

# **Electrochaea Presskit**

**5/2018**

# Electrochaea Fact Sheet

## Name & Address

Electrochaea GmbH  
Simmelweisstraße 3, 82152 Planegg/Munich  
Germany  
[www.electrochaea.com](http://www.electrochaea.com)

## Industry

Power-to-gas, energy storage, CO<sub>2</sub> recycling, energy efficiency, renewable energy, biotechnology, cleantech

## Technology

Electrochaea provides a technology based on biological methanation that makes it possible to store renewable energies and recycles CO<sub>2</sub> in a cost-effective way. This technology eliminates the temporal link between energy supply and demand, allowing efficient energy and CO<sub>2</sub> storage when renewable power is available thereby stabilizing the market for electric power. The more unpredictable energy generation becomes, the more relevant this technology will be.

## How It Works

- Step 1: Green electricity is used to generate hydrogen with the help of electrolysis.
- Step 2: Hydrogen and CO<sub>2</sub> are being fed into a specifically designed bioreactor where large and very stable cultures of archaea (single-celled microorganisms) convert both hydrogen and CO<sub>2</sub> into high-quality biomethane.
- Step 3: The biomethane can be used on the spot or injected into the existing natural-gas network, where it can be stored and used on demand anytime, anywhere.

## Unique Features

- Electrochaea is the first company to deploy and successfully operate a commercial 1 MW plant using biological-methanation-based power-to-gas technology
- Unlike previous thermochemical methanation methods, Electrochaea relies on specially developed microorganisms (archaea) which produce biomethane efficiently, quickly and with a high degree of dependability
- Electrochaea has the world's most efficient pure strain of archaea; it is protected by patents in all major markets
- Electrochaea is betting on the large-scale use of biological methanation to allow grid scale energy and carbon storage ("go big or go home principle")

- The gas network's existing storage capacity is already ample for future energy-storage needs; new investments in storage infrastructure are therefore not necessary
- The process developed by Electrochaea can store large quantities of renewable electricity over the long term

## Customers

- Plant operators who want to reduce CO<sub>2</sub> emissions, for example wastewater treatment plants, biogas plants, cement plants and power plants in industry and energy generation
- Gas network operators who want to ensure the future viability of their networks by transporting "green" gas
- Municipal utilities and energy providers
- Power grid operators who want to avoid capital expenditures for network expansion
- Producers and users of CO<sub>2</sub>-neutral fuels
- Manufacturers of carbon-capture systems

## Business Model

- Income is generated from technology development services, from project management of methanation plant design and realization and from providing services relating to biocatalysts
- Over the medium and long term, sales revenues will be generated from licenses on the sale of gas, heat and system services by plant operators

## Market & Competition

- Increasingly, the market for energy storage systems and from linking electricity and the gas industry will be determined by large-scale plants
- The key markets are countries and regions with a high percentage of wind and solar energy production and/or regulation of CO<sub>2</sub> emissions
- The demand for biogas and renewable gas is growing sharply in Germany and in the EU
- When regulatory changes are adopted that unmask the pricing signal for low cost renewable power, the energy and CO<sub>2</sub> storage market can be in the billions
- Competing technologies: batteries (comparatively resource-intensive, charge-discharge sequence more inflexible, limited energy-storage capacity), hydrogen (significantly more expensive to store, admixture with natural gas limited, hydrogen infrastructure not available), methanisation via chemical catalysis (comparatively far more expensive and more sensitive in terms of operations management and impurities in the reactant gas)

## Milestones

**2006:** Basic research and "proof of concept": Prof. Laurens Mets and his colleagues at the University of Chicago recognize the potential of archaea and work hard to optimize them.

**2011-2014:** First major laboratory-scale field tests with raw biogas in St. Louis, USA, and on pre-commercial scale (5000L bioreactor) in Foulum, Denmark.

**2014:** Electrochaea GmbH established as part of Series A financing by Munich Venture Partners, b-to-v, Sirius Venture Partners, KfW, Energie 360° and Caliza Holding.

**2016:** The team grows/go-to-market: To establish the company's market position, an international team of 20 engineers and scientists was formed around Mich Hein (CEO), Doris Hafenbradl (CTO) and Markus Forstmeier (VP Business Development). Commissioning of the world's first 1 MW plant (BioCat Project). Joint venture with the MVM Group in Hungary.

