

Flue gas as a raw material – Newly discovered micro-organisms utilise CO₂ particularly well

- § **Interim status after two years of co-operation:
Joint RWE Power/BRAIN project reaches strategically important milestone**
- § **Project scope to be expanded once more**

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Tailor-made specialist micro-organisms directly “feed” on CO₂-containing flue gases from lignite-fired power stations and even grow at temperatures of 60 degrees centigrade. This is the very promising initial result of a research project run in co-operation by RWE Power and BRAIN AG. The electricity producer and the biotechnology company kicked off their co-operation at the Niederaussem power station exactly two years ago. The joint project aims at converting CO₂ into biomass or directly into secondary raw materials with the help of micro-organisms bred to explore innovative CO₂ conversion and synthesis pathways. Ultimately, biomass and industrially usable products emerge such as new bio-materials, bio-plastics and intermediate chemical products. Potential applications are being investigated for these products, e.g. as construction and insulation materials or in the production of fine and speciality chemicals - or possibly even bulk chemicals.

Researchers at BRAIN, a leading white biotechnology company, screened their own BioArchive as well as samples taken straight from the flue of the Niederaussem BoA 1 power station¹ for micro-organisms able to grow in flue gas conditions utilising CO₂. All in all, they took a closer look at more than 3,000 micro-organisms. Only one out of every three qualified for further investigation. In a next step, the scientists identified and characterised the most efficient utilisers of the greenhouse gas. By now, the researchers have selected 29 candidates with particularly convincing growth properties – of which ten were completely unknown or hitherto undescribed as was determined by the genetic characterization of the micro-organisms.

“Our pioneering work in the search for biotechnological CO₂ conversion solutions bears first fruit – we continue to lead the efforts to protect the climate,” underscores Dr Johannes Heithoff, Head of Research and Development at RWE Power. “We are thoroughly convinced by the results delivered by BRAIN’s research team in co-operation with our power station experts. As a consequence, we will expand the research programme.” So far, more than two million Euro have been invested in this research program.

“We have reached a strategic milestone which shows that we are on the right track. The fact that RWE Power intends to expand its research efforts in this area is yet another proof for our successful work,” explains Dr Jürgen Eck, BRAIN’s Chief Scientific Officer. “We seek to make a lasting contribution when it comes to utilising CO₂ in an industrially scalable system. In doing so we harness the wealth of opportunities offered by microbial metabolism pathways and synthetic biology solutions in order to convert CO₂ as efficiently as possible with the help of powerful designer micro-organisms,” says an optimistic Dr Eck.

¹ BoA – lignite-fired power station with optimized equipment technology

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RWE Power intends to go beyond the current project focus as the utility company plans to examine other carbon-rich waste streams generated e.g. by sewage water, the production of food or refinery processes. In this context, RWE wants to establish an Innovation Alliance, bringing together a total of 21 industrial companies, small and medium sized enterprises as well as academic research institutions in order to promote waste stream utilisation projects through intense and synergistic co-operation.

The Coal Innovation Centre located at the Niederaussem power plant site bundles all RWE Power activities on climate-friendly power generation from coal. Aiming at reducing emissions, the company operates Germany's first CO₂ scrubbing plant, a pilot plant in which lignite is pre-dried (fluidized-bed drying with internal waste heat utilization) and a REAplus² high-performance scrubber unit for improved dust and sulphur dioxide capture from flue gas. All of these projects, costing the company more than Euro 100m, are part of what is currently the world's most modern and efficient lignite-fired power station (BoA 1).

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About BRAIN

BRAIN AG is one of Europe's technologically leading industrial white biotechnology companies. In strategic co-operation projects with partners and customers from the chemical and pharmaceutical industries as well as the cosmetics and food industries, BRAIN AG identifies and develops innovative products and solutions by harnessing nature's yet untapped microbial diversity. Active product components are found in BRAIN AG's own "BioArchive", one of the most comprehensive of its kind. Since its foundation in 1993, BRAIN AG has entered into more than 70 strategic collaborations with nearly all the relevant players within the chemical industry, such as BASF, Ciba, Clariant, DSM, Evonik Degussa, Genencor, Henkel, Nutrinova, Sandoz, Bayer Schering, Südzucker and Symrise, to name but a few. Currently, the company employs 99 highly skilled staff.

Please visit www.brain-biotech.de for more technology information and pictures.

About RWE Power

RWE Power is Germany's largest electricity producer. Over 17,000 employees work in the opencast mines and power plants, processing plants and research projects, training centres and administrative offices. With a power plant capacity of 33,000plus megawatts, the company contributes to RWE's broad energy mix of lignite, hard coal, nuclear power, gas and renewable energies. RWE Power invests billions in the construction of new, low-polluting power plants and in the development of even more efficient, environmentally benign technologies for power generation in the future.

For more information and pictures of the Coal Innovation Centre please visit www.rwe.com.

² REA – flue-gas desulphurisation unit