

# **Energy, Innovation and Circular Economy**

*How to speed up the cost-effective transition  
towards a clean, competitive and secure energy future*

Thematic conference held by the parliament of the Netherlands as part of the parliamentary dimension of the Dutch EU Presidency in the first half of 2016

In the Hall of Knights and the premises of the House of Representatives in The Hague

on Monday 4 April 2016

## **Report**

On 3 and 4 April 2016, the States General of the Netherlands held a thematic conference on energy entitled "Energy, including some aspects of innovation, paying special attention to the circular economy".

The key issue under discussion was how to accelerate a cost-efficient transition towards a clean, competitive and safe energy future. The Vice-President of the European Commission, Maroš Šefčovič, European Commissioner Karmenu Vella and the Dutch minister of Economic Affairs, Henk Kamp, spoke during the plenary morning programme. This was followed by a panel discussion with several international guest speakers. In the afternoon, four parallel sessions were held.

## **First Plenary session**

In the chair: Ms **Esther-Mirjam Sent**, chairperson of the Committee for Infrastructure, Environment and Spatial Planning of the Dutch Senate.

### **Opening address by the Speaker of the House of Representatives, Ms Khadija Arib**

In her opening address Ms **Arib** said that instead of depleting the Earth's resources, we need to work on creating a better, future-proof world for the generations to come. She believed this was the ambition of all the representatives of the people, whose responsibility it is to work together to find opportunities to shape the transition towards sustainable energy and a circular economy, ensuring everyone's needs can be met in a way that is and remains affordable. She hoped that the conference would inspire the participants and that they would discover new and useful ideas that could be relevant to their everyday practice. She concluded by saying: "if we succeed in achieving a clean, clever and secure energy system, we will ensure that the energy of more than seven million people can continue to live up to its potential."

### **Introductory remarks by the chairperson**

The **Chairperson** said she believed that today's conference was a great platform for parliamentarians within the EU to exchange experiences and best practices with each other with regard to energy policy and the circular economy. Subsequently, she briefly introduced the three keynote speakers on the topic of the conference.

### **Keynote speech given by Mr Maroš Šefčovič, Vice-President of the European Commission for the Energy Union**

Mr **Šefčovič** emphasised the importance of the energy union and said that such a project cannot be built in Brussels. It must be built in the Member States. His request to the parliamentarians present was "engage, engage, engage!", in order to make sure that the proposals can be implemented in legislation this year and next year, building a strong framework for the energy union.

Mr **Šefčovič** went on saying that at the Paris climate summit something had been accomplished which ten months ago still would have been seen as unthinkable. On the road to Paris the EU managed to contribute to a very ambitious agreement and to the global commitment to fight climate change, thanks to the strong European diplomatic effort and the close ties the Member States had developed over the past few years. The road from Paris is equally important, however, and even much more challenging, because what has been agreed upon in Paris must now be implemented. Mr **Šefčovič** said he very much counted on the Dutch Presidency to help the Commission to start this process and to go through these very important first phases. He said the cooperation was very close and that the Dutch Presidency programme in the area of energy and climate was very ambitious.

Subsequently, Mr **Šefčovič** gave an overview of the actions to be taken in the area of energy policy.

The Commission is working on reform of the Emissions Trading System (ETS). Before the summer break the Commission will present its so-called Non-ETS Effort Sharing Decision, which is the translation of the Paris agreement in concrete actions to reduce greenhouse gas emissions in so-called non-ETS sectors: building, transport and agriculture.

Also still this year the Commission will put in place the proposal for a new electricity market design. As we have a free flow of goods and services we should also have in Europe a free flow of energy. For that we need a new framework, Mr Šefčovič said.

Mr Šefčovič pointed out that much more global cooperation is needed in fighting climate change and said that the Commission had assisted the Chinese in introducing a similar emissions trade system. Other countries are either working on similar systems or have one in place already. This year we should start thinking about how to make sure that these systems can be linked up together, Mr Šefčovič said.

When turning to the subject of smart cities, Mr Šefčovič said he knew that the Dutch Presidency was very committed to the Urban Agenda. Cities are suffering the most from air pollution, traffic jams et cetera. That is why the EU Member States must work together and introduce the smart city concept in all Member States. The Amsterdam summit on the issue will be a starting point for this process, which will be taken over by the Slovak Presidency in July this year, which is already preparing a follow-up of the ambitious declaration which is being prepared for the Amsterdam meeting.

Mr Šefčovič subsequently mentioned research and innovation as two of the obvious areas where more efforts are needed. The Commission will further develop its heating and cooling strategy and it will reform its proposals for the energy performance of buildings. Making use of today's new technologies can lead to enormous savings, which would not only be beneficial to the environment, but lower the citizens' energy bills as well.

For all these changes we need the proper financing, Mr Šefčovič said. That is why the Commission intends to come up with the Smart Financing initiative, aimed at the building sector, as part of the package the Commission is preparing for the summer. There is plenty of money to invest in good projects in the field of energy efficiency and the greening of our economy, according to Mr Šefčovič. However, the various stakeholders, such as businessmen, pension fund managers and bankers, need regulatory stability. The Commission wants to help and encourage them through the Juncker Investment Fund.

Meeting all the Paris commitments worldwide would require a 30.3 trillion dollars investment in new technologies. The European industry, which is very competitive and which was the first to introduce energy efficiency and all these new modern technologies in Europe, should be the first to supply the experience, the know-how and the new technologies to the EU's partners in the world.

Mr Šefčovič concluded by thanking the parliamentarians gathered at the conference for their readiness to engage in a discussion about this very important project. With a reference to the famous phrase "What happens in Vegas, stays in Vegas", Mr Šefčovič made clear that what happens in Brussels should not stay in Brussels when it comes to the energy union. "I believe that with your help we can bring this to our Member States", he told his audience.

**Keynote speech given by Mr Karmenu Vella,  
Commissioner for Environment, Maritime Affairs and Fisheries, European Commission**

Mr Vella thanked the Presidency for the invitation to Vice-President Šefčovič and himself and said he took this double invitation to be a very good sign, because the future of energy is also the future of the environment.

Subsequently, Mr Vella spoke a few words on the circular economy package adopted by the Commission in December last year, stressing the tangible opportunities for investment, innovation, and job creation it contains. He emphasised that the circular economy was an environmental necessity, but also a matter of smart economics. Europe is rich, especially when it comes to skills and innovation. The future lies in making the most of these assets. This will also allow the EU to continue as a market leader for green technologies.

Mr Vella explained that a circular economy means a switch towards products and processes that are designed to be more durable and more resource-efficient and set out that the circular economy package contains a broad selection of supporting measures to help Europe achieve that transition in numerous areas. "We are not only talking about innovative ways of producing but also of consuming" Mr Vella said.

Mr Vella pointed out that rethinking the EU's economic model and adopting more resource-efficient practices could bring considerable net savings and even boost the EU's GDP by almost 4%, according to calculations by the Ellen MacArthur Foundation. The aim of the Energy Union Strategy is to ensure that energy efficiency policies, resource efficiency policies and policies to boost the circular economy are all pulling the economy in the same direction.

One area with considerable potential is "waste to energy", so the Commission is looking to adopt a communication on waste to energy by the end of this year, Mr Vella said. He then raised the question how to speed up the cost-effective transition towards a clean, competitive and secure energy future and indicated that both the circular economy and ocean energy play an important role here. The circular economy isn't just about activities on land. It also has a major maritime component. Mr Vella pointed out that healthy seas can offer considerable economic rewards. The EU already has a global lead in the ocean energy sector, for instance, which is an important component of a secure energy future.

Referring to innovation and investments to implement the package Mr Vella said that there could be no proper innovation without proper investment. Most of the efforts will need to come from the private sector, but the Commission is proposing a range of support measures to ensure that investments remain attractive. A major €650 million initiative has been launched under Horizon 2020 on "Industry 2020 in the circular economy". Mr Vella mentioned the European Fund for Strategic Investments (EFSI) which can help raise private funding, particularly in areas where commercial banking is still hesitant to get involved.

"In all this, we cannot underestimate the role of national parliaments", Mr Vella told his audience. Parliamentarians have a crucial role to play, as they can put in place frameworks to reinforce effective implementation of the package, but they can do a lot more together with other stakeholders. He summed up three ways to do so:

1. Scaling up good examples. Parliamentarians can ask their colleagues in regional and local authorities to look for "the best in class", and to replicate and repeat these solutions where possible.
2. Working together with businesses, and help them draw down European funding.
3. Parliamentarians can look closely at the economic and fiscal incentives suggested in the package.

Designing successful transitions requires a coordinated approach according to Mr Vella, who concluded by stating that cooperation on common goals is the best way to fulfil the role towards future generations: "we can, and we will achieve our objectives, if we are all working in the same direction".

### **Keynote speech given by Mr Henk Kamp, minister of Economic Affairs of the Netherlands**

Mr **Kamp** pointed out that in shaping the future of energy in the European Union three conditions need to be met:

1. Energy needs to be affordable to consumers, businesses and industries;
2. energy generation and transport need to be secure;
3. the impact on the climate needs to be reduced, by cutting emissions and moving away from fossil fuels, while at the same time meeting the needs of a rapidly growing global population.

The minister said that the EU's ambitious targets to reduce carbon emissions by 40% by 2030 have been set with the greatest sense of urgency, and he called on the parliamentarians present to share this sense of urgency and to keep it at the heart of their decision-making.

According to Mr Kamp one of the main ways to meet all three conditions is to move towards a single energy market in Europe. One step to achieve this is promoting regional co-operation. Some cooperation partnerships are already in place. The EU initiates and supports such forums, but the minister stressed that ambitious involvement of individual member states remains indispensable.

A second step, Mr Kamp explained, is to facilitate two major and irreversible trends, namely the growth of sustainable energy and consumers as energy producers. EU Member States should encourage developments that already occur in this field, in order to render the European energy market stronger. This will generate valuable market opportunities, since the shift to a new energy system requires innovation, construction, new business models and even entire new industries. These changes create jobs, revenues and export opportunities. Moreover, efforts in this field will keep the EU on track to reach its emissions targets for 2020 and beyond.

Eventually, minister Kamp affirmed his conviction that the EU and its member states should work with determination and perseverance on achieving a single European energy market, because this will be beneficial to the EU as a whole as well as to individual members states and their citizens. "The Dutch Presidency of the EU is dedicated to supporting the transition to such a single European energy market", Mr Kamp said.

## Debate

Mr **Gerbrandy** expressed the views of the European Parliament, the third institution in the EU, and started with a warning to members of national parliaments against the growing tendency towards intergovernmental approaches. The European Parliament believes that this is not the right approach. "We badly need a rules-based approach", he said. That might not be the case with an intergovernmental approach, which involves the risk of distortion of the level playing field, uncertainty for investors and a lack of democratic control.

The European Parliament is currently working on some legislative files on the circular economy and the energy union.

For the European Parliament the objectives of an energy union are clear, Mr Gerbrandy said: "we want clean and cheap energy in Europe and we want to be as independent from third countries as possible." To achieve that, the European Parliament asks for a more ambitious energy and climate package for 2030, in the form of binding 2030 climate and energy targets, to be implemented by means of individual national targets.

The European Parliament strongly supports the Commission's approach to regional cooperation; parliamentary control should be limited in this field. The European Parliament also emphasises the role of ACER.

Referring to the circular economy Mr Gerbrandy mentioned that the European Parliament has emphasised the huge economic benefits of the circular economy and its significance for becoming less dependent on resources from abroad. "We all have to believe in that concept, politically, and we should act accordingly", Mr Gerbrandy said.

Mr Gerbrandy concluded by urging the national parliaments to work strongly together on the topics under discussion.

Mr **Allizard** from France asked what the Commission was planning to do with regard to recent proposals concerning the security of supply of natural gas and the draft intergovernmental agreement on energy supply. The French Senate is of the opinion that these proposals are too intrusive and risk to be counterproductive. The Senate is considering a subsidiarity check.

With regard to the implementation of the Paris agreement Ms **Brunner** from Austria asked Commissioner Šefčovič whether the European Commission was working on raising the ambitions with regard to the climate targets and the energy union.

Mr **Balsys** from Lithuania made mention of the construction of a nuclear power plant in Belarus, financed and built by the Russians. He asked Commissioner Šefčovič what he personally would do in order to stop this dangerous project.

Mr **Cutajar** from Malta asked whether the European Commission took into account the initiative of 6,557 local and regional authorities, united in the Brussels based Covenant of Mayors for Climate & Energy, to implement actions to reduce carbon emissions.

In reply to Mr Allizard's question Mr **Šefčovič** explained that when the Commission first presented the project of the energy union, transparency and compatibility of intergovernmental agreements were highlighted as priorities. The incompatibility of intergovernmental agreements with EU law has led to many problems in the past. Any deficiency in this regard should be corrected. Mr Šefčovič said the Commission was now proposing to make sure that the European Commission will be notified in time of any future intergovernmental agreement to be made in the field of energy. The Commission is committed

to make sure that intergovernmental agreements, once signed and ratified, are fully compatible with European law. As to the transparency of commercial contracts, Mr Šefčovič pointed out that the Commission is fully bound by case law and the current practice of the DG Competition, and has to respect the confidentiality of the contracts, business secrets and all sensitive information linked to such contracts.

