Electrochaea Presskit

9/2017

Electrochaea fact sheet

Name and address

Electrochaea GmbH
Semmelweisstrasse 3
82152 Planegg/Munich
Germany

Website

www.electrochaea.com

Industry

Clean technology, energy efficiency, renewable energy, power-to-gas, energy storage, CO_2 recycling

Technology

Electrochaea provides a technology based on biological methanation that makes it possible to store renewal energies and recycles CO_2 in a cost-effective way. This technology eliminates the temporal link between energy supply and demand, allowing efficient energy and CO_2 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

- Power-to-gas principle: Biocatalysis using large very stable cultures of archaea (single-celled microorganisms).
- Excess power from renewable energy sources is used to generate hydrogen with the help of electrolysis. The archaea are fed the hydrogen and added CO_2, which they convert into high-quality biomethane. Both the archaea and the bioreactor system have been optimized and patented for this special application
- 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 attributes

- 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

Target groups and customers

- Plant operators who want to reduce CO_2 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_2-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 and 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_2 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_2 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.

2018: Commissioning of the BioCat plants in Solothurn, Switzerland and Golden, CO, USA, planned

Locations & reference facilities	Munich-Planegg, Germany; Copenhagen, Denmark; Solothurn, Switzerland from 2018
Projects	Power-to-Gas Hungary, cooperation with the Hungarian utility company MVM, MHPSE, BioCat Project, STORE&Go, POWERSTEP
Memberships	BVES, Dena, IBB Netzwerk
Partners	Audi, BIOFOS, Hydrogenics, Energinet.dk, HMN Gashandel, Insero, Neas Energy, MVM Group, MHPSE
Investors	• Munich Venture Partners, b-to-v, Sirius Venture Partners, KfW, Energie 360°, Caliza Holding • In November 2014, the company concluded Series A financing for a figure in the EUR mid-single-digit millions range.
Team	17 employees at the Munich-Planegg headquarters 3 employees at the Avedore Copenhagen site
Management	Mich Hein (CEO), Doris Hafenbradl (CTO), Markus Forstmeier (VP Business Development)

Press contacts

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Management Team Résumés

Mich Hein, PhD - Chief Executive Officer

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 - Chief Technology Officer

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 mircobiology to the study of hyperthermophilic archaea in the laboratory of Prof. Dr. Karl Stetter at the Archaea Centre at the University of Regensburg.

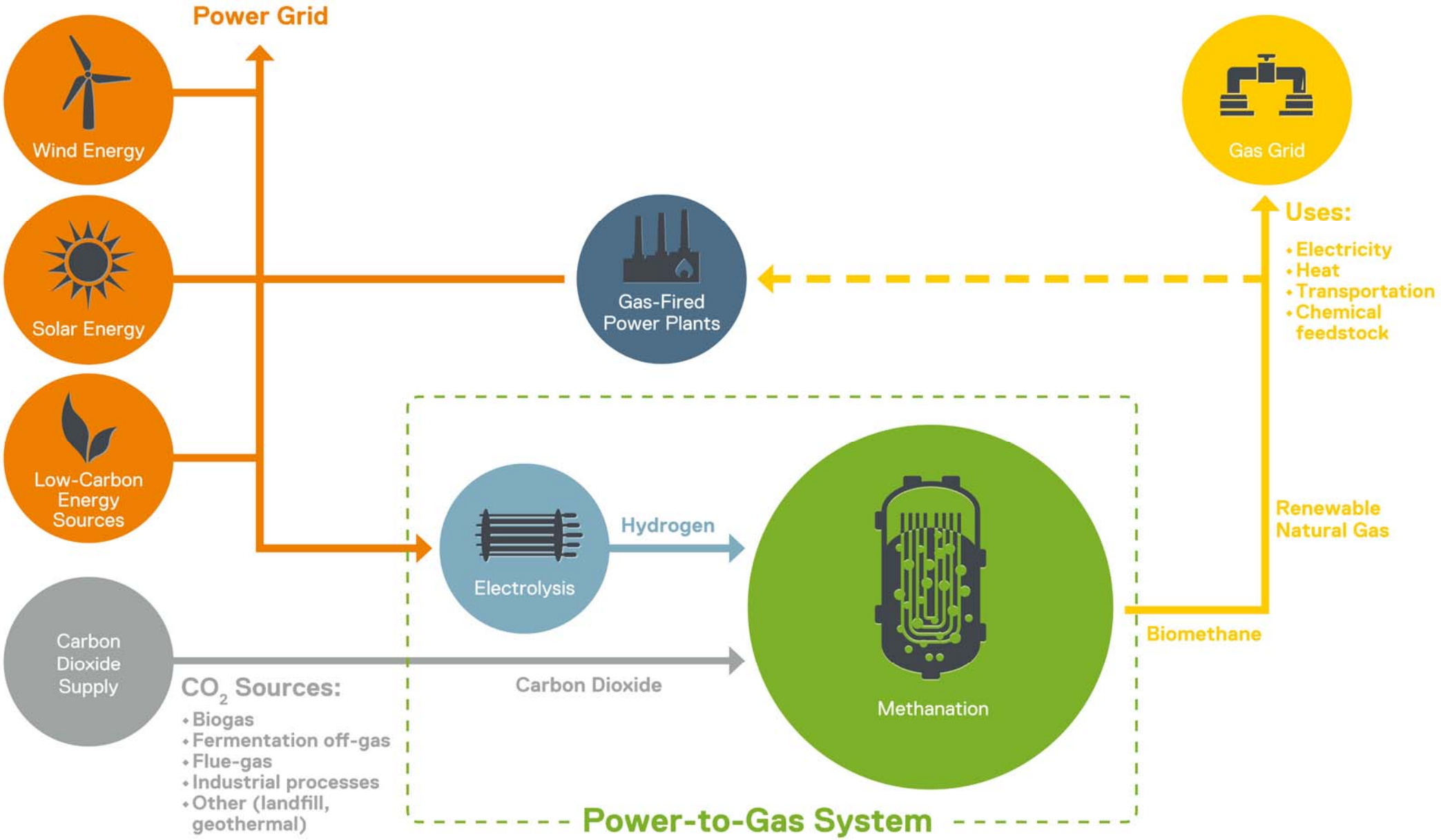
Markus Forstmeier, PhD – VP Business Development

Markus has gained broad experience in the renewable energy and water treatment space for more than 15 years. Building on a strong technology background from R&D he progressed into strategic and operational management positions. Prior to joining Electrochaea, Markus was Head of New Business Development at SGL Group, a leading producer of carbon materials, with a focus on market introduction for energy storage materials including the responsibility for an internal start-up producing full cell components. He served as Director, Corporate Strategy at Siemens AG and as Lead Engineer at General Electric Global Research, both with a focus on renewable energy. Markus holds a MBA degree from Augsburg University & Katz School of Business, Pittsburgh and both a Diploma in Environmental Engineering and a PhD in Process Engineering from Technical University of Berlin.

Lutz Elger - Chief Financial Officer

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



Graphic adapted from Sterner, Specht 2008

Electrochaea‘s BioCat Methanation System