



2nd generation biofuels: a new technological step

press release

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Lurgi in brief

Lurgi is a **leading technology company operating worldwide** in the fields of process engineering and plant contracting for the **refining and petrochemicals markets**. Its technological leadership is based on **proprietary technologies** and **exclusively licensed technologies** which aim to **convert all carbon energy resources** (oil, coal, natural gas, biomass ...) in **clean products**.
www.lurgi.com

Bioliq[®]: a three step process

In a first step, the straw is converted into bioliqSynCrude[®]. The second step is a gasification of this liquor to produce syngas, a mixture of hydrogen and carbon monoxide. Fuels are then synthesized from this gas mixture in the third step.

As part of its policy targeting the reduction of greenhouse gases, the **European Union** requires that the proportion of **biogenic motor fuels should be increased to 5.75% by the year 2010**. In **Germany**, the Federal Government is aiming for a significant higher quota of fuels generated from **renewable resources by year 2020**. **Second generation biofuels**, as they do not use the edible part of the plant, will contribute to this ambitious objective.

In this context, **Lurgi, a 100% subsidiary of the Air Liquide Group**, will build a **second generation of biofuel plant** at Forschungszentrum Karlsruhe, Germany in a joint project with the Karlsruhe Institute for Technology (KIT). This pilot plant will demonstrate the viability of the **three-stage bioliq[®] process**. Since the first stage of the pilot plant completed in 2007 was successful, it is now entering the **second stage**.

In this second stage, the bioliqSynCrude[®] **generated from straw** in the first step is processed to become **synthesis gas**. The project covers the engineering, construction, supply, installation and commissioning by Lurgi. Commissioning of the gasifier is planned for **autumn 2011**. This unit is substantially sponsored by **the German Federal Ministry for Nutrition, Agriculture and Consumer Protection** under the program for renewable biological resources.

François Darchis, Senior Vice-President Air Liquide Group, in charge of R&D, Advanced Technologies and Engineering & Construction, commented: ***"We are very proud that the bioliq[®] project by Lurgi in Germany is being continued. In a world where energy and environmental issues take on greater importance every day, Air Liquide intends to play an active role in creating viable alternative energy solutions. Energy and the Environment remain two of the Group's growth drivers."***

Lurgi

2nd generation biofuels

Second generation biofuels are fuels produced from the **none edible** parts of plants (straw, vegetal waste, wood, etc.) in this way leaving the "fruit" or sugar of the plant **for use as food**.

Multi-stage bioliq[®] process converts **straw and other agricultural and forestry residues to synthetic fuels** for vehicles. This technology also has the advantage of increasing production yield and has a much more **favorable balance sheet in terms of CO₂** compared to first-generation (reduction up to 90% of CO₂ emissions).

*With more than **40,000 employees** in **75 countries**, Air Liquide is the **world leader** in industrial and medical gases and related services. The Group offers **innovative solutions** based on constantly enhanced **technologies** and produces **air gases (oxygen, nitrogen, argon, rare gases...)** and many other gases including hydrogen. The Group contributes to the manufacturing of **many everyday products**: bubbles in sparkling beverages, protective atmosphere for packed foods, oxygen for hospitals and homecare patients, ultra-pure gases for the semiconductor industry, hydrogen to desulfurize fuels...*

*Air Liquide is committed to **sustainable development** and helps to **protect life**. Founded in 1902, Air Liquide has successfully developed a long-term relationship with its shareholders built on **trust** and **transparency** and guided by the principles of **corporate governance**. Since the publication of its first consolidated financial statements in 1971, Air Liquide has posted **strong and steady earnings growth**. Sales in 2007 totaled **11,801 million euros**, with sales outside France accounting for almost 80%. Air Liquide is listed on the Paris stock exchange and is a component of the CAC 40 and Eurostoxx 50 indices (ISIN code FR 0000120073).*



www.airliquide.com