The Commission wants to base its contingency planning on regional cooperation and wants to be well-prepared for the so-called N-1 scenario, in which the supply of gas is discontinued. That is why the Commission would like to be notified of the conditions of long-term contracts, with a duration of more than one year, covering more than 40% of the domestic consumption. The European Council welcomed a proposal in this regard, which will be presented by the Commission as a Security of Supply Package in February.

In answer to Ms Brunner's question Mr Šefčovič said that it is very good to have ambitions, but that it is also very important to establish a good track record. That is why he urged all the member states to meet the EU 2020 objectives. In 2020, for instance, the Commission has to present concrete proposals on how to meet the new target of limiting global warming to 1.2°. Subsequently, Mr Šefčovič described in broad outline the path to a carbon neutral economy in 2100. He assured his audience that Europe would definitely be among the most ambitious players in this area.

The issue of the nuclear power plant in Belarus was discussed in great detail during Mr Šefčovič's energy tour in Lithuania. The European Commission is in touch with the Belarussian authorities so as to make sure that they will respect international obligations pertaining to the safety of the nuclear power plant.

The European Commission is very happy with the way in which the Covenant of Mayors is developing. The Commission is looking for ways to include mayors from all over the world to work together.

In reply to Mr Gerbrandy's remarks Mr **Vella** reiterated that the circular economy is the best way forward towards Europe's competitiveness. As to the topic of working together Mr Vella emphasised the importance of cooperation at a global level.

Mr **Kamp** said he agreed very much with Mr Gerbrandy, who is in favour of a rules-based approach of the energy union. This provides investors with certainty. However, rules are one thing, but results are also important. Regional cooperation could support this rules-based approach, in order to achieve these results.

The minister also agreed with Ms Brunner's observation that the EU-targets are no longer sufficient after "Paris". Nevertheless, Europe's goals are very ambitious. The 2030 target of a 40% carbon emissions reduction compared to 1990 is very ambitious. The first thing for the EU to do now is to realise its 2020 target and then its 2030 target. In the meantime the EU can see what it can do more.

Ms **Seitlova** from the Czech Republic asked Commissioner Šefčovič about the ratification process of the Paris agreement, especially in big countries such as Australia, India, China and Canada.

Ms **Kafantari** from Greece also asked a question to Mr Šefčovič about the Paris agreement. The United Nations has scheduled a special session on 22 April 2016. The presidents of China and the United States of America, countries that are responsible for 40% of the carbon emissions, have announced they will be attending the meeting. Will the United States also sign the Paris agreement?

Mr **Altunyadiz** from Turkey asked Commissioner Šefčovič about the funding of projects to achieve the energy targets, such as the Southern Gas Corridor. Are public private partnerships available as a funding model? Is there a connection between Industry 4.0 and the circular economy?

Mr **Šefčovič** announced that in a couple of days the treaty agreed on in Paris would be signed in New York. After that, the process of ratification will start. There are clear European Council conclusions stating that the Member States should do this as soon as possible. Mr Šefčovič said he believed that the EU Member States, but also China, the US, Canada, Australia and India would do this on time.

The Southern Gas Corridor is a project of strategic priority for the EU, Mr Šefčovič said. The project is on track and everything goes according to plan. Europe has to do its homework properly to make sure that all interconnectors, especially those in South-East Europe, will be built on time. Mr Šefčovič affirmed that the financing of such big projects is usually done in a public private partnership. He also affirmed that the energy transition is closely linked to the economic transformation. "We have to invest in Industry 4.0, but there are wider implications, so we have to make sure that Europe will become Europe 4.0".



## Second Plenary session

In the chair: Ms **Roos Vermeij**, chairperson of the standing committee on Economic Affairs of the House of Representatives.

### Panel Debate (with introductions) moderated by Mr **Kamran Ullah**

Participants on the panel were:

- Mr **Fatih Birol**, Executive Director of the International Energy Agency
- Mr **Andrew Steer**, President of the World Resources Institute
- Mr **Feike Sijbesma**, Chairman of the Managing Board of DSM

The **Chairperson** briefly introduced the participants on the panel and then invited them to make their introductory remarks.

Mr **Birol** pointed out that energy and climate are closely linked topics, because two thirds of the emissions are caused by the energy sector. There are two preoccupations in this field:

1. low energy prices;
2. COP21. Is the Paris agreement going to affect the energy sector, and who is going to do what?

Whereas the demand for energy in the European Union is already declining and will further decline in the future, among other things because Europe is using energy more and more efficiently, the growth in demand will come from the emerging countries, mainly in Asia, and India in particular.

Mr **Birol** mentioned that oil and gas prices were very low at the moment. The coal price is even rock bottom. One of the very important implications of low fossil fuel prices is that, for instance, oil companies are now cutting their investments. This is reaching a dangerous level. Within a few years, when the demand gets higher, this may lead to surprises in the oil market in terms of oil prices.

The bulk of the cuts in the oil projects comes from North America, Latin America, Russia and Africa. This means that the world's reliance on the Middle East for oil supply will increase; a low-cost region which is going through very difficult times. It would be overly optimistic to believe that the geopolitical situation in the Middle East would considerably improve tomorrow. Therefore, the low oil price brings energy and geopolitics closer together.

The good news is, Mr **Birol** said, that last year and this year, so for two years in a row, the global emissions did not increase, even though the global economy grew by more than 3%. He mentioned two main reasons for this.

1. The US and China were the main drivers of the emissions reduction;
2. Last year, more than 90% of all new power plants produced renewable energy.

The important thing is what will happen in the future, Mr **Birol** said. Is this a trend that will continue for many years to come, or was it only a pleasant two-year surprise?

Mr **Birol** explained that the International Energy Agency has made an analysis of what needs to be done in the energy sector to achieve a 2° trajectory. Every country has its own energy

resources, policies and economic backgrounds. All countries are different, but there are certain policy areas that are common to all countries: renewable energy and energy efficiency. These two are a must if we seriously want to achieve the 2° trajectory, Mr Birol said. The good news is that the costs of renewable energy are falling very quickly.

COP21 was a historic milestone, according to Mr Birol, but now it is time to deliver. The EU should ensure a clear, transparent sharing of burdens, across the sectors and across the countries, so that everybody knows who is going to do what. The renewable energy sector is growing fast. Maybe there is a need for redesigning the renewable energy support policies, especially in the context of competitiveness. Moreover, the EU has to look at its carbon pricing scheme, because after "Paris", the carbon price fell from 9 to 5 euros.

In Europe there is huge support for energy efficiency, Mr Birol said. Yet, he called for attention to efficiency improvement in trucks. It is time for Europe to follow the successful examples of the United States, Japan and other countries, that have set stringent mandatory fuel efficiency standards for trucks.

Mr Birol stated that lower fossil fuel prices might complicate the transition to renewable energy and hamper the implementation of strict efficiency policies. If the governments are serious about the COP commitments, it is a litmus test for them to stick to their renewable energy and energy efficiency policies.

Mr Birol concluded by saying that no country is an energy island. Therefore, it is very important that international cooperation is an issue at the top of the agenda. The International Energy Agency is ready to support the European countries as well as all other countries on the planet.

Mr **Steer** explained that the world is facing huge and unprecedented challenges, such as migration, terrorism and an extremely weak world economy. Yet, a new multilateralism is emerging. At last September's UN General Assembly all the countries in the world endorsed the sustainable development goals (SDGs). If the world were to implement the SDGs, it would address the climate change problem. The SDGs and climate are interlinked. In the 1992 Rio summit, the heads of state and government signed the framework convention on climate change. There was a real sense of moral purpose back then, but it appeared lost in the two ensuing decades. It came back in Paris in 2016. Mr Steer emphasised that "as leaders we need to seize that sense of moral purpose and to seize the opportunity that we have today". Mr Steer raised 3 questions in this context.

1. Why are we seeing so much willingness among countries, cities and businesses to take action?
2. Will today's urgent problems prevent addressing tomorrow's important problems?
3. Will Europe lead?

As to the first question Mr Steer said that there is an intellectual revolution out there, and also a practical one. Three years ago, the Global Commission on Climate and the Economy was set up, mainly consisting of Nobel Prize winners in economics. They were asked: will it cost a lot more to move from today's low-efficiency high-carbon world economy to tomorrow's low-carbon high-efficiency world economy, as so many are claiming it will? This turned out not to be the case and no one has denied the numbers they came up with.

The second question the commission was asked was: what will climate action do to economic growth? Will it hurt growth? That same group of world famous economists analysed this and

their answer was: no, it will not hurt growth. On the contrary, they found that good climate action will force improvements in economic and resource efficiency. It will promote new technology and it will close the infrastructure gap. It will provide long-term predictable policy signals and it will also reduce pollution and congestion. These elements together constitute a powerful cocktail of growth promoting climate action. So, "why would governments and businesses do all this? Well, because they are smart", Mr Steer said.

A survey carried out by the World Economic Forum among 1,200 CEOs of major corporations and ministers around the world found that migration, state collapse, interstate conflict, unemployment and failure of national governance were seen as the biggest global risks in the next eighteen months, whereas water crises, failure of climate change mitigation and adaptation, extreme weather, food crises and profound social instability were seen as the risks for the next ten years. Mr Steer stressed that having these urgent short-term problems should not lead to the long-term issues being ignored: if we want to address these long-term issues, we have to start working on them today. If we want to address the urgent issues and prevent them from becoming chronic over the next 50 years, we have to address the resource issues now, he said.

Answering the third question "will Europe lead?" Mr Steer said: Europe must lead, because Europe can lead. Europe has been the leader in the field of sustainable development throughout the last decades. Europe is blessed in the sense that the private sector and the private-public relationships in Europe are very strong. Mr Steer explained that European companies in general are more positive in their lobbying for climate action than, for instance, American companies, who tend to argue against action on climate change. This is partly because Europe is so open and because European companies have understood more than companies elsewhere that they need to move towards a circular economy. The reason for that is that the emergence of a global middle class around the world is driving towards a shortage of commodities and towards a variability in commodity prices the world has not seen before. Smart CEOs and smart governments realise that this is leading to a greater volatility in prices. That is what drives the economic case for a circular economy.

Subsequently, Mr Steer went into the issue of food loss and waste. He pointed out that if food loss and waste were a country, it would be the third biggest emitter of greenhouse gases in the world, just after the United States. So it is no wonder that the SDG 12.3 says: we are going to halve food loss and waste by 2030. However, at the moment food loss and waste is increasing. That is why the World Resources Institute, together with the Dutch government, recently set up a group of champions that is going to take this on.

Finally, Mr Steer said that a public private approach to solving problems is required. The question is: will the EU really lead on this issue and on some of the other issues that we are discussing? "Everybody wants change, but nobody wants *to* change", Mr Steer said, and here is where parliamentarians come in. "If we want to achieve the EU vision for 2020 of living well within the limits of our planet, we absolutely must act today."

Mr **Sijbesma** stated that if you want to keep the ball rolling, you need to make it circular. Life itself is circular. A linear process will get you into trouble at the end of the day. Only 250 years ago, with the start of the industrial revolution and the extraction of minerals such as coal, oil and gas, the economy changed from a circular economy to a linear one. People find it normal to extract raw materials, to process them, to consume the products they make of them

and then throw these products away. Mr Sijbesma explained that this cannot continue and that we have to return to a circular economy, for several reasons:

1. At some point, the necessary materials will not be available anymore;
2. Some countries will develop a tremendous dependency on other countries. This holds also true for Europe, and for the Netherlands in particular;
3. At a certain point in time the alternatives will be cheaper;
4. The planet will face huge climate change. The effects of climate change will cause a flow of climate refugees creating serious geopolitical tensions.

The good news is, Mr Sijbesma said, that there is no scarcity of raw materials. All molecules and atoms remain on earth. What needs to be done is to redesign the supply chains in a more innovative way and perhaps use the CO<sub>2</sub> in the air as a raw material. We also need to develop alternative energy sources. We have to make use of the sun, the wind, the water and the land like we did before the start of the linear economy 250 years ago, but in a more innovative way than we ever did in the past, Mr Sijbesma said. That is the world we need to head towards at full speed. Mr Sijbesma added that this is also about the quality of life: take for instance the air pollution in cities such as Beijing.

Mr Sijbesma went on explaining that DSM runs many circular economy projects. However, we have to speed up and cannot rely on only a couple of companies doing this because they believe in it, Mr Sijbesma said. To this aim we need an incentive, in the form of putting a price on carbon. Mr Sijbesma urged his audience to take the lead in this field. Last year in Paris a huge step forward was made in addressing climate change. Now is the time to put a price on carbon.

The transition to a circular economy will create winners and losers, as any change does. It is now up to companies to choose whether they want to be in the camp of the winners or in the camp of the losers. Mr Sijbesma made an appeal on his audience for regulatory involvement, by putting a price on carbon. The introduction of a price on carbon is *the* way to split the intergenerational carbon bill, instead of putting the burden on the shoulders of our children, Mr Sijbesma said. A meaningful price on carbon -- which is not 5 euros per ton as is the case in Europe -- is supported by many business leaders. He said he hoped that at the April meeting of the World Bank a major step forward could be made. A step forward also involves not doing the opposite, namely subsidising the use of fossil fuels, Mr Sijbesma continued. That would be contradictory to the aim of reducing carbon emissions.

