhibition dedicated to the Electrical Energy Storage (next June).

Project leader

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