KNIGHTS OF THE FUTURE: ENERGY EDITION

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THE CHALLENGES

1. How can we continue the growth of solar energy deployment in The Netherlands?

2. How can we reduce the total energy consumption in the IT sector, despite the exponential growth of data?

3. If large energy companies open-source their data how can that be used for the energy transition?

4. How can we meet the high-temperature heat demand of the industry without CO2 emissions?

5. Energy for all as a purpose: How could changing the narrative influence the energy system and possibly make it future proof?

6. What do we need to create a competitive ‘smart industry’ with circular resources that leads to low CO2 emissions?

7. How can we ensure sufficient - sustainably generated - energy in periods of little wind and little sun?

8. How will we ensure that future generations have the technical expertise to install their own energy connection?

9. How do we incentivise pension funds to invest in the energy transition?

10. What will a global transport system for sustainable energy look like, and how can we shape it?

1. How can we continue the growth of solar energy deployment in The Netherlands?

The Netherlands is a densely populated country and most areas are used intensively. Therefore, realization of the full potential of solar energy depends not only on further reduction of costs, but also on combining functions and integration, on attractive aesthetics and on availability of easy-to-use solutions for a wide variety of applications. In other words, on moving away from the one-size-fits-all approach that has been very successful in recent decades, but is now getting in the way of a rapid further roll-out of solar energy.

TNO innovation for life

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2. How can we reduce the total energy consumption in the IT sector, despite the exponential growth of data?

The need for ICT services shows exponential growth, 40% on a yearly basis in The Netherlands, resulting in growing energy consumption of the sector by its infrastructure and data centres. How can we further increase the energy efficiency and lower the resources impact and will that be enough?

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3. If large energy companies open-source their data how can that be used for the energy transition?

More and more generated energy is dependent on the weather (sun and wind). Access to large open source data sets can help increase adoption of alternate energy solutions. Open data helps innovation by giving it all the information needed to create viable solutions. Therefore all energy companies should make their data available to third parties to assist with the energy transition. The question is what can that data be used for and how do we incentivise energy companies to share their data?

gasunie
crossing borders in energy

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4. How can we meet the high-temperature heat demand of the industry without CO2 emissions?

This heat demand is currently being met through the use of natural gas and coal. Where the electricity demand can be met by sustainable resources, this is much more difficult for the industry. Especially in cases where the requested temperatures are high (higher than about 200 degrees). How can we make energy production co2 neutral?

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5. Energy for all as a purpose: How could changing the narrative influence the energy system and possibly make it future proof?

Energy is one of our most vital needs. What could be possible if we rethink and re-engineer the current complex system aiming at a resilient sustainable solution? Could the customer-need to pay less for energy be used to drive a transition towards a beneficial antifragile energy eco-system?

Our current energy system is a system of competition. By paying for units of energy consumers enable the battles on energy markets and energy production by commercial parties. This leads to a system where energy is transported nationally and internationally and possible 2nd competitive market around flexibility could be at hand. Yet, in nature competition is the form of symbiosis where both parties loose.

What if- we change the rules of the game: Energy consumers do not pay for the units of energy they consume. They only pay if they force the system to operate beyond a certain threshold (to transport, store, produce or convert energy). This systems starts with the free, raw and abundant energy that nature delivers on your roof.

In this system Consumers and system operators share the same objective. By cooperating and co-creating the evolvement of this system, the system would get more diverse, resilient and antifragile, extending the threshold at which customers need to pay for energy. At this table we are going to explore this new line of thinking, its benefits and pitfalls, including topics like commonization, power of digital twins, lessons to be learned from biomimicry and ecosystems that evolve towards abundance.

ENEXIS NETBEHEER

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6. What do we need to create a competitive ‘smart industry’ with circular resources that leads to low CO2 emissions?

The industry faces major challenges: CO2 has to be reduced, resource streams and raw materials have to become circular and competition is becoming more and more disruptive due to smart industry. But these challenges are related: Is the combination of a smart industry with circular raw materials to only way to achieve low CO2 emissions and be competitive?

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7. How can we ensure sufficient - sustainably generated - energy in periods of little wind and little sun?

In order to keep the energy system as reliable as it is right now, large backup capacity based on gas-fired base-load capacity, must remain in the reserve. This means that also in periods of cold weather , with little sun and little wind - and a lot of energy demand, everyone should get enough energy. Possible solutions to this problem, such as keeping gas-fired power stations available, conversion of sustainable power to hydrogen or using battery technology for long term storage are either very expensive or not (yet) available. So, how should we keep the sustainable energy system running?

GasTerra

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8. How will we ensure that future generations have the technical expertise to install their own energy connection?

Consumers are increasingly generating their own electricity and there is an increase in electric cars and therefore in charging points. This means a significant increase in work for qualified personnel. In addition the aging population will lead to an outflow of a relatively large group of employees. Increasing scarcity in technicians and data analysts forces us to deal creatively with this issue. Can we work differently? Will digitalization provide solutions? Or are there other solutions that can be tapped to have quick access to the energy system (plug & play) and to realize the connection of the future?

STEDIN.NET

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9. How do we incentivise pension funds to invest in the energy transition?

The people who trust their pension savings to the pension funds demand a conservative attitude, while society asks for more investments in a sustainable future. The "traditional" model for pension funds is based on investing in a proven technology in a mature market and with a guaranteed ROI. The chances of being at the basis of a new sustainable economic model and social pressure require a reorientation on how we assess and finance these opportunities (companies, projects, programs). How can we align the interests of our pension savers with the interest of society?

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10. What will a global transport system for sustainable energy look like, and how can we shape it?

In the future, just like the current situation, there will probably be regions that need to import part of their (sustainable) energy needs from other regions that can produce and export (sustainable) energy surpluses. Will the current logistics of the energy system then change? Think of transport, storage and distribution to the end user. And what disruptive innovations are needed to make this a success? Or can the energy carrier - now mostly gas or liquid - be changed in such a way that it can be fitted into the existing logistics infrastructures?
And which disruptive innovations are needed in that case? Or is something completely different going to happen because global relations (Africa) will change significantly as a result of the transition to sustainable energy? And what will this world be like?

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