Mr Sijbesma pointed out that we need to address more items, such as carbon leakages and the role of the financial sector. Governments, businesses and NGOs should work together to tackle climate change and make the transition to a circular economy. Mr Sijbesma also mentioned the responsibility of individual citizens and said that people had to switch from being consumers to becoming users, in the interest of future generations. Mr Sijbesma concluded by saying "you cannot be successful, do not even dare to call yourself successful, if you live in a world that fails."

## **Panel Debate**

The debate was led by Mr **Kamran Ullah**, who started the discussion by asking Mr Steer what his message was to the vast majority of companies that are still not making the transition to a circular economy, saying: look, my company is growing, so I am a winner.

Mr **Steer** said that overwhelming evidence has emerged that if you want to have yield, you have to invest in sustainable companies. So, the message to those at the back of the peloton is: "good luck, but it is going to happen and the smart thing to do is to get up there sooner rather than later, because otherwise your long-term profitability is going to suffer very badly."

Mr **Sijbesma** added that if you want to run your company on a long-term basis you have to focus on sustainability. That is your responsibility, but it also makes sense from a business point of view. Moreover, companies not doing this, will have difficulty in finding employees in the future. "People like my son do not want to work for companies who do not address this issue", Mr Sijbesma said.

Mr **Birol** took a slightly different approach. Although it is true that companies active in the non-sustainable energy sector, such as coal companies, are not doing very well, whereas renewable energy businesses are doing well, it is too early to shout victory. National governments have to make the necessary arrangements in market design, to ensure that investments are made in sustainable industries. Mr Birol mentioned mandatory carbon pricing as a necessary measure in this field.

Mr **Ullah** asked Mr Birol to give an example of what national governments could do in the field of energy efficiency.

Mr **Birol** answered that the introduction by the EU of fuel efficiency standards for trucks and SUVs would lead to a reduction in oil consumption and to a decrease in carbon emissions. Another example is the introduction of very strict efficiency standards for electric appliances in the EU.

Mr **Sijbesma** added: 100 years from now, when we are all dead, people will look back and say: energy saving? That is so 2016! Given the development in the pricing of solar and wind energy, for instance, Mr Sijbesma said he was sure that 100 or 200 years from now, people will see energy saving in a totally different way. Energy saving is key at this moment and remains very important in the decades to come, according to Mr Sijbesma, but he also stressed the importance of developing renewable alternatives. The first step to be taken now, is to speed up the development of alternative technologies such as solar and wind energy. Since this development is somewhat slowed down by the current low prices of fossil fuels, this is the right moment to put a price on carbon.

After Paris the price of carbon per ton in Europe did not rise; it fell. According to Mr **Steer** this tells us that investors do not believe European policy makers. If they had believed them, the price would have risen. Policy makers and parliamentarians are to blame here, for not being believable, rather than the investors.

Mr **Sijbesma** replied he did not believe that this would happen and mentioned that the Paris conference was different from the Copenhagen conference. Paris was bottom-up instead of top-down. All the plans came from the parliamentarians and the countries themselves. Even a review mechanism was initiated.

Mr **Ullah** said this was the right moment to involve the parliamentarians in the discussion.

Mr **Mustafa** from Kosovo pointed to the challenge of the various Member States having differing starting points. In Kosovo, for instance, coal lignite is considered as the most cost-effective source of energy. Mr Mustafa asked how we can build more synergy towards a common approach, especially in South-East Europe.

Mr **Steer** answered that there needs to be a very serious analysis of how the Member States of the European Union work together. The EU has to recognise that there is heterogeneity. "We need to do a better job than we are currently doing", Mr Steer said.

Mr **Sijbesma** added that including in the energy price the costs of pollution and the costs for future generations, as well as the costs of an increase in the number of climate refugees, would reveal that in the end, fossil fuels are not that competitive.

Mr **Ola** from Norway said that in order to achieve the 1.5° target set in Paris, the world has to be carbon neutral by the second half of this century. In his presentation Mr Birol showed a 2° target. Mr Ola asked Mr Birol to elaborate on that and on the role of carbon capture and storage.

Mr **Birol** answered that bridging the gap between the 1.5° and 2° targets is not just a matter of increasing the efforts by 25%. It is a huge difference, which requires much more effort. Carbon capture and storage is an extremely critical technology, because even in the 2° scenario, 60% of the energy will still come from fossil fuels. However, the appetite for carbon capture and storage is not very strong. Mr Birol would strongly support a global carbon price, but that is still in the future.

Ms **Sarkinen** from Finland recalled that the carbon price in Europe is too low and asked what the EU could concretely do about the carbon market. Is the carbon market really an effective tool to reduce emissions or should we focus on other tools? Can we rely on market tools, or should we use other regulatory tools?

"Do not blame the carbon market, but blame the fact that we are too liberal in what we allow", Mr **Steer** said. We have to be more serious in setting targets that are actually going to make a difference. A price on carbon is not enough. It has to be supplemented by other mechanisms. But it is by far the single most important measure.

Mr **Sijbesma** added that within a carbon trading system, you have to decide how much credit you give to the market. With that you can influence supply and demand. A carbon price of 5 euros has zero effect. The price should be within the 20-40 range to be effective.

Mr Sijbesma said he was not so sure that increasing the carbon price would cause companies to move abroad. He pointed out that taxation systems are much more differentiated between countries in the world. He went on to say that he was not sure either whether we need a totally harmonised global carbon price to prevent all carbon leakage before we can actually take a step forward.

Mr **Steer** said that good economics is taxing bad things and not taxing good things. So, why do we tax good things, like work and profits, whereas we do not tax bad things, such as congestion and carbon emissions? Some of the Republican think tanks in the US are exploring this, because it would be accompanied by a reduction in corporate tax. In doing so you would actually get a more efficient tax system and the economy as a whole would become more efficient.

In addition, Mr **Biol** emphasised the importance of mandatory standards.

Baroness **Scott of Needham Market** from the United Kingdom said that the transition to a more circular economy would require a whole new set of skills. Will the market deliver those skills, or is there a role for governments and policy makers in this field?

Mr **Sijbesma** answered that mother earth will not be helped by setting targets alone. The emissions must go down. Targets are an incentive to achieve innovation. To this end, we need new supply chains and new technologies, Mr Sijbesma said, and referred to Mission Innovation, in which many entities from the public sectors work together to foster innovation. In the circular economy, companies and governments need to collaborate throughout the supply chain. There are already good programmes in place, but we need to drive this innovation forward, Mr Sijbesma said. This requires collaboration skills, which need to be developed.

For Mr **Biol** Mission Innovation was one of the most important outcomes of COP21, which aims at accelerating the innovation in energy technology. He would like to take the opportunity to invite the Dutch government to join Mission Innovation.

Mr **Sijbesma** totally agreed with Mr Biol and told the Dutch parliamentarians he hoped the Netherlands would soon join Mission Innovation.

Mr **Steer** said that a huge psychological shift is needed. Parliaments in Europe have started to use the term "circular economy". The European Commission has done the same. If you go to business school in Europe nowadays, this will be on the agenda, which is not the case in the United States, however. It turns out today that young people want to be part of the idea of the circular economy, Mr Steer added.

Ms **Cegerrek** from the Netherlands asked Mr Biol what the role of the EU would be in making existing buildings energy efficient and sustainable. She asked Mr Steer whether investing in renewable energy sources would be as important for the European economy as it is for the climate goals.

Mr **Biol** answered that 75% of the domestic energy consumption in the EU related to the use of energy in buildings. Once again he stressed that setting mandatory standards could lead to substantial energy savings. This can only be achieved if a meaningful carbon price would be introduced. This has to be done at EU level.

Mr **Steer** said that in Europe, as well as in the Netherlands, a lot more needed to be invested in renewable energy. Originally, the technology was developed in Europe and Europe led the world, but it has lost its way a bit.

Mr **Glebocki** from Poland raised the question whether, instead of aiming at the elimination of carbon, the focus should be on the development of new technologies allowing for a more efficient and environmentally friendly use of fossil fuels, such as coal for the production of energy. We should also take into account the ability of forests to absorb CO<sub>2</sub>, Mr Glebocki added.

Mr **Altunyaldiz** from Turkey recalled that the price of fossil fuels dropped by 66% and asked the panel whether countries and companies chose the easy and short-term profit instead of the long-term one. What would be the driving force for Europe to take the lead in this field?

Mr **Allizard** from France said that the European carbon market, the ETS, seemed to be a valid system, although the price of 5 euros per ton was still too low. However, the market did not cover all the sectors emitting lots of carbon, certainly not when it comes to land use. He asked what the panel thought about carbon capture and storage in this respect.

In answer to Mr Glebocki's question Mr **Birol** commented that the EU had to look at accelerating the development of clean energy technologies, including the use of fossil fuels in a cleaner way. In answer to Mr Altunyaldiz question Mr Birol pointed out that the low fossil fuel prices might slow down the increase in the use of renewable energy sources. He added that if governments were not vigilant, this might complicate the transition to clean energy technologies.

Mr **Sijbesma** said that companies tend to look to the short rather than the long term. However, supervising boards have a responsibility here. They have the responsibility to link remuneration to sustainability goals and not only to short-term financial goals. Carbon capture and storage could be one of the solutions, but it is not the only, final solution. There are opportunities for carbon storage, but according to Mr Sijbesma it would be much better to push alternative technologies rather than focussing on carbon storage.

Mr **Steer** added that the low prices of fossil fuel were seriously undermining the climate targets. There is a role for governments here, and also a strong role for parliaments, because the markets are not appropriately valuing the long-term benefits of the transition to a circular economy, said Mr Steer.



## **Session I Energy Infrastructure and Security of Supply**

In the chair: Ms **Annemarie Jorritsma-Lebbink**, Member of the Senate.

The **Chairperson** welcomed all participants to the parallel session on energy infrastructure and the security of supply. After some practical points regarding live translation, livestreaming and the use of microphones, she explained that the three guest speakers would provide a short introduction after which there would be time for discussion.

### **Introduction by Mr Peder Andreasen, President European Network of Transmission System Operators for Electricity (ENTSO-E)**

Mr **Andreasen** spoke about his views on the transition to green electricity and what this transition means for the expansion of the electrical network and for border-crossing networks, for which a level playing field is necessary. He remarked that there are differences between the energy systems in various European regions. Right now, renewables are poured in on a massive scale. Mr Andreasen asserted that as a side effect of this greening of the electricity system, traditional power plants are being squeezed out of the market because renewables, especially wind and solar, have a marginal cost of zero. This could become a problem for the supply security, because additional power plants would be needed to back up wind energy and solar energy when wind and/or sunshine are unavailable.

Mr Andreasen then addressed the lack of good investment signals for keeping traditional power plants alive let alone for building new, flexible power plants. Only energy itself is priced; issues such as flexibility and system services are not sufficiently priced right now. When more renewables were put into the system, an enhanced market model that puts a value on flexibility and system services would be needed for the system to move forward.

Mr Andreasen next discussed the Energy Union Package of the European Commission. This package proposed to link wholesale and retail together, allowing wholesale prices to travel all the way down to consumers, who can then start reacting to the prices. As Mr Andreasen indicated, this creates flexibility of demand and of distribution. In his opinion more price spikes have to be allowed for as well, even though this asks for customer protection against high invoices. In this way there should be more price pacts in the future. Mr Andreasen pointed out that the right design of the market is critically important when moving forward, if more renewables are to be accommodated into the system.

Mr Andreasen next discussed infrastructure. In some regions renewables are used on a massive scale while the infrastructure is still weak, causing problems in the surrounding regions because of loop flows. The infrastructure should be expanded in due time to allow renewables to travel across nations. That is really helpful for supply as well as to get the right prices for renewables. If power can travel from a low price area to a high price area, better prices for renewables can be realised, and the need for subsidies will go down, Mr Andreasen explained. He said that the problem is that citizens do not like the energy infrastructure. That means many projects are delayed. In his view, parliamentarians should step up to their responsibility and explain to their citizens that infrastructure is needed. Of course it is then up to the market to avoid putting up ugly infrastructure or choosing the wrong corridors. Parliamentarians and citizens should enter into a good discussion in order to find good solutions.

Mr Andreasen finally explained that he welcomed the proposal of the Commission for more cooperation, not only from the point of view of system operations but also from a political

point of view. Regions should discuss where to have renewables, how much of them and what type. If decisions can be reached about these questions on a regional level the congested situations that exist too often today will no longer occur.

### **Introduction by Mr Frans Rooijers, CEO CE Delft**

Mr **Rooijers** addressed the question of how to accommodate sustainability in the power sector. At the moment many European countries put a large amount of solar energy and wind energy into the system. Also, an explosion of new users of electric vehicles is expected starting 2018 and the industry is using more electricity instead of heat. According to Mr Rooijers, to assess the impact of these future developments on the system, we should look to residual demand: demand minus solar and wind. This should be covered by the normal electricity system.

Mr Rooijers provided figures showing that the impact of residual demand will decrease in the future. This may lead to problems for the system such as congestion of the connection. It may also influence the balancing market and the wholesale market. After illustrating this with a graph, Mr Rooijers pointed out that this is the case when the system is operating fully as well as when only a few companies are in the market.

