▲ *Roderik van Grieken, Founder and Director of the Nederlands Debat Instituut; Roel Croes, Co-founder GreenICT Foundation; René Steenvoorden, CIO Rabobank; Frits Verheij, Director Smart Energy, DNV KEMA; Sylvia Roelofs, CEO ICT~Office; and Mark Dierikx, Director General Energy, Telecom and Competition at the Ministry of Economic Affairs, Agriculture and Innovation.*

▲ *Roel Croes, "An Innovative Truth" organizer, Co-founder GreenICT Foundation and Peter Molengraaf CEO Alliander N.V.*

◀ *Mark Dierikx, Director General Energy, Telecom and Competition at the Ministry of Economic Affairs, Agriculture and Innovation and Sylvia Roelofs, CEO ICT~Office.*

An Innovative Truth:
Multidisciplinary cooperation for sustainable innovation

On June 20th, the fourth edition of "An Innovative Truth - Conference on Sustainable ICT & Energy" took place. From the very beginning, cooperation of science, government, ICT Industry/business (supply and demand) and the energy world forms a central theme of the conferences. Transferring knowledge in a durable (and sustainable) way is another central theme. In order to manage environmental and energy issues, and, also to play a lasting role in a highly dynamic global economy, national cooperation of science, business and government, in the Netherlands, is crucial.

Entering into alliances is vital if one intends to be a player in the global market. At the international level, partnerships such as the United Nations and the European Union are inevitable. In the global game, unity is strength, especially for smaller countries like the Netherlands. It is noted that cooperation can only be effective if it is based on the participants' consensus, all parties involved keep themselves to the agreements and are willing to accept common interest (also) as own interest. Creating coalitions can contribute to solutions to seemingly conflicting trends. The global energy market and decentralized energy generation are good examples of this. On the one hand, growing globalization calls for cooperation at the (inter) national level. On the other hand, there is a trend of decentralization towards a local level.

At this time, a considerable number of regional initiatives are unfolded in the Netherlands. This is an excellent development, especially if this concerns practical projects that are application focussed and commercially interesting. Given the scale, for the Netherlands is a small country, one needs to take care to avoid fragmentation of national funds. Viewed in this light, more fundamental scientific research may be served best by scientific cooperation at national level because of limited available resources, both financial and concerning the number of scientists. Joining forces at national level is highly recommendable, if the Netherlands wants to maintain itself as a global player.

For a society that increasingly depends on technology, it is essential that a substantial part of the population has a technical (so-called beta) education and/or background. Therefore, the "An Innovative Truth" conferences promote the visibility of scientific research and innovation. Ph.D. and master's students are hereby consciously involved. At the conferences, they can discuss their Ph.D. research and come into contact with potential employers. It is important to continuously involve younger generations. For a lasting contribution to Dutch innovation, research and economic development, especially European and, more specific, Dutch youth will probably be the most promising.

Besides this, renewable energy sources will become increasingly common and will claim their place. Because of their relatively unpredictable supply characteristics, adding intelligence to energy grids is inevitable. We don't know what the future will look like. What we do know is that the network landscape will significantly change, with challenging implications in, among others, the technical, legal and societal fields. The consequences of the change, which aren't necessarily positive for all disciplines, simultaneously, will certainly provide scientifically and commercially interesting possibilities.

In order to cope with the changes and to realize the necessary technological and social breakthroughs, a common focus and a durable "sustainable mind-set" should be commonplace. The visibility of your possibilities for other stakeholders will play a major role. Therefore, only cooperation can be the solution. ■

Introduction by Roel Croes Co-founder GreenICT Foundation
Photos by Mark van den Brink for GreenICT Foundation

Frits Verheij

Director Smart Energy, DNV KEMA Energy & Sustainability

"The trends I see in the energy sector seem to contradict each other. Locally, smart grids are coming up: we will have solar energy systems, smart lighting, washing machines and dishwashers in a neighborhood communicating with each other to use energy in a cheap and efficient manner. Decentralization is a movement starting at the bottom and working its way to the top. You can see this in Germany, Denmark and the Netherlands: local businesses working on their level in the energy sector.

Besides local we will expand globally. Nations will strengthen each other. South Europe will deliver more solar energy while Northern Europe will provide wind energy. The transition to renewable sources asks for cooperation. The dialog in Europe will have to grow and even better policies about the European network and the energy traffic have to come. The challenge is to fit this large scale movement within the small local initiatives and vice versa.

