



11 May 2009

Achema 2009 Lurgi – your clean conversion partner *press release*

Contact

Lurgi GmbH
Corporate Communications
Klaus Kilian
Lurgiallee 5
D-60439 Frankfurt / Main
Phone : +49 (0) 69 58 08 - 42 54
Fax : +49 (0) 69 58 08 - 11 09

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. Lurgi is a subsidiary of the Air Liquide Group.

www.lurgi.com

No. 1 – Frankfurt/Main: “Lurgi – your clean conversion partner” – that is this year’s motto for Lurgi’s presence at Achema 2009.

Lurgi is presenting itself for the 25th time but debuts as a company of Air Liquide at a stand in Hall 9.1 covering an area of around 340 sqm. The main topics of the exhibition relate to the fields of Synthesis Gas, Hydrogen Production as well as Clean Conversion Technologies for the generation of motor fuels and chemicals. On the stand, designed in a futuristic look, Lurgi presents itself as a provider of innovative solutions that is at the same time continuously committed to research and development.

Dwindling energy reserves, climatic change and need for raising efficiency send a clear message. Air Liquide and Lurgi have addressed these issues, identified their role and defined their duties in this regard. Air Liquide has long included this dimension in each of its activities. The Group’s environmental commitment is strong: activities that preserve the environment and life represent 33% of its revenue. In addition, over 60% of its Research and Development budget is directly related to environmental issues (reduced energy consumption, cleaner production, development of tomorrow’s energies, etc.).

“For Lurgi as a technology-oriented plant engineering and contracting company operating worldwide, Achema in Frankfurt is the “leading trade show”. It offers an ideal platform for presenting the complete range of our technology portfolio to a top-level international audience. In the present context, it is key for Lurgi to present itself as a strong and innovative player in converting carbon energy resources in clean products.” (François Venet, CEO of Lurgi GmbH)

Lurgi’s Activities in the Synthesis Gas Market

Lurgi highlights three main topics from the Synthesis Gas sector: Hydrogen, Multi Purpose Gasification and Coal Gasification.

Hydrogen

The predominant part of the hydrogen produced worldwide is used subsequently in refineries and the petrochemical industry for various purposes. More than 95% of this demand is covered by steam reforming of hydrocarbon feedstocks. Lurgi has longstanding experience with this technology. Great efforts have been made to



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develop it further in order to be able to offer tailored solutions for each and every application in industry. Lurgi commands the full range of experience in engineering hydrogen and steam reforming units based on various feedstocks. Natural gas, refinery gases, associated gases, naphtha, LPG or any mixture are used as process feedstock.

Multi Purpose Gasification (MPG)

MPG is a mature process for converting refinery residues into clean synthesis gas with minimal environmental impact. Many of the undesirable components in crude oil – sulfur and heavy metals – are concentrated in residual fuel oil. Increasingly stringent environmental legislation dictates a reduction in sulfur content and/or the application of expensive flue gas treatment techniques when burning such residual fuels. MPG makes these measures dispensable. The declining demand for residual fuel oil and increasing demand for distillates are pushing refineries to look for alternative conversion processes of the heavy residues. MPG is such an alternative.

Coal Gasification

Today, coal is an attractive raw material for the production of fuels and synthetics. For coal gasification the Lurgi dry bottom fixed bed gasifier technology has on the market since 1931. Presently, 101 Lurgi gasifiers are in operation for synfuels, SNG, methanol and ammonia production. The Lurgi gasifier is suitable for low grade caking and non caking coals such as lignite, sub-bituminous and bituminous coals, as well as anthracite. Lurgi offers the full range of processes for the production of fuels and synthetics from coal.

Latest Developments in the Refinery Technology

The refinery market is undergoing a process of change towards a more efficient use of the raw materials which requires the continuous development of new technologies as well as the improvement of already existing ones. More efficient processes including the optimal use of the “bottoms of the barrel” to meet the requirements of new or existing plants are our goal. As a result of increasing consumption, global energy demand will strongly increase in the coming years; this implies a future change in raw material needs which will go hand in hand with a shift from almost exclusively oil-based fuel production towards synthetic fuels via synthesis

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gases. Natural gas, associated gas, coal, heavy residues and biomass will be the feedstock of choice for synthesis gas production. For the automotive industry synthetic fuels will open up new opportunities for optimized and highly efficient engines. Synthetic fuels are quasi sulfur-free and will lead to a reduction in greenhouse gases by around 40%. Thus excellent conditions will be created for meeting future emission control requirements. In this context Lurgi is a competent partner for the energy industry.

bioliq® - 2nd Generation Biofuels

Today, the worldwide energy supply relies mostly on non-renewable resources. Increases in demand have accelerated the depletion of fossil resources. In this context, renewable energies will in future constitute an indispensable element of the energy mix. Renewable resources can and will contribute to covering the growing global energy demand and at the same time reduce carbon dioxide emissions thereby thwarting global warming. Together with Forschungszentrum Karlsruhe, Lurgi is developing a process for the generation of synthetic fuels from biomass - so-called second generation biofuels. Unlike in the case of the first-generation biofuels, not the plant fruit such as oilseed or grain is used for the production of second generation biofuels but the whole plant. This allows for the processing of straw and energy plants but also of residues from agriculture and forestry which do not compete with the food chain. Also with regard to environmental friendliness these fuels are convincing because they exhibit a clearly higher CO₂ reduction potential. The advantage is that they can be easily adapted to future emission standards and engine technologies and are therefore flexible as to their application. For these fuels, also no limit has been specified for their maximum admixture in view of compatibility with engines or particle filters like in the case of biodiesel.

In the framework of the Achema Congress Lurgi will be represented with an expert lecture on the topic "Gasification of alternative feedstocks for the production of synfuels and 2nd generation biofuels" held by Dr. Armin Günther, on 13 May 2009, 10.30 a.m., room Entete, Hall 4.C.

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Air Liquide is the world leader in gases for industry, health and the environment, and is present in over 75 countries with 43,000 employees. Oxygen, nitrogen, hydrogen and rare gases have been at the core of Air Liquide's activities since its creation in 1902. Using these molecules, Air Liquide continuously reinvents its business, anticipating the needs of current and future markets. The Group innovates to enable progress, to achieve dynamic growth and a consistent performance.

*Air Liquide combines many products and technologies to develop valuable applications and services not only for its customers but also for society. **Innovative technologies** that curb polluting emissions, lower industry's energy use, recover and reuse natural resources or develop the energies of tomorrow, such as hydrogen, biofuels or photovoltaic energy... Oxygen for hospitals, homecare, fighting nosocomial infections...*

***A partner for the long term**, Air Liquide relies on employee commitment, customer trust and shareholder support to pursue its vision of sustainable, competitive growth. The **diversity** of Air Liquide's teams, businesses, markets and geographic presence provides a solid and sustainable base for its development and strengthens its ability to push back its own limits, conquer new territories and build its future.*

***Air Liquide explores the best that air can offer to preserve life, staying true to its sustainable development approach.** In 2008, the Group's revenues amounted to €13.1 billion, of which almost 80% were earned outside France. Air Liquide is listed on the Paris Euronext stock exchange (compartment A) and is a member of the CAC 40 and Dow Jones Euro Stoxx 50 indexes.*

www.airliquide.com