After identifying three types of flexibility demands, Mr Rooijers discussed the many flexibility options available, such as the conventional options CCGT and CHP and new options such as demand-side management. Mr Rooijers affirmed his belief that there are a lot of possibilities for demand-side management in a technical way, but more so for the industry than for households. Mr Rooijers pointed out two graphs indicating the more hours these flexible options are used, the lower the price becomes.

Mr Rooijers then went on to discuss the consequences for the normal production units. He asserted that in the future less MWh of conventional electricity per year will be used. This means that the price of normal electricity per MWh will sharply increase. The less hours gas-fired units are needed because of the increasing role of solar and wind, the higher the price of normal electricity.

There are different kinds of flexibility for different types of markets. The needs of the balancing market and the wholesale market lie in seconds, minutes, hours and days. But here is also a need for the long-term market, so summer and winter. Mr Rooijers pointed out that until 2025 the needs can be managed by building batteries and use demand-side management. But after that period, the summer-winter interaction should be looked into. This interaction is not possible with batteries or demand-side management. For these needs flexibility options such as hydrogen are needed. This gas should be produced when there is a lot of electricity. It can be used in normal units when there is no solar and wind.

Mr Rooijers said that until 2025 connections can take the form of interconnections between northwestern Europe and southern Europe. After that period, other kinds of connections between the South and the North have to be looked into. Solar fuels should be produced in the south of Europe and transported to the north.

Mr Rooijers concluded his presentation by suggesting three courses of action the EU could take: a move to cost-based tariffs, an open flexibility market, and looking into the question of how to pay for the next generation of solar and wind. At the moment these are subsidized, but who will want to invest when prices are low?

## **Introduction by Mr Adam Romanowski, DG ENER - Internal Energy Market Networks & Regional Initiatives, European Commission**

Mr **Romanowski** spoke about the necessity of an integrated policy on energy supply. In his view, energy infrastructure is at the heart of the European energy system. It is a prerequisite to have a sustainable, competitive and well-integrated market and to build a resilient energy union.

Mr Romanowski said discussions about infrastructure should concentrate on four questions. His first question was: do we need more infrastructures in Europe? He pointed out that the energy infrastructure in Europe has to undergo a major revolution. By 2030 45% to 50% of the electricity will come from various forms of renewables. At the moment it is 25% on average. So the EU should ensure that by 2030 the infrastructure is ready for that major step. The costs to achieve the 2020 objectives were 1 trillion euros. Out of this 1 trillion, 200 billion was for transmission infrastructure, 140 billion for electricity and 67 billion for gas. A new infrastructure is needed and it will be a challenging task to build it, because of the scope of the tasks and the costs.

The second question was: should we concentrate on investments in the electricity sector? Mr Romanowski affirmed the need for investments in the electricity system. The process of electrification in Europe should continue in order to accommodate the increasing amount of power produced by renewables. Also needed is a proper infrastructure in order to transport the green energy from the places where it is produced to where it is needed. Mr Romanowski also mentioned the need to invest in gas infrastructure. Even if the ambitious targets for greenhouse gas emissions, for renewables and for energy efficiency are achieved, gas will still play an important role in the energy mix of several member states. The share of gas will be smaller but still considerable although smaller, Mr Romanowski pointed out. So investments in the gas infrastructure are needed as well. It is a clean fossil fuel that is needed as a back-up for electricity produced from renewables.

The third question was: what requirements are needed for the new infrastructure in Europe? Mr Romanowski listed three of these. The first is capacity. New infrastructure should provide new capacity. More trade as well as cross-border flows are needed and electricity highways should bring green energy. EU member states have agreed on a 10% interconnection level for electricity. Following the call from the European Council, a 15% interconnection target is now being considered, provided that the costs are acceptable and there is potential for commercial exchanges. The second requirement for new infrastructure according to Mr Romanowski is flexibility and reliability to accommodate the fluctuations that will come with increased amounts of renewables. The third requirement for new infrastructure is smartness. There are many reasons for this requirement, the most important of which is the need for a smart system in order to activate the demand side. Mr Romanowski pointed out that consumers and users should actively participate in operating the system and that they should be able to adjust the operations to the price of electricity that they receive.

The fourth question was: how should tasks in developing and constructing infrastructure be divided? What should be the role of the EU and especially of the European Commission, and what should be the role of the industry? Mr Romanowski posited that the roles are quite clear. He expressed the opinion that the industry, private investors and the market should be in driving seat. They should be designing, developing and constructing the infrastructure. The role of the European Commission should be to provide a proper framework to make sure the process is as flexible as possible. This proper framework should take the form of measures that are addressing market issues but also of measures that stimulate the construction of infrastructure per se.

Mr Romanowski mentioned that the European Union has done much to facilitate and streamline the implementation of cross-border infrastructure. First of all, in 2013 a new legislative framework was put into place providing sets of rules to facilitate implementation of cross-border projects. Secondly, a new, more dynamic way of identifying critical energy products in Europe has been provided by the Commission. That process is repeated every two years. The Commission plus a lot of stakeholders such as the industry decide on critical products that should be focused on. Thirdly, the Commission has provided proper schemes and financial support to develop an energy infrastructure. However, some projects cannot be implemented because of a financial cap. In some of these cases public financing should step in, in order to close the gap, to leverage public and private expenditure. Fourthly, the Commission has changed its approach towards infrastructure as well as the entire energy system. They are looked at from a regional perspective rather than from a national or European perspective. This regional approach is apparent in all sectors. Also, Regional Initiatives were established.

In conclusion Mr Romanowski remarked that more infrastructure is needed. The EU cannot concentrate solely on electricity but also needs to work on other sectors. Above all, whenever private money or public money is invested, these investments should be based on costs and benefits.

## **Debate**

Mr **Andreasen** pointed out that the amount of money available to invest in infrastructure is important. However, the cost is not the only important factor. The 140 billion for electricity mentioned by Mr Romanowski will offer returns and provide a good investment for society. From a socio-economic, benefit-calculation point of view, there are still a lot of positive infrastructure investment opportunities that make Europe richer. He remarked that this was the reason he asked for the support of parliamentarians.

Mr. Andreasen agreed that the four sectors, gas, electricity, district heating and transportation, should come together. They should be seen as supporting each other. The Commission and parliaments should engage in understanding how well these sectors can fit together if they are well designed, and how they can bring down the costs of the green conversion. Gas is not just a fossil fuel. Enormous amounts of electricity can be stored in the gas system.

Mr Andreasen gave the opinion that the 10% interconnection target that Mr Romanowski mentioned is far too low. Already there are countries with a 100% interconnection capacity that are still building fervently because interconnection is such a good business case. So why should the EU limit itself to 10% or 15%, Mr Andreasen wondered. These percentages could be a starting point, to lift some countries out of isolation, but they should never be the target. If there is money to be saved and harvested for European citizens, the target should go far beyond 10% or 15%. Also, interconnection targets are fine on the borders, but they do not help at all if there is congestion within the countries themselves, Mr Andreasen said.

Mr **Rooijers** agreed with Mr Romanowski about the importance of the gas infrastructure. This applies not only to natural gas. In the future sustainability will have to be introduced into the gas sector. This raises the question which kind of gas should be transported: natural gas or a syngas. Mr Rooijers expressed his belief that after 2015 gas will be produced by solar power to use for heat and electricity demands at those moments when solar energy and wind energy are unavailable in the northwest of Europe. He suggested it may be a good idea to think about which kind of gas should be transported from the south of Europe to the north. Natural gas may not be the most practical for that purpose.

Mr Rooijers also agreed with Mr Romanowski that interconnection is very important for Europe, but he did state that this is very difficult. He expressed his belief that the plan of the European Climate Foundation about interconnection between France and Spain would be very hard to realize.

Mr **Bosman** from the Netherlands said that in the future there will be progressively more subsidized renewables, leading to lower energy and electricity prices, forcing the current power plants out. He suggested there should be a plan for a 24/7 and 365-days-per-year solution for energy when building renewables. In that way, when renewables are built, the question of storage is addressed. Right now, however, renewables without a potential for storage are being built. In Mr Bosman's opinion, the market should be allowed to act as it sees fit but this is currently impossible.

Ms **Sarkkinen** from Finland asked whose job it is to maintain reserve power plants that can be used when demand peaks, for example in cases of heavy winter weather. Because of falling energy prices, power companies are closing down power plants as these have become too expensive. Whose job is it to pay for the upkeep of reserve plants, Ms Sarkkinen asked. In her opinion there should be an EU-wide discussion about this, maybe leading to a road map indicating the way ahead.

Ms Sarkkinen then mentioned that European countries subsidize renewable energy sources. This has helped to boost technological development. Should the EU also subsidize or support the energy storage system or at least the research and development in this sector? As far as Ms Sarkkinen is concerned, this is the main question.

Ms Sarkkinen's final question regarded the infrastructure. Should the EU discuss how to create infrastructure for alternative traffic fuels?

Mr **Kols** from Latvia agreed with Mr Romanowski about the questions that Europe has to tackle and address for the future. However, he thought it surprising that no one had talked about present issues that will affect Europe's energy union in the future.

Mr Kols expressed the view that the Energy Union will allow its members to pull resources across Europe and lessen their energy dependency on Russia. According to him, however, there is a significant issue that threatens to unravel the entire Energy Union, viz. the Nord Stream 2 pipeline. In Mr Kols' opinion, rather than being a strictly commercial project, Nord Stream 2 is a geopolitical project. If Nord Stream 2 is implemented, all Russian natural gas delivered to Europe will be transmitted via Nord Stream 1 and Nord Stream 2, bypassing Ukraine and thus depriving it of its transit fees, which are significant to its fragile economy. Mr Kols stated that the introduction of a Russian-controlled infrastructure in the EU's energy market, supplemented by cheap gas will undermine the fiscal need to diversify and deter any feasible competition. Such extensive control over Europe's energy infrastructure will allow for price manipulation as well as for possible geopolitical manipulation, Mr **Kols** stated. It will enable Russia to cut off Central and Eastern Europe while maintaining gas flows to western EU states.

Mr Kols stated his opinion that the principle behind an energy union is the collective view that one country should not be in a position to use energy as a tool for foreign policy and manipulation. If Nord Stream 2 is allowed to move forward the EU will be signing away its principles as well as its ability of independent policy making, said Mr Kols. He urged all member states to remember their commitment to address EU energy issues and to reject the Nord Stream 2 project. He postulated that the Nord Stream issue is a significant test of the time, commitment, solidarity and common interest of all member states.

Finally Mr Kols focussed on a parliamentary dimension. He would prefer to exchange views with members of other national parliaments rather than to discuss and exchange views with the experts. He called for other member states to adopt similar resolutions at their national parliaments.

Mr **Altunyaldiz** from Turkey expressed his opinion that the integration of the electricity networks of countries has a wider importance than just to allow these countries to benefit from the technical advantages interconnected power systems offer. It is also important to ensure a sustainable security of supply and a diversification of resources together with an increase of the import and export potential.

Mr Altunyaldiz pointed out that on September 18, 2010, following feasibility studies and tests Turkey was connected in a trial synchronous operation to the European Network of Transmission System Operators for Electricity (ENTSO-E). He said that steps towards full membership are continuing, but that this is a long-term process. An ownership agreement was signed on January 14, 2016 making the Turkish Electricity Transmission Company (TEIAS) an observing member of ENTSO-E. Mr Altunyaldiz expressed his wish for Turkey to become a full member of this network system to ensure the reliability of the connectivity. In his opinion, full membership will give a more reliable connectivity so that countries can feed one another in times of crisis.

Secondly, Mr Altunyaldiz talked about transferring gas from the producing countries to the consuming countries. The producing countries are centred around Turkey, especially the Caspian countries and the countries in the Middle East. He mentioned the Southern Gas Corridor. Mr Altunyaldiz said that the producing countries would like to reach the consuming countries with a reliable pipeline. Work on settling and building this pipeline from the Caspian countries is ongoing as Mr Altunyaldiz explained. How can this pipeline be swiftly completed to effect a sustainable and secure supply chain from producing to consuming countries, he asked.

Thirdly, Mr Altunyaldiz talked about storage. Prices are going down and it is not known when they will start to go up again. Mr Altunyaldiz agreed with the suggestions that storage issues should be addressed. The question how the capacity to store renewables can be enlarged should be looked into.

Mr **Allizard** from France said that electricity plays an increasing role in economic development because coal is used less and less. This leads to changes in the means of production. Other production sources, renewable energy, should be looked into. As a result of these changes managing the electricity system as a whole is becoming more complex.

Mr Allizard said he approved of the objective of the changes: the fight against climate change. He wondered, however, whether the management of the energy mix for production on a national level and the accompanying network infrastructure will be sufficiently equipped for this challenge. Is the aspect of securing the electricity supply in the EU consistent with the mechanisms for the distribution of the capacity that are being developed, Mr Allizard asked. The security of supply between the various states should be looked into. Which developments on the electricity market can ensure more security in the electricity supply, Mr Allizard asked. Mr Allizard stated that increasingly this is becoming a local issue. Which time frame and what geographical areas are being looked into?

