ENERGIE PARK MAINZ

Press release

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Green light for green hydrogen at Energiepark Mainz

Festive kick-off for energy storage project in collaboration between Stadtwerke Mainz, Linde, Siemens and the RheinMain University of Applied Sciences

MAINZ. With a symbolic push of the facility's start button, the world's largest green hydrogen plant was inaugurated in Mainz today. Thereby a lighthouse project in Germany's journey towards renewable energies was officially kicked off after a construction period of almost one year. Malu Dreyer, minister-president of the state of Rhineland-Palatinate, Eveline Lemke, Minister of Energy and Michael Ebling, mayor of the city of Mainz, were present at the official opening ceremony. The CEO of The Linde Group, Dr Wolfgang Büchele, together with Siemens board member Prof. Siegfried Russwurm, members of the board of Stadtwerke Mainz AG, Detlev Höhne and Dr Tobias Brosze, and Prof. Detlev Reymann, president of the RheinMain University of Applied Sciences, were on hand to officially start operations at Energiepark Mainz. The energy park is the result of a joint collaboration between these partners and has been designed to produce hydrogen using electricity from environmentally sound sources of energy such as neighbouring wind parks. Around EUR 17 million has been channelled into the project, which is also being funded by Germany's Federal Ministry for Economic Affairs and Energy within the framework of its "Förderinitiative Energiespeicher" (Energy Storage Funding) initiative.

At the festive ceremony, the partner figureheads and guests from Germany's national, state and local political circles all agreed that the energy park and its underlying technical concept could become a key milestone in Germany's transition to renewable energies. Already today, wind and solar power stations have to be switched off at certain times if they produce too much energy for the grid. This problem is set to increase over the coming years as the renewable energy network expands. Energiepark Mainz can use this "surplus" electricity to break water down into oxygen and hydrogen. The resulting environmentally sound hydrogen can be stored and then used at a later date when demand is higher. This process will enable renewable energies to be harnessed more flexibly to dynamically meet fluctuations in demand.

"Fuel-cell drive technology has advanced greatly and is now being launched to the market," explains Dr Wolfgang Büchele. "If this technology is adopted on a wide enough scale, it has the potential to significantly reduce traffic-related environmental pollution. Today, most of the hydrogen that Linde

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supplies to filling stations is already ‘green’. Energiepark Mainz has the capacity to produce enough hydrogen for around 2,000 fuel-cell cars”.

In the project, Linde is responsible for purifying, compressing, storing and distributing the hydrogen. The company’s innovative ionic compressor technology ensures that the compression process is extremely energy efficient, giving the plant a high degree of operational flexibility. The hydrogen produced in Mainz-Hechtsheim will be stored on site and partly loaded into tankers to supply hydrogen fuelling stations. Some of the hydrogen will also be fed into the natural gas grid for heating or power generation.

Siemens delivered the park's hydrogen electrolysis system. This highly dynamic, PEM-based high-pressure electrolysis system is a technological highlight of the Mainz plant, clearly setting it apart from other, significantly smaller pilot projects. With a peak performance of six megawatts, it is the largest system of this kind in the world. The energy park therefore has enough capacity to prevent bottlenecks in the local distribution grid and to stabilise the power supply of smaller wind parks.

"The energy systems of tomorrow will be much more complex, integrated and flexible than they are today. The PEM electrolyser is an important building block in the new energy mix," elaborates Prof. Siegfried Russwurm at the opening. "Hydrogen electrolysis is a great way to feed renewable energies in particular more efficiently into power grids. It can be used to dynamically capture, store and harness energy that is not currently needed. We have developed an innovative system at Energiepark Mainz that can help turn a vision into an industrial-scale reality."