How are we going to make sure that the end market, you and me, will follow the change that we have to make? I think that fossil fuels will disappear in the end. It will take a few decades, and I am sure that some might disagree with me, but the trend is that, for example, less oil is being used for the energy supply. Oil is becoming increasingly difficult to produce and the costs are rising. Producers are investing more and more in gas instead of coals. We don't put it aside yet, but we are investing more and more in other energy sources, especially in renewables."

> "The challenge is to fit this large scale movement within the small local initiatives and vice versa."

Rens Knegt

General Director, Netbeheer Nederland

"The most important trend I see is the decentralized insertion of gas and electricity. A logical consequence of this is that we, as network companies and operators have to make sure that the grids can handle this from a technical point of view. Electricity has to flow back and forth. Sometimes, I might have too much or too little power from my solar panels. The net has to facilitate and even store electricity for me.

In the Netherlands there are over 400.000 cables for gas and electricity. That is ten times around the globe. New cables are smart, but it will take decades to replace all the old cables with ones with ICT functions. In Europe we strive towards an integrated energy market. Citizens are getting involved and receive more responsibility over time. They are free to choose a supplier or to produce electricity themselves. The nets have to be connected with one another to facilitate this.

The dialog between network companies and the government can improve. Grid operators have to install smart meters, but at home you only benefit from this when you have a device which shows you the results. We have to provide the meter, but, by law, we may not provide such a device. That is strange. In the Netherlands there is a junction between producer and supplier, which leads to an ongoing discussion about the role division.

We are public businesses. Our investors are provinces and municipalities. We use public companies to achieve public goals. It is in a public interest to do so. We have to cooperate. Not as rivals but with a collective goal."

> "Use public companies to achieve public goals."

An Innovative Truth

“The more we are able to spare, the more we will consume.”

Ton Backx

Dean of Department of Electrical Engineering, Eindhoven UT

“Electrical energy is going to play an even more prominent role in the future supply of energy than it does today due to its relatively high efficiency in conversion from and to other forms of energy. Most renewables can deliver their energy in the form of electrical power. The transition to sustainable sources of energy is not just a matter of a new technological solution, but also has major societal impact. We have to rapidly reduce the global consumption of fossil energy. Coal, oil and gas have relatively high energy density in comparison to electricity. This explains why the majority of our current energy supply still is in the form of coal, oil and gas.

The troubling thing is that the existing infrastructure isn’t prepared for a transition to electricity as main source of energy. If you want to make a transition to supply the majority of the energy in the form of electrical power the system has to change. The capacity of the electric grid has to expand. A solution might be to convert electricity into clean synthetic fuels. This way the existing energy infrastructure can largely remain to be used without the undesired current emissions. A big trend is smart grids, the solution for reducing fluctuations in energy demand. Smart grids help to spread the energy demand over time, ideal for a household situation. Smart grids solve the electricity storage challenge by enabling flattening of the peaks and dips in demand.

At Eindhoven University of Technology, I am responsible for the process of exchanging knowledge with society. Technically there is a lot possible and in the coming decades much more will be developed, but society has to develop too. People have to learn to use energy differently. That is certainly something we have to get used to.”

Gerard Beenker

VP, Scientific Director, Central R&D/NXP External Relations, NXP Semiconductors

“When you look at the concept of smart grids, decentralized energy production and mutually negotiating about prices, the following questions arise: “What is actually the business model?”, “Who will get the control over it?” and “Who will earn money with it?” These things aren’t completely clear yet. The discussion must still be conducted.

In the Netherlands there is a collective of companies, the Smart Energy Collective, that try to apply ideas by experimentation with pilot projects. On a small scale, all of this is simple and amazing, but when you try to unroll this on a larger scale, it can be rather difficult. The challenge will be to develop and standardize solutions for the optimal integration of decentralized and centralized energy generation. The concepts of micro-grid need further research. The interaction between appliances and the grid will increase, hence new interoperability approaches need to be developed.

The biggest challenge for the Netherlands is to bring all the different disciplines together. Gas and electricity, but also the entire industry around new innovative concepts. I look at it from a product perspective. We lessen the energy use of devices. The role of electricity increases as form of energy. Products get smarter and more efficient. The whole energy market is changing. But, at the same time, it leads us to a paradox: the more we are able to spare, the more we will consume.”