Mr **Žemaitaitis** from Lithuania addressed a question to Mr Andreasen and Mr Romanowski, who both talked about the necessity of infrastructure and its practical and financial aspects as well as about renewable energy and gas. Gas is good for Russia and renewables are good for the whole of Europe, but why is nuclear power not mentioned, Mr Žemaitaitis asked. The

Baltic states, Estonia, Latvia, Lithuania, and neighbouring countries will have a big problem in two or three years when Belarus will have built a nuclear power plant. Mr Žemaitaitis expressed his opinion that the nuclear power plant will certainly be built, as Russia donates it. What will happen then, he asked. According to Mr Žemaitaitis this is not a problem of renewable energy or a gas problem, but a problem of nuclear power. A new power is coming to Europe.

Mr Žemaitaitis mentioned that all three Baltic states share one infrastructure, the BRELL energy ring. At the moment the Baltic states are discussing whether it is time to break up this ring. This will have consequences for Kaliningrad. Mr Žemaitaitis asked what Mr Andreasen and Mr Romanowski think about this.

**Mr Messis** from Cyprus said that Cyprus welcomed the sustainable energy security package that was announced by the European Commission last February as a positive step towards achieving more competitive, sustainable and secure energy. He expressed his view that currently the internal energy market is fragmented and underperforming and that efforts should be made to complete it in order to ensure that energy can flow freely among EU members.

Mr Messis then focussed on the example of Cyprus. The energy isolation of Cyprus and the small size of its market impede competitiveness, resulting in higher prices for fuel and energy compared to other EU-countries. Mr Messis spoke about the plans to interconnect Cyprus with the energy infrastructure of mainland Europe and if possible, even with its energy storage facilities, in order to end its energy isolation. To achieve this, the European Commission has approved the EuroAsia Interconnector, a cable to connect the electricity grids of Cyprus, Israel and Greece, as well as the Eastern Mediterranean pipeline, to link the gas fields of Israel and Cyprus with Greece and mainland Europe.

Mr Messis concluded by stating that a lot of challenging and difficult steps will have to be taken in the near future and that there are still a lot of barriers to be removed.

**Mr Romanowski** started by answering the questions from Mr Žemaitaitis. He said that the point about desynchronizing the Lithuanian, Latvian and Estonian grid from the Russian and Belarussian system is very well known to the Commission. It cooperates very closely with these three member states and Poland on that matter. Mr Romanowski explained that one of the priorities for the Commission within the Energy Union is to make sure that the three Baltic states are no longer operating synchronously with Russia and Belarus. For that reason the Commission has established the BEMIP group (Baltic Energy Market Interconnection Plan). This meets on a regular basis to discuss what has to be done in order to reach a decision about this desynchronization and whether the three Baltic states should be synchronized with the continental European network or with the Nordic network. This is a priority for the Commission. It will stay committed to delivering on this objective.

The second point Mr Žemaitaitis raised concerned the nuclear power plant in Ostrovets. Mr Romanowski confirmed that this is an important issue for the Commission as well. In February vice-president Šefčovič discussed this matter with president Grybauskaitė, the prime-minister and the Minister of Energy. The Commission is aware of discussions between Lithuania and Belarus within the Espoo Convention regarding safety. The Commission has always been clear that there cannot be a compromise on safety. Safety is a priority. Mr Romanowski then pointed out that Belarus voluntarily agreed to run a stress test together with the Commission. Also, the Commission will run a peer review like it did for nuclear power plants located in Europe. Mr Romanowski indicated that the Commission is monitoring the situation and expressed the hope that in the end there will be solutions that work for all parties: the three Baltic States, Poland but also Russia and Belarus.

Mr Romanowski then announced that the Commission is going to make an important proposal in December 2016 consisting of three elements. The first element is a proposal for a new electricity market design. This proposal will to a large extent address the issues that have been raised. The second element is a proposal for a review of the renewables directive in order to make sure that the Commission has appropriate policy tools to meet the 2030 targets. The third element regards communication, addressing both the implementation of vital pieces of infrastructure in Europe and the measures to deliver on the 15% target for 2030.

Mr Romanowski mentioned that for some members this target may not be sufficient but any legislation in the European Union has to pass through the Parliament and the Council and should reflect costs as well as the potential for commercial exchanges and a qualified majority voting in the Council.

Mr **Rooijers** spoke about investments in renewables and in normal power plants. According to him, conventional power plants are needed even in a world with a lot of solar and wind energy. It should be accepted that prices may vary and may sometimes be very high. This is the basis for investments in conventional power plants.

With an example of the situation in the Netherlands ten years ago Mr Rooijers made clear that transparent prices and accepting higher prices at certain moments form the basis for investment in small power plants.

Mr Rooijers then talked about some problems he perceived with renewables. Solar and wind are heavily subsidized. This means prices are getting lower and the subsidies in turn need to become higher. If a new mechanism to invest in solar and wind is not introduced, the process of renewable energy will stop in 2025 because by then for an investor, electricity is not worth a penny at the moment it is produced. According to Mr Rooijers, this should be thought through. He expressed the hope that this will happen within the system of the EU.

Mr **Andreasen** observed that a lot of the remarks centred around the question what to do when no sun and wind are available. The market is the answer to this question. As far as Mr Andreasen is concerned there is security of supply when the supply curve and the demand curve cross. The question is how much the prices will go up if that happens. According to Mr Andreasen they should be allowed to go up considerably. He suggested that the Commission might want to look at the limits and see if the maximum price per MWh should be lifted. This will force traders to hedge their positions, because they cannot handle these higher limits, which their customers will be unable to pay.

Mr Andreasen said that storage and batteries will certainly be part of the solution but although there will be a dramatic decline in the price of batteries in a few years' time, this will be peanuts compared to what is really needed. Batteries may be a good solution, but mainly for rural areas where connectivities are weak. For mainstream business purposes they will not provide the solution.

Mr Andreasen then addressed the question whether renewables will be there when they are needed. According to him, this will not be the case if their scope is limited to any particular country. However, studies by ENTSO-E show that on a European scale the probability of having wind somewhere in Europe is good, so that wind can be relied upon as a resource. There will always be wind somewhere in Europe, the energy just needs to be transported to the buyers.

Mr Andreasen said that ENTSO-E shared the concerns of Lithuania about the three Baltic states and strongly supports the Commission's work. The Nordic countries need to evaluate their best options with the Baltic states. Should the Baltic states form their own synchronised area, should they synchronize with Poland, or should they synchronize with the Nordic countries? All solutions are technically feasible according to Mr Andreasen.



Mr **Andreasen** said the question of Kaliningrad needs to be solved but, as it is a political issue, he hoped that this would be done by the Commission.

Mr **Andreasen** then addressed the questions by Mr **Altunyaliz**. He mentioned that ENTSO-E welcomes TEIAS and wants it to be a full member. ENTSO-E is working hard towards that goal. Mr **Andreasen** said that he is not familiar with gas in the southern parts of Europe and therefore could not answer the questions thereon.

Mr **Bosman** asked if he understood Mr **Andreasen** correctly that storage should basically be in a gas-fired plant.

Mr **Andreasen** answered that batteries play a role. In some regions there is speculation against the tax system, because consumption can be hidden behind the meter. Gas-fired plants will never offer storage but they may offer back-up capacity.

Mr **Mustafa** from Kosovo asked whether there are any studies that show when vehicles powered by electricity will become economically viable. In which way will this influence the overall picture of energy?

Mr **Kols** said it took some twenty years to switch from coal to gas. So to switch from gas to renewables might take an additional twenty years. He expressed a wish to hear Mr **Romanowski's** opinion on Nord Stream 2, and he asked how the European Commission and experts assess the risks of Nord Stream 2. Are the Eastern and Central European countries just being alarmist?

Mr **Žemaitaitis** asked for Mr **Romanowski's** opinion on the European Union becoming a partner of the nuclear power plant in Belarus. What about safety?

In answer to Mr **Mustafa's** question about electrical vehicles, Mr **Rooijers** explained that studies show that these are a very realistic kind of flexibility option for the near future. They are, however, only suitable for short-term flexibility. They do not address seasonal demands, but only the demands of a day or a week.

Mr **Andreasen** said that to answer the question about Nord Stream 2 he would put on another hat, that of TSO (transmission system operator) of Denmark. An energy terminal was just opened in Lithuania. This led to an immediate drop in prices. Mr **Andreasen** then put forth the idea of a competition with Russia regarding pipes, for instance from Norway through Denmark to Poland to the Baltic states and Finland.

Mr **Andreasen** said that electrical vehicles can be an option and have to be one because they may help the balance by absorbing energy from the power system when there is too much energy in it. He also stated that in order to decarbonize the transportation system electricity is a must because of its efficiency. Biomass also is a must in transportation systems.

Mr **Romanowski** addressed the Turkish comment on gas. According to him the objective of the European Union and the whole concept of having a resilient energy union in Europe are to diversify supply sources. He stated that the Commission believes this can be achieved through LNG terminals and by having more LNG in Europe, but also by opening up the Southern Gas Corridor. The Commission's policy on and approach towards the Southern Gas Corridor has not changed; the Commission still very much promotes this. The gas pipelines which are to bring gas to Europe through that corridor from the Caspian Sea have received the status of Project of Common Interest twice. The Commission does not promote this project on paper

only. Recently the European Investment Bank provided a grant for the development of the Trans-Anatolian Natural Gas Pipeline (TANAP). Mr Romanowski mentioned this to confirm that the European Union is interested in this project and ready to provide financing for it.

Mr Romanowski then went on to state that the same cannot be said for Nord Stream 2. The official position of the Commission, repeated by president Juncker and vice-president Šefčovič, is that this is not a European project. The Commission does not support Nord Stream 2 and this project has not received the status of a Project of Common Interest, Mr Romanowski explained. If Nord Stream 2 is implemented the Commission will look at the project and assess it against the European legislation. If it is implemented, it will be subject to the same treatment as any gas pipeline built in Europe, Mr Romanowski said.

Mr **Kols** mentioned that this holds true in case of cross-border cooperation. He wondered about private companies, however. He pointed out that Gazprom is state-owned but has subsidiaries in Europe and that OMV, an Austrian company, is very interested in Nord Stream 2 as well. It recently signed a strategic agreement with Gazprom exploring the North Sea. Mr **Kols** said that in this way, the European Commission can be bypassed easily, as it concerns a private venture.

Mr **Romanowski** said the Commission is happy to support projects which are of European value. He provided a few examples of the Commission extending appropriate financial support to gas infrastructure.

## **Session II Energy Conservation – Energy Saving Cities**

In the chair: **Ms Marijke Vos**, Member of the Senate.

### **Introduction by Mr Jonas Kamleh, Deputy Head of Urban Development and Climate, Environmental Department, City of Malmö**

Mr **Kamleh** started his presentation with a short video about Malmö's smart energy system. This is a rendition of its content.

Malmö's ambitious goal is to run on 100% renewable energy by 2030. To achieve that more smart energy systems need to be developed. The production of renewable energy has to be increased as well. Energy systems are being developed to compensate for the variability of renewable energy. Finally, solutions have to be found to use energy ever more efficiently.

Traditionally the energy flows in one direction only: from energy production units out to energy consumers. The grids are now being upgraded to allow energy to flow in all directions. This allows electricity from rooftop solar panels, for example, to flow into the energy grid. Furthermore, functionalities are being added to the energy systems that allow consumption and production units to communicate. Traditional grids only use basic consumption information to tell production units when to produce and distribute energy, but a smart energy system allows information to flow in all directions. In this way the smart grid can tell energy consumers when there is a lot of renewable energy available and, thus, when it is less expensive and more sustainable. It also shows consumers how much energy they use in real time, which raises awareness. For example, when is the best time to run the washing machine or dish washer? In an apartment building in Malmö's Western Harbour, the energy system lets residents choose to charge their electric cars either immediately or automatically when renewable energy is most abundant within a certain time frame.

Malmö's smart energy system includes an extensive district heating and cooling infrastructure, to make energy optimization even more flexible. For instance, there is an apartment building that heats tap water with solar panels and collects any unused heat in accumulator tanks, literally saving it for a rainy day. The apartments are heated with district heating. When it is in excess, the building conserves heat in the building's concrete structure. When district heating is in short supply, the building stops accepting it and uses its accumulated heat instead. The residents can control their heating system remotely, turning it down when they go on vacation, and up again in anticipation of their arrival home via an app in their smart phones.

Currently, Malmö's grid is prepared to connect 9,000 more energy efficient households like the above mentioned building. Furthermore, it is expanding to encompass buildings that will be constructed soon. Eventually old, less energy efficient buildings will be connected to the smart grids as well. Malmö envisions a not so distant future, in which the abovementioned smart energy solutions are scaled up to encompass the whole city, and where sensors are incorporated into the city's infrastructure to provide smart services to its citizens. Smart energy flow is already feeding life in Malmö. Thanks to the great collaboration with citizens, local businesses and energy providers, Malmö is on its way to becoming a 100% renewable city by 2030.

After the video Mr Kamleh explained that Malmö has to deal with the classical challenge that many cities are facing: the number of citizens goes up, but car use, energy use and greenhouse gas emissions have to go down. At the same time Malmö aims for maximal welfare within planetary boundaries.

The municipal organization is to take the lead in reaching the city's ambitious goals. By 2020 the entire organization will be powered by 100% renewable energy. Malmö expects to already reach this goal in 2018. The first step for the city as a whole is to aim at a 20% reduction of energy use by 2020 and another 20% reduction by 2030.

