Nuon turns Magnum-plant into a sustainable super battery

ISPT-project Power to Ammonia enables Nuon to store energy in ammonia

Nuon takes a new direction with her Magnum-plant in Eemshaven. Nuon has commenced research within the Power to Ammonia project of ISPT to find out how the plant can be made to operate CO2 emission free in the future.

Gas-fired power plants offer the most efficient and flexible back-up capacity in times when the supply of wind and solar energy is low, yet these plants are seeing little use. Despite this Nuon sees a future for these power plants. Currently it is impossible to store large quantities of wind and solar power. This means that this sustainable energy cannot be given any use when there is a large supply of wind and solar energy. Together with the other partners in the Power to Ammonia project, Nuon is researching what possibilities there are to convert the oversupply of sustainable energy into ammonia. The ammonia produced using sustainable energy can later be used as a fuel in the power plant which emits no CO2.

Recycling the wind
Alexander van Ofwegen, director of Nuon Heat, elaborates: “This idea consists of three steps. The first step is to convert the electricity garnered from wind power into liquid ammonia. This involves a chemical process wherein hydrogen and nitrogen are bound together to create ammonia. Ammonia is then stored in large tanks for as long as is needed. In this way there will always be a sizeable fuel-supply available to be used in times of low energy supply from sustainable energy sources. This is possible due to the fact that ammonia can be used as a fuel that produces no CO2. An additional strong advantage of this concept is the fact it can be used all over the world to convert sustainable energy to ammonia. This concept comes down to recycling the energy from the wind and the sun – wind and solar energy is used to produce ammonia and turn a gas-fired power plant into a super battery!”

Magnum-plant takes the lead in the energy transition
The Nuon Magnum-plant in Eemshaven was officially opened in 2013. The original concept revolved around setting up a power plant that would be able to run on different kinds of fuel, like biomass, gas and coal. In consultation with environmental organizations it was decided in 2011 that the Magnum-plant would remain a gas-fired power plant until 2020. Now, due to the research within Power to Ammonia, Nuon has decided to definitively renounce the option to use coal in the Magnum-plant in the future. Instead the focus will shift towards finding a CO2-emission free future for Magnum.
Research TU Delft and Nuon
Although TU Delft and Nuon are still sitting at the drawing board and a lot of additional research is needed, both parties agree that storing energy in ammonia is a promising technique that after the necessary research and with additional funding can be made applicable on a large scale in about ten years. Of course both safety and environmental considerations are a major priority during this research.

Alexander van Ofwegen: “Ammonia has already been used in many different ways for over an hundred years – it is the raw material for manure, but it also sees extensive use in large scale cooling installations such as seen in ice-rinks for example. Additionally the Netherlands also has quite a lot of experience with the storage of ammonia. But of course, just as with storing any concentrated chemical product, taking the necessary safety precautions is essential. We hope to be able to do a demonstration on a relevant scale within five years.”

Power to Ammonia
The research of Nuon and TU Delft is a part of the project ‘Power to Ammonia’, wherein the Institute for Sustainable Process Technology (ISPT) has brought together many different parties to perform research and share knowledge. Power to Ammonia is a partnership of ISPT, Stedin Infradiensten, Nion, ECN, Technische Universiteit Delft, Universiteit Twente, Proton Ventures, OCI Nitrogen, CE Delft and AkzoNobel.

For more information on Power to Ammonia, click here.

About Nuon
Nuon is an energy enterprise whose 4.400 employees service up to 2 million consumers, companies and organizations in the Netherlands. A dependable, affordable and as sustainable as possible energy supply is at the core of Nuon. Nuon produces and delivers gas, electricity, energy related products, heat and cold and helps her costumers to reduce their energy use. Nuon in the Netherlands has over 2000 kilometers of heat piping, 251 wind mills, 2 hydropower plants, 1 biomass power plant, 9 high-yield gas-fired power plants and 1 coal-fired plant. Nuon is a part of Vattenfall.