**2017:** Commissioning of the BioCat plants in Solothurn, Switzerland and Golden, CO, USA, planned

## Reference Facilities & Projects

- Copenhagen (DK); Solothurn (CH) from 2018
- Power-to-Gas Hungary, cooperation with the Hungarian utility company MVM, BioCat Project, STORE&GO, POWERSTEP, ORBIT

## Memberships

BVES, IBB Netzwerk, UseCO<sub>2</sub>, The Danish Partnership for Hydrogen and Fuel Cells

## Partners

SoCalGas, NREL; Partners in the BioCat Project: Audi, BIOFOS, Hydrogenics, Energinet.dk, HMN Gashandel, Insero, Neas Energy; partners in other projects: MVM Group, Regio Energie Solothurn

## Investors

- Munich Venture Partners, b-to-v, Sirius Venture Partners, KfW, Energie 360°, Caliza Holding, Focus First Holdings
- In November 2014, the company closed Series A financing for a figure in the EUR mid-single-digit millions range

## Team & Management

- 20 employees at the Munich-Planegg headquarters, 3 employees at the Avedore Copenhagen site
- Mich Hein (CEO, MD), Doris Hafenbradl (CTO, MD), Francesco di Bari (CFO, Director of Business Strategy)

## Press Contacts

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## Management Team Résumés

### Mich Hein, PhD (CTO, Managing Director)



As an inventor, entrepreneur and corporate executive, Mich has 35 years experience in technology development and commercialization. In addition to his role at Electrochaea, Mich is a Partner at Focus First and a Managing Partner of the Nidus Partners (St Louis, MO). Prior to starting Focus First, Mich served as Executive in Residence at the University of Chicago's Office of Technology and Intellectual Property, and as Chief of Staff at the Illinois Medical District where he managed the Chicago Technology Park. He started his career as a research chemist with Monsanto and then PPG Industries before joining the faculty at The Scripps Research Institute in La Jolla, CA. Mich's investigations into mucosal immunology and plant-based proteins led him to found Epicyte Pharmaceutical, Inc which was acquired by Biolex, Inc in 2004. His entrepreneurial career also included positions as CEO at Chromatin, Inc and as founder of Heliose. Mich holds a BS degree from the Honors Tutorial College of Ohio University and both an MSc and PhD in Plant Physiology from the University of Minnesota.

### Doris Hafenbradl, PhD (CFO, Managing Director)



Doris has enjoyed a successful career as scientist and corporate executive in the biotech and pharma industry in the US and Europe. She joined Electrochaea from Axxam, a leading provider of integrated discovery services for the life sciences industry, where she was responsible for the company's discovery services activities. Prior to Axxam, she held several senior management roles in international, industry-leading pharmaceutical firms including BioFocus, Proteros, GPC Biotech, Axxima Pharmaceuticals, Genomics Institute of the Novartis Research Foundation, and Diversa. Doris dedicated her doctoral research in microbiology to the study of hyperthermophilic archaea in the laboratory of Prof. Dr. Karl Stetter at the Archaea Centre at the University of Regensburg.