The next step is to power the city by 100% renewable energy in 2030. To achieve that, the city has adopted the UN sustainable development goals. Mr Kamleh focussed on three goals: renewable energy, good jobs and economic growth, and sustainable cities and communities. To illustrate his story he talked about an area of 400 apartments with about 1,000 tenants that was retrofitted. Although a lot of work had been done on the laundry facilities, elevators, windows and roofs, the main part consisted of updating and installing technical systems: solar cells, district heating system, water consumption monitoring system etcetera. By focussing on the technical systems as opposed to the climate shell of a building, costs were about 20% of the costs of more traditional retrofitting. That is why Mr Kamleh thought that is where the big potential is for a lot of existing buildings.

Working towards a sustainable city has some beneficial side effects. First, retrofitting improves buildings in a technical way. As a result the value of some buildings has doubled. Second, it adds social value. People feel more positive about the building and the area which they live in. As a result less damage is inflicted on the area, which also makes it safer and more attractive. Third, jobs are created. Working on a wider scale than just the building has a substantial impact: it creates tangible societal value.

Malmö's Western Harbour area is an illustration of how energy saving cities can become a reality when we set our mind to it, said Mr Kamleh. Up to the 1980s one of the largest shipyards in Europe was based there. Due to the big oil crisis the shipyard was no longer economically viable and closed. It was decided to redevelop the area. In 2001 a housing exhibition was organised in the area. Nowadays the Western Harbour is one of the most attractive areas to live in. When it was constructed in 2001, it was already 100% powered by renewable energy.

According to Mr Kamleh we may not know what energy saving cities will exactly look like, but we are already on our way towards them.

### **Introduction by Ms Anke van Hal, Professor Sustainable Building at Delft University of Technology and at Nyenrode Business University**

According to Ms **Van Hal** there are three success factors of energy friendly renovation projects. The first factor is money. You have to be able to afford it. The second one is technology. The applied innovations must work and work well. The third success factor is the topic of Ms Van Hal's presentation.

In the Netherlands 20% of the CO<sub>2</sub> emissions comes from the built environment. The government has been trying to reduce the energy use in existing houses since the 80s, but retrofitting the existing housing stock is a big challenge. The goals are

not reached yet. To reach the goals the third success factor has to be taken into account.

Ms Van Hal explained that the third success factor of energy friendly innovation consists of three elements. The first one is the complexity of the decision making process. Researchers have come up with a model for energy saving behaviour of tenants and home owners, which shows why making a decision is so hard. It is a flow chart with all kinds of questions they can ask themselves. For example: "Will I dwell in this house long enough to reap the benefits? Is my house suitable for these measures?" The second element is related to emotions that are involved in the decision making process. Before people decide to renovate, emotional questions can pop up. "What will my neighbours do? Does it affect the value of my house? Should I spend my savings on my house or on a new car?" There are also very strong emotional arguments like: "I do not want strangers about the house. I do not like the mess and the nuisance." While a lot of housing professionals think that home owners are very rational, financially driven people, they in fact tend to act very emotionally. The third element is the way people cope with bad experiences. Negative news raises more interest, travels faster and can do a lot of damage. This was illustrated by the story of two residents of a house that was retrofitted in a very innovative way. For whatever reason they started to complain in the media, compromising the entire retrofitting project.

A lot of housing professionals think that the third success factor is vague, but there is a lot of knowledge about it in the field of human sciences, such as psychology, sociology and behavioural economics. They are, however, not familiar with this kind of knowledge. Why that is a missed opportunity Ms Van Hal explained with the following example. If you decide to invest in energy saving measures, you pay a sum of money. After a certain number of years that sum is earned back, because your energy bill is lower. That logic is simple enough. However, psychologists know that people suffer from "loss aversion": the emotional reward of saving money on your energy bill does not outweigh the loss you feel when you invest a sum of money. Most housing specialists are also not fully aware of "delay discounting": the longer it takes to get the reward, the less enthusiastic people are about it. If you take emotions like these into account, it will make a simple payback calculation totally different.

The question now is, Ms Van Hal continued, how we can integrate this knowledge in the daily practice of housing specialists. One way is to convert energy efficiency into an interesting topic that lights up the frontal cortex to the same extent as when people look at a picture of a beautiful car, for instance. In other words: how do we make people feel passionate about energy efficiency? How do we make it sexy?

She distinguished three steps in strategy. First, know what is on people's mind, what their needs are. Second, use your knowledge of energy efficiency to meet those needs. Third, start thinking about finance. Finance is not the last step because it is less important, but because people become much more creative in finding a way to finance something if they really want it. It sounds very simple, but in practice one tends to focus on the financial side.

To illustrate how this works, Ms Van Hal told the story of a new heating system that was being installed in a block of houses. One group of home owners complained a lot about the new system: it was noisy, it took up space in their house, strangers had

to come in and install it et cetera. The other group was delighted with the new system. The difference was: their system was installed in a box outside of the house, next to the entrance. No one had to enter the house to install it. As a bonus, the box could also serve as shoe storage space. The side effect was that this group was also enthusiastic about energy efficiency measures that were taken after that.

Ms Van Hal concluded her presentation by stating her main message: accept that taking energy efficiency measures is not only about technology and finances; it is more complicated, but there is a lot of knowledge that we can use.

### **Introduction by Mr Tom Jongen, Deputy director Renovation, BAM**

Mr **Jongen** started with an interesting question: would you like to have a retrofitted home with no extra costs, live in an energy saving city and at the same time save the planet?

14 billion euros is the amount of money spent annually by Dutch households on energy for home consumption. 30% to 40% of the stock of housing corporations is outdated. The housing corporations lack funds to renovate, because the costs are high and the benefits few. This leads to an undesired situation. This situation can be turned around with deep energy retrofitting, said Mr Jongen. (*Wikipedia: A deep energy retrofit is a whole-building analysis and construction process that uses "integrative design" to achieve much larger energy savings than conventional energy retrofits.*) In the Netherlands four construction companies and six housing corporations have joined forces to improve living conditions and at the same time contribute to saving the planet and creating energy saving cities. With deep energy retrofitting all electric, self-sufficient homes can be created.

The monthly energy bill of many Dutch households exceeds €150. This is quite a lot of money. It would be really great if we manage to reduce that. Mr Jongen explained how the energy bill can be used to finance deep energy retrofitting and to create a win-win situation for everybody involved, including the planet.

Retrofitting gives housing corporations a higher return on their investment, because it adds value to the property and makes it future-proof. The tenants get a modern, future-proof home with a healthy living environment, with no extra costs. Furthermore, they are free to choose whether they want to participate in deep energy retrofitting or not. Construction companies get a business case with long term benefits. They get innovate by applying the principle of total cost of ownership. And they get industrialisation by innovating in deep energy retrofitting.

Power grid companies, on the other hand, will face some problems when the transition is made to all electric homes, because they have to prepare to deal with the load and unload of these homes. At the moment, European Union funded research is conducted by Polish, Belgian, Dutch and Spanish companies to make smart grids. This study is going really well, said Mr Jongen.

It is not easy to realize a deep energy retrofitted house that is modern, self-sufficient and all electric without any extra costs for the tenant, Mr Jongen explained, as all parties involved have to join forces, especially the government. The latter plays a very important role in realizing energy saving cities through innovation. This requires changes in legislation and permit application procedures. In the Netherlands new legislation was adopted to allow housing corporations to draw up energy

delivery contracts, which ensures that tenants do not pay extra money for deep energy retrofitting. A task force was created to simplify permit application procedures for deep energy retrofitting. A generic extension of the law was created to compensate damages to flora and fauna. These measures ensure scalability and production flow, stated Mr Jongen.

He concluded that it is possible to create energy saving cities through innovation. Annual CO<sub>2</sub> emissions per household can be reduced by 3.7 tons, one can get strong support from environmental groups, and a positive business case is achievable for housing corporations as well as construction companies and subcontractors. Last but not least, it is possible to achieve at least 90% customer satisfaction.

## Debate

Mr **Busto** from Italy asked what the source is of Malmö's district heating.

Mr **Kamleh** answered that there are a lot of different sources for district heating at the moment. One of the sources is biomass. Another one is waste. About 90% of the waste is recycled in Malmö. The other 10% is burned for electricity production as well as district heating. Natural gas is used during peaks in demand in the winter. The city also harvests geothermal heat. In the near future Malmö wants to drill as deep as 7 kilometres into the earth's crust. This hole should be able to provide one third of Malmö's district heating.

Mr **Calvo Y Castañer** from Belgium said that in his home town of Mechelen, Belgium, the reduction of energy use in transportation poses the biggest challenge, especially when it comes to the use of cars. He wondered if this is also the case in Malmö.

Mr **Kamleh** confirmed this. He said that it is hard for politicians to tell people to make less use of their car. Instead the city heavily invests in making cycling and walking more attractive, but the number of pedestrians and cyclists is not growing fast enough. The annual population growth is also 30% larger than expected. Those two factors urge the city to do more in that area.

Analogue to the psychological effects that occur when people are considering to invest in energy saving measures, Mr **Calvo Y Castañer** pointed out that it is also interesting to look at the psychological effects of cities. In his opinion concrete projects in cities are far more useful than big debates in national parliaments, because it happens in your city, in your neighbourhood, in your street.

Ms **Van Hal** agreed to a certain level that projects can be quite effective on a local level, for instance when local building companies and installation companies team up, because it feels more familiar to people. She said, however, not to believe one is more effective than the other. The combination of local and national efforts is important. She advocated once more the use of human sciences to make policy more effective.

Mr **Kamleh** touched upon the element of cognitive dissonance: everyone knows that we need to do something about climate change, but people wonder what they can do.

In that regard it is very important to spread good examples across cities and neighbourhoods. For example, when people see their neighbour has solar panels, they want it too.

The **Chairperson** asked the representative of Romania to elaborate on the Romanian housing refitting project that is funded by the EU.

Mr **Marcoci** from Italy said that his government invests 500 million euros in a big project that involves the construction of a thermal system and the grand scale insulation of buildings. Government support is important as it is hard to convince people to invest because they do not have any money to begin with. When Mr Marcoci was the president of the Romanian environmental fund he had a trillion euros to spend. It was a good opportunity to see how that money could be best put to use. The fund financed 80% of a solar water heating project, which is now used by 90% of the hospitals and 80% of the schools in Romania. Currently the government seeks to expand the project to private home owners. There are many applicants, but too few government officials to approve them.

Ms **Van Hal** asked if Romanian renters pay a fixed sum for their energy use as part of the rent, or if the energy companies charge the renters directly for what they use.

According to Mr **Marcoci** the latter is the case. So there is an incentive to use less energy.

Mr **Jongen** asked if the Dutch system could work for Romania too: instead of paying the energy supplier for the amount of energy used, you "rent" the energy of a company that invests the money in energy efficiency.

That is difficult to realize, said Mr **Marcoci**, as there are no big corporations that build large apartment blocks and 95% of the people own their own apartment.

Mr **Jongen** expressed his belief that in the future it will not really matter whether a house is privately owned or owned by a housing corporation. He foresees all will be easier once the scale on which retrofitting takes place is big enough.

Ms **Van Hal** pointed out the positive effects of choosing a new system of procurement. The city of Paris, where some suburbs have a high percentage of run down houses, for instance, challenged private companies to come up with ideas to improve them. That made a big difference.

Mr **Stanislawek** from Poland liked the perspective that Malmö has 100% energy from renewable sources in 2030. He wonders whether part of this renewable energy will also be harvested from sewage treatment plants.

According to Mr **Kamleh** sewage treatment plants and biogas produced from food waste only make a very small contribution to the energy production.

The **Chairperson** asked if there were programmes in Poland to make houses more sustainable.



More and more small coal powered plants in houses are being replaced by small energy efficient plants, answered Mr **Stanislawek**. This is very difficult, however, due to problems similar to those in Romania: over 90% of the people own their flat. In ten to twenty years, a lot of energy in Poland will come from renewable sources. To that end, the Polish government has recently invested in the creation of biogas plants in farms and energy production units in large sewage treatment plants.

Ms **Van Hal** asked Mr Calvo Y Castañer to elaborate on the passive house movement in Belgium. (*Wikipedia: The term passive house –Passivhaus in German– refers to a rigorous, voluntary standard for energy efficiency in a building, reducing its ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling.*)

The movement is not that strong, **Mr Calvo Y Castañer** answered. It is a challenge to make the passive house concept mainstream. He thought that efforts should be directed towards the renovation of existing buildings as well as the stimulation of the passive house movement. He said he expected that Belgium could still make some steps forwards.

According to Mr **Busto** Italy can gain the most by investing in distributed energy and heat production, and by reducing the use of cars. He wanted to know how Malmö manages to do that.

Mr **Kamleh** thought automated cars will be a major game changer. The automotive industry itself predicts that the amount of cars in the city will decrease by 80%, as many cars will be shared instead of owned. Automated cars will make driving more efficient, he expects. The Swedish government is ready to approve the use of automated cars as soon as manufacturers apply for it.

Mr **Busto** asked if the Swedish trust that the number of cars will be reduced as a result of market mechanisms as opposed to government policy.

Mr **Kamleh** said that policy to that end has already been adopted and that further policies will be. However, he expects technological developments and market mechanisms to outrun policy in a while.

Ms **Van Hal** added that government policy can have a significant effect. The introduction of low emission zones in cities, for example, has helped to clean the air dramatically.