The energy park is directly connected to the medium-voltage grid of the Stadtwerke Mainz Netze GmbH utility company. It is also linked to four neighbouring wind parks that belong to the Stadtwerke group. "We have many years of experience as a grid operator. Across the Group, we are aware of the benefits – but also the drawbacks - of renewable energies. We know just how important it is to find further storage technologies for electricity," add SWM board members Detlev Höhne and Dr Tobias Brosze, underscoring the importance of the energy park. "The ability to store surplus electrical energy decentrally during peak periods of wind power can help integrate renewable energies into the grid and keep the grid stable". The RheinMain University of Applied Sciences has been working in this area for many years and is providing scientific support to the research project, which is set to run for four years. The findings will be incorporated and evaluated in a PhD thesis. "At Energiepark Mainz, we can experiment with converting wind energy into hydrogen on an industrial scale and find out which operational concepts are the most viable. Being able to cost-effectively and sustainably harness energy from fluctuating sources such as wind and solar power is an important long-term goal,” enthuses Prof. Birgit Scheppat, head of the university’s hydrogen lab. “We expect this initiative to deliver exciting, ground-breaking insights that will help us move toward this key goal”.

Minister-president Malu Dreyer praised the energy storage project, underscoring its pioneering status not just for the city of Mainz but for the entire state of Rhineland-Palatinate. “The transition to renewable energies is a major undertaking for the state government – it will extend over generations and change our society and economy for the long-term. Using environmentally friendly

energy to produce hydrogen is an important step on the road to climate protection," emphasises Dreyer.

At the ceremony, Mayor Michael Ebling expressed his delight that Mainz was now home to an innovative research project which had garnered international attention even before it went on stream. "Both the city of Mainz and Stadtwerke Mainz have done a great deal to drive the transition to renewable energies and increase the use of renewables in recent years," states Ebling, referring to an agreement stipulating that the city of Mainz will source 30 percent of its power from renewable energies by 2020. "It's not just a question of building and operating more wind parks and solar power plants. We also need to effectively harness this energy," continues Ebling. "The energy park is an important step here as it enables us to store renewable energy."

For further information, go to: www.energiepark-mainz.de

Project partners

Stadtwerke Mainz AG is one of the leading municipal utility companies in Germany. Its sole shareholder is the city of Mainz. The SWM Group provides secure supplies of energy (electricity, gas, heat), drinking water and mobility services to the city of Mainz and the surrounding region. The company has been successfully pursing a sustainable transition to renewable energies for a number of years now.

www.stadtwerke-mainz.de

The Linde Group is a world-leading gases and engineering company with approximately 65,500 employees working in more than 100 countries worldwide. Under the "Clean Technology by Linde" banner, the company offers a broad portfolio of products and technologies that help make renewable energies economically viable, conserve fossil resources and reduce CO_2 emissions. The Group's offering here ranges from specialty gases for solar cell production through industrial-scale CO_2 separation and recycling technologies to alternative fuels and energy carriers such as liquefied natural gas (LNG) and hydrogen.

www.linde.com/cleantechnology

Siemens AG (Berlin and Munich) is a leading international technology group. For more than 165 years, Siemens has stood for technological excellence, innovation, quality, reliability and international reach. The company operates in over 200 countries, focusing primarily on the fields of electrification, automation and digitisation. Siemens is one of the largest manufacturers of energy- and fuel-efficient technologies worldwide. It is number one in offshore wind construction and is also a leading provider of gas and steam turbines for energy generation and transmission solutions. Siemens is a pioneer in the development of infrastructure solutions as well as automation, drive and

software solutions for the industrial sector. The Group is also a leading provider of medical imaging equipment such as CMT and MRI systems. In addition, Siemens develops solutions in the field of lab diagnostics and clinical IT. The Group's hydrogen electrolysis system is based on proton exchange membrane (PEM) technology developed by its Process Industries and Drives division.

www.siemens.de/hydrogen-electrolyzer

The RheinMain University is a leading institution in the field of applied sciences and one of the largest universities of its kind. It is renowned for its cutting-edge syllabus and application-oriented research. The university's engineering faculty is based in the German town of Rüsselsheim. With 3,000 students, it is the largest faculty in the university. It has been researching hydrogen and fuel-cell technology for many years now and is involved in several key projects and networks of excellence.

www.hs-rm.de

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