### **Francesco di Bari, PhD (CFO, Director of Business Strategy)**



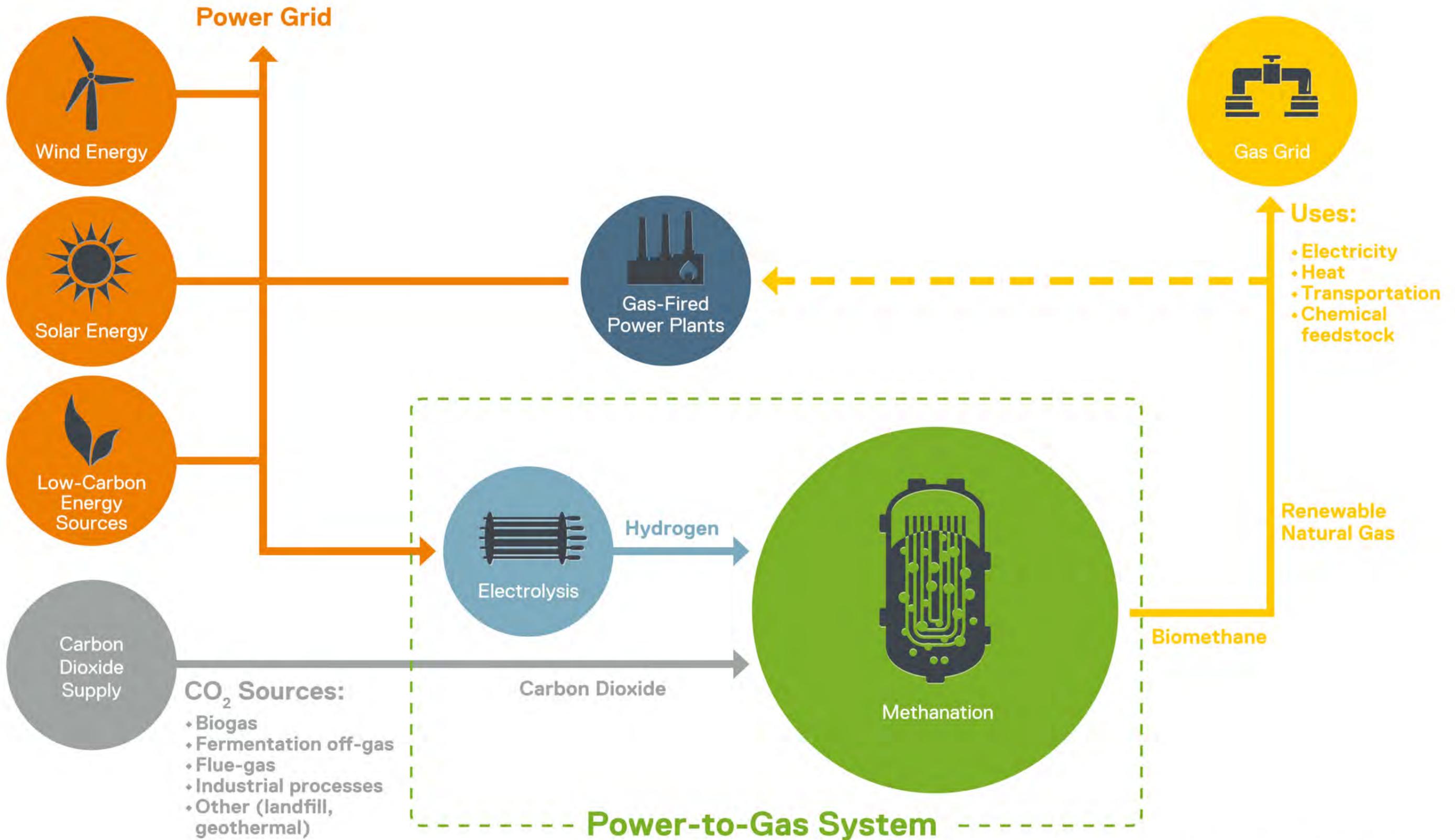
As an entrepreneurial international professional and corporate executive, Francesco has 24 years of experience in finance, business development /M&A and change management. Prior to starting with Electrochaea, Francesco helped start ups raising capital and building their operation in the space of robotics, artificial intelligence and software. Francesco worked as CFO, Managing Director, Head of M&A and COO in multinational companies such as Daimler-Benz, Deutsche Telekom, Infineon Technologies, SYMG and Solera Inc. building up and establishing businesses in Europe, Asia and Latin America. Francesco holds a Dottore in Economia Aziendale degree from the Università Commerciale L. Bocconi Milan, and a CEMS Master from the Wirtschaftsuniversität in Vienna.

### **Lutz Elger (Financial Consultant)**



After his apprenticeship in banking, Lutz studied Business Administration at Ruhr-Universität Bochum (Dipl. oec.). He has more than 20 years of experience as a permanent employee in different commercial positions in the service and production sector and worked as a CFO/Head of Finance Department at a German media company and a German greentech start-up. Since 4 years, Lutz is acting as an interim CFO for various clients, especially start-up companies where he sets up Administration, HR, Accounting and Controlling departments and processes.

# Power-to-Gas Energy Storage



# Electrochaea's BioCat Methanation System

- 1 Electrolyzer
- 2 Pre-Processing
- 3 BioCat Reactor
- 4 Post-Processing