The **Chairperson** asked everyone present: how can governments and the EU help in the transition towards more sustainable energy production and use?

Mr **Jongen** advocated to look at renewable energy not on a local or national scale but from a much bigger perspective. It would provide a lot of insight to make a map of Europe which shows the energy potential in different places.

The **Chairperson** added that that would help to create new connections and collaborations.

Ms **Van Hal** pointed out that a lot of regulation makes it hard for individuals to innovate. She calls on governments to support their energy innovation heroes and not to make their life difficult.

According to Mr **Kamleh** we need strong leadership that is able to create the demand for the future we want.

Mr **Marcoci** said he wants the European Union to take the lead and national governments to back the EU's decisions. In his opinion the Romanian government does not make good use of waste, which can be an important source of energy.

Mr **Kamleh** stressed the importance of the circular economy, in which materials are reused and recycled as much as possible. Everything that remains after that should have no CO<sub>2</sub> impact when burned.

### **Session III Renewable Energy Sources**

In the chair: Ms **Stientje van Veldhoven**, Member of the House of Representatives

The **Chairperson** welcomed all participants in the session about renewable energy sources (RES) and introduced three introductory speakers, Mr Matthias Buck, Mr Mario Ragwitz and Mr Siebers, who were the first to take the floor for their presentations. She suggested to proceed the session with questions and answers concerning the presentations to be followed by a debate based on keynote statements.

#### **Introduction by Mr Matthias Buck, Senior Associate EU Energy Policy, Agora Energiewende**

Mr **Buck** from Germany expressed thanks for the opportunity to participate in this conference. He explained that in his speech the focus would be on renewables in the power sector. He started by saying that the EU's target for 2030 is for renewable energy to have an average 50%-share in the power mix, thus turning a niche capacity into the mainstream of the power system. He noted that in 2014, the EU decided on new climate and energy targets and that by 2030, at least 27% of the overall energy consumed was to come from a renewable energy source of which almost half was likely to be delivered by the power sector.

Since constraints on an increased use of biomass and biofuels and limitations to transport and hydroelectric power had led to an estimated 30% of wind and solar PV (photovoltaic) in the power system, Mr Buck felt that dealing with the volatility of the existing wind and solar PV electricity would prove to be much more challenging. He expressed that, seeing that renewables would be at the centre of the power system, it was important to look at the factors that constrain and shape the space for renewable electricity. Europe's targets implied a 68%-decline in energy production by coal-burning power plants by 2030. This was of significance for both the protection of the climate and the structure of the power market. A transition to a power mix in which renewable electricity has a much higher share, however, challenges the flexibility of the capacity mix, Mr Buck said. Answering the question how to undergo the transition in the most cost-effective way, Mr Buck stated that for a more flexible mix it was important to have a different quality of the capacity installed. For the transition to be economically effective it was important to add an increased share of renewable electricity to a more flexible mix of the installed capacity.

Although discussions tended to focus on further improvement of the so-called energy-only market and further reform of the EU emissions trading system (ETS) in order to achieve a cost-effective energy transition, Mr Buck believed that just fixing the market design would not be enough. During the transition, he said, energy systems in and outside Europe were subjected to great pressure while politicians hesitated for fear of lowering the system's adequacy. He pointed out the strong political tendency to complement the energy-only market by interventions to safeguard system adequacy. Furthermore, he noted that the EU did have an emissions trading system and had agreed on reforms in the market-stability reserve last year. A further reform of ETS would lead to an ongoing decrease in yearly emissions auctions, thus increasing reduction. Even if the measures, both now agreed on and suggested, were fully implemented, he felt there would still be a cumulated allowance surplus in the market stability reserve by 2030-38 that would come back into the market in case of a scarcity. Mr. Buck mentioned it was very unlikely a stable carbon price would be achieved within the next ten to

fifteen years and that precisely this period of time was critical for investors, which made it a fact that should influence choices.

Mr Buck noted a more pragmatic approach to power market design was needed. In this respect, he said, five elements (shown in a pentagon) were important of which a reformed energy-only market and a further improved ETS were two. In order to achieve the EU target it was also necessary to address the issue of high carbon assets, the issue of revenue stabilisation for renewable energy and interventions to safeguard system adequacy.

Looking more closely at the five elements Mr Buck explained that 1. a number of no-regret measures could create more flexibility in power markets, including linking day-ahead, intraday and balancing markets and improving the predictability of scarcity prices and that 2. all analyses showed that for a very long time a continuous surplus of allowances in the market would keep prices much lower than needed. He said he was convinced that more was needed to make ETS work, of which a stable mid-level carbon price of about €30/t CO<sub>2</sub> was the most important. This would create the necessary switch from high-carbon fossils to low-carbon fossils. He mentioned that this price, although not adequate to act as an incentive to invest into renewables, would reduce the gap between market revenues and renewable installations and reduce the costs of support schemes. For coal to be taken actively out of the market, Mr Buck said it was both necessary and effective to incorporate a mechanism within the ETS allowing governments to undertake national initiatives because it was a matter of course that allowances that were not used by a national government would be used elsewhere in Europe. 3. Mr Buck thought the active removal of legacy investments in inflexible high carbon capacity to be relevant for the protection of the climate and market design. He explained that most carbon emissions in Europe were caused by coal-fired power plants while the inflexibility of the greater part of the coal capacity in Europe blocked a more flexible and better working market thus preventing a cost-effective transition in the power market. He added it was important that some EU member states, particularly Germany, actively remove coal capacity from the market. 4. He stressed that it should be acknowledged that support had to come from mature renewable technologies as well, seeing that market certainty found itself reflected in the cost of capital invested in renewable capacity. He explained that on the present power market investors saw too many uncertainties for them to make an investment in renewables in Europe worthwhile. 5. To safeguard system adequacy, Mr Buck continued, there should be clear and firm rules for interventions consistent with both the flexibility challenge in the power market and the long-term decarbonisation.

Mr Buck concluded that also for mature RES technologies some form of revenue stabilisation was needed to reduce investors risks and that auctioning systems were needed to reveal where the market was ready for support-free investments. To his mind, a lot of work had to be done to make the power system RES-ready.

### **Introduction by Mr Mario Ragwitz, Head of Unit Renewable Energy at Fraunhofer ISI**

Mr **Ragwitz** from Germany thanked the chairperson for giving him the floor.

He mentioned that the European Commission's policy files marking a strong role of renewables in Europe's future energy mix as a no-regret option implied the wide acknowledgment that renewables contribute to the European security of supply, economic competitiveness and environmental sustainability. To his mind, the European Council had good reasons to set the 27% target for renewables based on 40% greenhouse-gas savings and 27% energy efficiency targets. He emphasized that for answering questions such as how to achieve the aforementioned 27% and whether a change in market design and ETS were

enough to do so, it was important to stay abreast of a comprehensive impact analysis of all economic drivers caused by RES policy.

He mentioned that the Fraunhofer Institute recently had conducted three studies on behalf of the EC -- Employ-RES II, DiaCore and Towards 2030 -- of which the first study related on the effect of a 27-30-35% target for renewables on the overall economy and GDP-growth in Europe. In the DiaCore study achieving the 2020-targets had been analysed and an assessment had been made of the capital costs, its effect on investments into renewables and the need for policy. The study Towards 2030, Mr Ragwitz said, focused on the set-up of a governance system to achieve the 27%-renewables target and the question whether and how this target ought to be translated into member state targets.

He explained that Employ-RES II made it clear that all renewable targets were expected to uplift GDP in the range of one percentage point until 2030, which would be neither good nor bad. He pointed out that although several modelling technologies and sensitivity analyses were used, all results showed that a 30% RES target would lead to a growth of 0.1 to 0.4% of EU GDP and employment benefits up to 720 K and that a 35% RES target would lead to a growth of 0.1% to 0.8% of EU GDP and employment benefits of 1.5 m.

Considering the fact that some people felt the 27% RES was so moderate a target that no distinct policies or instruments were needed to achieve it, he explained that a comparison between the net and gross increase of the total RES generation over the decades had shown that the 2030 targets were as ambitious as the 2020 targets. In his view, plans for new final energy generation to the extent of 1.500 terawatt-hours (TWh) were needed because the target would not be achieved automatically. Mr Ragwitz argued that the same appeared to hold true for renewable electricity generation. The 50% target mentioned by Mr Buck led to 500 TWh, but in his view, a gross increase implied a higher ambition level for 2020-30, namely 500-800 TWh as well as different assumptions for energy efficiency or an increase of biofuels or renewable heating.

Mr Ragwitz quoted the opinion of the EC in the governance package that "the EU target should be fulfilled through member states contributions guided by the need to deliver the EU target collectively", a statement that according to Mr Ragwitz evoked more questions than answers. He felt that progress could be made by member states defining their fair share and by raising the awareness that an agreement on a 27% EU target meant a financial commitment for all member states, as it was clear to him that a European instrument had to be developed and managed by the EC should the member states not achieve the target. Although member states had reached an agreement, he felt they asked for more flexibility compared to the 2020 framework, while investors asked for certainty, stability and transparency. He stressed that the Fraunhofer research explicitly showed that reliability and stability played a key role in costs and in offering renewable deployment and consequently in exerting influence on the efficiency and effectiveness of RES. He pointed out that investors were in need of a transparent and reliable planning framework showing which member states should implement what number of renewables and long-term commitments to coordinate investments in grids and generation assets. He visualised his statement in a possible benchmark graph made by the EC in which the 2020 formula was applied to 2030 targets. From the benchmark he derived that all member states should increase their renewable deployment by as many as seven percentage points on average. Wealthier states like Ireland, Germany and the Netherlands were to contribute a bit more than states with a lower GDP. He stressed that member states ought to enter into a discussion on this subject.

Mr Ragwitz continued that the DiaCore project showed that the weighted average cost of capital (WACC) for RES investments in European markets ranged from 3.5% (Germany) to 12% (Greece), which was partly caused by the general country risk. Although this could not be influenced by renewable energy policy, he said there were in fact instruments related to

renewable energy policy that could influence the WACC. The lower the stability, reliability and planning horizon for national commitments, the higher the WACC. He explained this would have a direct influence on the costs of renewables and delay their becoming competitive. He felt this boiled down to a very strong argument for national commitment, national planning and any type of benchmark in order to reduce capital costs.

Ending his presentation, Mr Ragwitz concluded that even though the agreed target of 27% was only moderately ambitious in terms of macroeconomic results it was a no-regret option. Higher RES shares would result in higher macroeconomic benefits, but, as he said, at least the 27% should be achieved. In terms of lifting economic and non-economic barriers the 27% ambition was not to be underestimated in view of the necessary replacement of RES plants built before 2010. He felt a focus on wind, solar and ocean technologies was essential. He stressed that a moderated but dedicated support for renewables, risk-mitigating instruments for renewables and member state targets were required to reach the 2030 target for renewables at low costs.

### **Introduction by Mr Rik Siebers, CEO REDstack**

Mr **Siebers** from the Netherlands was grateful for the opportunity to tell something about blue energy: energy obtained from the difference in salt concentration between for instance seawater and fresh water or sea water and brine. He started by saying that although Mr Pattle had discovered in 1954 that osmotic power of seawater equalled the power of a 200-meter waterfall, it was not until 2006 that fundamental lab-tests were done concerning reverse electrodialysis (RED). In 2014, Mr Siebers said, an experimental research programme was started with a pilot installation of 50 kW on the Afsluitdijk, the Dutch IJsselmeer Dam. He mentioned that the REDstack company was both privately funded by shareholders and publicly funded by regional, national and EU grants.

He explained that RED substantially contributed to the achievement of political targets, used no fossil fuels and emitted no carbon dioxide. Furthermore, RED caused no pollution, required neither chimneys nor high buildings and needed no back-up since rivers flowed 24/7. Shedding light on the working of RED Mr Siebers said two types of membranes were piled in a stack of which one type allowed negative ions (Cl<sup>-</sup>) and the other positive ions (Na<sup>+</sup>) to pass. In this way a battery was created. He reckoned prospects for RED and blue energy were promising, seeing that there was a high market potential and a firm contribution to innovative power and an attractive business proposition could result in an impulse for the “energy-from-water” market sector. A contribution to economic growth and employment was another benefit, provided the units would meet political targets.

Mr Siebers said progress had been and was being made in stack design, membrane design, composition and transport properties of ions, the life span of stacks and cost reduction. Nevertheless, challenges remained. Both stacks and membranes needed improvement and biofouling needed to be prevented. Another set of challenges were to be found in the commercial stage, such as obtaining licences and building up a market position and export network. He continued by saying that the estimated RED worldwide potential is in the range of 1.4 to 2.6 TW, coming from rivers only. For the Netherlands the potential is less high, namely an estimate 1,500-2,500 MW. He explained that RED had two market characteristics: surface water, with a large flow but low energy density, and industrial water, with a small flow but a high energy density. Since RED knowledge could also be applied to electro dialysis a contribution to desalination techniques was possible as well.

Finally, Mr Siebers reported on the Afsluitdijk programme (IJsselmeer Dam). The end product, electricity, was already added to the grid. He concluded by saying that, although

growth would enhance success, it also posed a threat because it may prove difficult to find the necessary investments. Since support programmes were usually aimed at mature technologies, Mr Siebers said that by the time blue energy was ready for the market it might fall short of investments and as a consequence not be used at all. He finally highlighted that help from the EU or the Netherlands, clear EU guidelines and political and financial support would benefit the development of RES and help reach sustainability in the required tempo.

