

## Energiewende: More Research Relating to Gas

**KIT and Caterpillar Operate Joint Gas Engine Test Laboratory – Cogeneration Power Plant Used for Research and Sustainable Supply on Campus North of KIT**



Arrival of one of the two gas engines at the GEL test laboratory of KIT. (Photo: S. Göttisheim/KIT)

**Gas-fired power plants are climate-friendly and capable of providing base-load power. They can be used to compensate fluctuations of renewable energy production. As they produce both power and heat and can be run with regenerative fuels, they have major economic and ecological advantages. At their joint Gas Engine Test Laboratory (GEL), KIT and Caterpillar plan to further enhance these advantages. For this, they invested EUR 11.8 million.**

“With its GEL project, KIT establishes itself as a center of research and a company well-equipped for the future,” Dr. Ulrich Breuer, KIT Vice President for Finance and Business Affairs, says. “We can now further develop a technology that is of high importance to the energy transition and, at the same time, make our own infrastructure environmentally compatible and economically efficient.”

“For Germany as a location of industry, it is important that companies and research cooperate closely,” adds Heinrich Baas, Head of



KIT Energy Center: Having future in mind

**Monika Landgraf**  
Chief Press Officer

Kaiserstraße 12  
76131 Karlsruhe, Germany  
Phone: +49 721 608-47414  
Fax: +49 721 608-43658  
Email: [presse@kit.edu](mailto:presse@kit.edu)

**For further information,  
please contact:**

Kosta Schinarakis  
Science Scout  
Phone: +49 721 608 41956  
Fax: +49 721 608 43658  
Email: [schinarakis@kit.edu](mailto:schinarakis@kit.edu)

Aljoscha Kertesz  
Caterpillar Energy Solutions  
Phone: +49 621 384 8748  
Email: [kertesz.a@mwm.net](mailto:kertesz.a@mwm.net)

Engineering, Caterpillar Energy Solutions. “Together, we can develop innovations that will help solve global challenges, such as climate change, and be successful in global competition.” Caterpillar Energy Solutions and KIT both have longstanding experience in the energy sector. Moreover, the MWM Company that has been part of Caterpillar since 2011 was established by automotive pioneer Carl Benz, graduate of the Polytechnical School, a precursory institute of KIT.

The Gas Engine Test Laboratory (GEL) accommodates two large-scale gas engines of 4.5 megawatts electric power each. The engines are 9.3 m long, 2.75 m wide, 3.45 m high, and have a weight of 52 tons. Being a cogeneration power plant, GEL supplies KIT's Campus North with power and heat. Thanks to the efficient technology, KIT saves operation costs in the amount EUR 600,000 every year. Primary energy consumption is reduced by about 12% and 10,000 t less carbon dioxide are emitted annually. KIT's investment in the amount of EUR 4.5 million will be recovered after eight years. KIT, one of the biggest research universities in Europe with more than 9000 employees and about 25,000 students operates laboratories and facilities at several locations. At Campus North the KIT and further institutions annually consume about 120 gigawatt-hours of electric and 80 gigawatt-hours of thermal energy. Within the framework of KIT's Zukunfts-campus (Sustainable Campus) project, sustainability of the campuses is being enhanced by e.g. establishing a solar power storage park, energy-related refurbishment of buildings, or purchase of green electricity and district heating.

The GEL as a research facility represents one of the biggest engine test beds in Germany. Instead of studying the behavior of a single cylinder on the laboratory scale, GEL allows for investigating complete engines. Long-term research collaboration between KIT and Caterpillar Energy Solutions will profit from GEL's integration into operation of a big research center. In the first phase, long-term tests will focus on exhaust gas cleaning, efficiency, engine components, and control technology. Later on, other research projects on alternative fuels, combustion methods, materials, and engine systems may be agreed upon. If necessary, two smaller gas engines of up to 1000 kilowatt power may be connected to the existing infrastructure. Investment costs of both partners of GEL total about EUR 11.8 million.

Gas-fired power plants are considered an important element of the energy transition. Contrary to coal-fired power plants, they can be controlled flexibly and they are capable of providing base-load power contrary to the wind and sun. In the short term, gas-fired power plants can close the gap between supply and demand of electricity until large-scale, sustainable, and economically efficient battery



*Panorama photo of the Gas Engine Test Laboratory. (Photo: M. Kohouk/KIT)*

storage systems will have been developed. Gas engines can be run not only with conventional natural gas, but also with biogas from renewable sources and with regenerative methane. This will ensure wide acceptance of gas-fired power plants within a climate-neutral energy supply system in the long term.

More information on the Zukunftscampus Staff Unit of KIT:

<http://www.zukunftscampus.kit.edu> (in German only)

### **About Caterpillar Energy Solutions**

Its brands MWM and Cat make Caterpillar Energy Solutions stand for highly efficient and environmentally compatible solutions for decentralized energy production. The product portfolio covers gas engines, power plants, and cogeneration plants. At the location of the company office in Mannheim, automotive pioneer Carl Benz established the “Mechanische Werkstätten Mannheim” (MWM, Mannheim Mechanical Workshops) in 1871. Find more information at [www.caterpillar-energy-solutions.de](http://www.caterpillar-energy-solutions.de)

**More about the KIT Energy Center:** <http://www.energy.kit.edu>

**Karlsruhe Institute of Technology (KIT) pools its three core tasks of research, higher education, and innovation in a mission. With about 9,300 employees and 25,000 students, KIT is one of the big institutions of research and higher education in natural sciences and engineering in Europe.**

### **KIT – The Research University in the Helmholtz Association**

*Since 2010, the KIT has been certified as a family-friendly university.*

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