## Questions and answers

Mr **Falzon** from Malta said Malta did not use the ocean as a source of energy. Referring to the intermingling of fresh water and salt water he asked Mr Siebers whether REDstack had worked with lower currents and used sea anodes as a source of energy as well.

Mr **Siebers** responded that he knew techniques to generate ocean current energy, tidal energy and temperature energy existed. Although several companies in the world had already been working with for instance propellers underneath the surface, Mr Siebers said REDstack did not carry out any research in this field.

Mr **Schennach** from Austria said the power market pentagram in Mr Buck's presentation did not mention the high potential of energy efficiency, an aspect that in general had been a bit ignored. In all countries the RES sector had a very high potential but whatever the structure, all of them were linked to the labour market thus exerting a large influence on regional companies.

Mr **Buck** answered he had not spoken of energy efficiency because he had tried to be short. It was, however, the centre of the shown pentagon. He explained the presentation was based on a comprehensive study in which the idea mentioned was seen in the context of the discussion about energy efficiency as well. He fully agreed with Mr Schennach and said the gains on energy efficiency had a bearing on the challenges in the power sector. He stressed that making renewable electricity the mainstream of the power sector was a challenge in itself.

Mr **Ragwitz** completely agreed with Mr Schennach and Mr Buck. He mentioned that after the revision of the EU energy efficiency directive the debate now focused on pushing up the target from 27% to 30%. He said that the impact assessment of the European Commission showed that a turn on energy efficiency policies would have a positive effect on the overall economy. If countries were to apply targets on greenhouse gas emission, energy efficiency and RES together, the most benefits would be obtained but he said to be aware of the fact that many energy efficiency measures were both capital and labour-intensive.

The **Chairperson** referred to the results shown by Mr Ragwitz on 27-30-35% targets and wondered whether the increase in costs and benefits would be equally distributed among all member states.

Mr. **Ragwitz** said this question could not be answered easily because so far a burden sharing mechanism had not been decided on. Implementing higher targets would lead to a concentration on the member states with the most economic potential but if they were to carry all the costs, Mr Ragwitz said, it could be harmful for some of them. In order to prevent this, he felt an effort sharing mechanism had to be activated.

Mr **Schennach** from Austria said that, in his opinion, in the long run every country should have a mix of different renewable energy sources. In Austria nowadays 108% of all electricity was generated by wind turbines which proved to be cheaper than the water energy used before. Following the EU targets Austria had replaced all public light systems by photovoltaic systems. He said that as chairman of the Monitoring Committee of PACE he was responsible for energy, water and environment. In this respect he also focused on security and climate change.

The **Chairperson** concluded by mentioning that investing in RES was not only good for the climate but would contribute to the Europe's independence from neighbouring countries. Furthermore, should the money now spent buying fossil fuels abroad instead be invested in Europe, it might have a positive effect on the economy.

## Debate

**Statement - Europe is to set 2030 member state targets for the deployment of sustainable energy sources. Is it the only fair and effective way to reach the 27% European RES target? Would dividing the 27% target into targets for individual member states benefit all?**

Mr **Damjanović** from Montenegro said that as a EU candidate Montenegro had to accept all obligations ensuing from the EU-entry process even those related to the 2030 targets. Montenegro had fulfilled the targets since two thirds of its electricity were already produced using renewables. He stressed that the influence of low carbon prices was a factor complicating the transition to a green economy based on renewables or blue energy, a significant problem that had to be solved. He explained that should low carbon prices last for a longer time, investments and revenues on budgets would be low. Furthermore, it would entail limited possibilities for a high pollution tax or carbon tax, feed-in tariffs or fiscal incentives. He acknowledged there were three dynamic goals: supply security, a competitive economy and environmental sustainability. Those might be achieved by a transparent planning framework and regulatory stability, but Mr Damjanović felt that member states also needed space for some economic manoeuvre and he doubted whether a single energy market would see to that.

The **Chairperson** said Mr Damjanović rightfully stressed the differences between member states and their wish to decide on how to achieve targets themselves.

Ms **Kafantari** from Greece said 15% of the total energy consumption had already been generated by RES in her country in 2013 which meant Greece would probably reach the mandatory 18% target set for 2020. In order to achieve the 20% target in 2020 Greece had drafted a national action plan incorporating RES in electricity generation for the residential sector and the use of biofuels and alternative fuels for transport. She pointed out that the high costs of energy production and the high percentage of imported fossil fuels and imported electrical power posed a problem. Although the European Commission had proclaimed a new climate policy for 2030 and 2050 incorporating cutting greenhouse-gas emissions by 80%, she said Greece wanted to maintain its step alongside other EU members. In her view, necessary reforms should include minimizing the costs of energy production and increasing energy efficiency as well as a reduction of energy consumption, a substitution of imported fossil fuels and a higher use of alternative fuels. She pointed out this could only be achieved through an



increase of renewable energy production at the expense of conventional fossil fuels and by implementing new policies to ensure a growth in the use of alternative fuels. She added that the transformation to a greener future would lead to a growth in GDP and provide more regional jobs. Finally she invited all participants to the European IPC on Tourism in Athens on 15, 16 and 17 May 2016.

Mr **Bokis** from Latvia said that although wind and solar power was less seen in Latvia, woodlands and hydropower stations were much used as RES. He explained that in Latvia 30% of all heating came from renewable sources like biomass chips and pellets. He added that Latvia's woodlands were about as large as those in Sweden and Finland and that some 13 million m<sup>3</sup> woodland was cut every year. The fact that only 30% of it was good enough to be used for e.g. furniture meant that Latvia had huge reserves for export. In his view, circular economy and cross-border cooperation were important to boost the export of biomass products to other EU countries, which could be doubled or even tripled next year. He thought Latvia's input to the EU energy policy was both very important and realistic.

Mr **Benamati** from Italy said he agreed with Mr Šefčovič that the target for 2030 had to be adjusted upward from 27% to maybe 30 or 33%. In Italy, the 2020 target was reached four years ago. He added that in his country 48% of all electric energy was generated by renewables. He felt, however, that a slight change in structure and instruments was needed for a move towards a more ambitious target. To him increasing the production of energy using RES seemed not to be enough. He believed the emissions trade system would not work because of the volatility of the costs of carbon dioxide, which meant Europe had to work on either the carbon price or a carbon tax. Furthermore, Mr Benamati believed that for a real increase in the use of RES in national energy systems coordination on a European level, fiscal policies, support policies and incentives were necessary. He said this was a question for the Dutch EU Presidency.

The **Chairperson** said she tried not to take up a particular position. She believed, however, that Europe's commitment to the agreed 1.5 degrees in Paris would lead to a discussion on how to comply with this obligation. She thanked Mr Benamati for bringing in the subjects of ETS, fiscal policies and support policies. She was convinced they were significant for delivering on the proposals made.

Mr **Vos** from the Netherlands mentioned that the cost price of offshore wind and solar energy fell considerably in the recent past which meant that renewables were going to be cheaper quickly. Were governments to give this consideration and invest in renewables, this would lead to a lower cost price. He stressed that as soon as the cost price was low enough for renewables to compete on the open market, the entire problem would be solved.

Mr **Buck** first said that so far, European negotiations had only taken place between the European Council and heads of state while in a normal legislative process decisions were made by a qualified majority. He said that the European Parliament had repeatedly asked for significantly higher and binding national targets on renewables and energy efficiency. He believed the question whether or not to have binding national targets had to be answered in light of the investments necessary to reach the targets. As more certainty would inevitably lead to both more investments and a lower cost price, Mr Buck felt there was an obvious case for a long-term commitment on renewables and energy efficiency in the EU-level framework. Secondly, he stated that a 1% increase in energy efficiency would decrease the European demand for gas by 2.6%. Pushing up the EU target from 27% to say 33% would therefore be

significant in view of the political difficulties that come with a growth in gas import to Europe. Thirdly, Mr Buck commented on the French proposal for a minimum carbon price of €30. He felt that even though such a price would ensure a fuel switch, it would need a 60% increase to act as an incentive for investments into renewables. Finally, Mr Buck confirmed Mr Vos' observation that the costs of renewables had considerably fallen over the last years, which meant renewables would become much more affordable. He stated that even today, it was more cost-efficient to invest into renewables as opposed to nuclear energy.

Mr **Ragwitz** acknowledged costs were going down but in his view this was due to lower costs of investments and technology. He added that for competitiveness, however, two requirements would have to be met: cheap capital and a high market value of renewables. He felt that regulatory stability was crucial in this respect, which was why member state targets were a no-regret option for offering competitiveness to new technologies, but flexible power systems were necessary as well. He explained that flexible power systems relied on having a transmission infrastructure in the right places that could be used by a common market enhanced by a further market convergence. Referring to the market design communication and the legislation proposed by the European Committee he believed Europe was on the right track but he once again emphasized the importance of regulatory certainty for investments into renewables.

Mr **Siebers** pointed out that, although blue energy was still in a stage of development, more simplicity, quantity and quality would make the system cheaper, the achievement of which could do with a little help from good friends.

Concluding the debate the **Chairperson** expressed thanks to all participants. She summarized the debate by noting that

- RES was important for climate protection, security and the European economy;
- targets needed to be sharpened in view of the commitments made in Paris;
- there were still several problems to be addressed, among which the low price of carbon and the effects of ETS;
- member states had different policies which meant further convergence was needed;
- member states wished for flexibility whereas investors needed reliability;
- costs had to fall by means of low capital costs, quality improvement and incentives for innovation thus increasing the effect of investments;
- differentiating was probably the most effective way to approach differences between member state policies and that these differences should be taken into account when setting national targets.

## **Session IV Circular Economy**

In the chair: Ms **Agnes Mulder**, Member of the House of Representatives.

The **Chairperson** reminded the participants of the theme of this session, "How to speed up the transition to a circular economy", and presented the definition of circular economy, formulated by the Ellen McArthur Foundation: A circular economy is one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.

### **Introduction by HRH Carlos Prince de Bourbon de Parme, Director INSID**

Referring to the definition of circular economy presented by the chairperson, HRH **Prince Carlos** said that recycling is the last resort in the circular economy. Only if a product cannot be reused, repaired, rebuilt, refurbished, resold or refinished -- activities that add value to a product -- should it be recycled. If that is not possible, it should be redesigned or removed from production.

Prince Carlos said that in essence the circular economy is about fairness and justice, about jobs and about peace and security. It is the way to achieve the sustainable development goals and the COP21 ambitions. It is vital to keep in mind that the transition to a circular economy is a positive change, Prince Carlos said, and he pointed out that we can only realise a sustainable future if we work together and create new and unusual alliances and partnerships. He illustrated this with an example from the Netherlands, where over 50 organizations, from Greenpeace to Royal Dutch Shell, recently signed a historical National Agreement on energy policies for the next 25 years, which was the result of a collaborative process, both top-down and bottom-up.

Prince Carlos said he believed that at COP21 in Paris the need for change was stronger than ever. It led to an agreement that understandably is criticized, but has also sent a message to the world that times are changing.

The key to a successful transition to a circular economy is not just a matter of innovation, technology or policy, Prince Carlos continued. The most important lesson the Dutch companies and organizations have learned, is that a circular economy is first and foremost an economy where working together is the key to success. This does not only relate to the public and private sectors. Public private partnerships are fantastic, but the civil society has to be involved as well.

Prince Carlos gave some examples of promising cooperation in the field of circular economy in the Netherlands. He said that Amsterdam Schiphol Airport had the ambition to become the most sustainable airport in the world. In a partnership with Philips and the energy company Cofeley Schiphol developed the project which has become known as "Light as a service". This means that Schiphol does not buy lamps anymore, but literally "light". Philips remains owner of all the hardware and is responsible for maintenance and replacements. This is a very circular solution, because Philips uses far less materials and the materials on their turn are used more efficiently, saving Schiphol fifty percent on their lighting costs.

The circular economy even makes sworn competitors work together, Prince Carlos said. Every report on circular economy agrees that it is essential for countries to gradually shift taxes from labour to the use of natural resources. However, the complexity of current tax systems is a formidable barrier. In the Netherlands, the accountancy firms Deloitte, EY, KPMG and PwC joined forces together with NGOs, and their experts are now working together on fiscal solutions for this tax shift. "The Big 4 working together... I wouldn't have believed it, if I hadn't witnessed one of their meetings", Prince Carlos said, and he concluded his introduction by quoting Henry Ford: "Coming together is a beginning; keeping together is progress; working together is success."

### **Introduction by Mr Martijn Paulen, CEO Capital D: Dutch Design Week**

Mr Paulen said he had come to this conference to scare his audience, to apologize and to end with a positive final note. He started with the scary bit. We live in a completely designed world, Mr Paulen said: Everything, from the room we are in here to the bed we sleep in, has been designed. Design is extremely important, because 80% of the environmental impact of a product will be determined in the design stage. To me, that is scary, Mr Paulen said. He wondered whether the audience was aware of this.

Given the fact that so much depends on design, Mr Paulen would like to apologize on behalf of all designers. Landfill after landfill is being filled with bad products. The design community is an integrated part of the "take, make, waste" linear economy. Mr Paulen illustrated this with the example of the cheap €7 toaster. He went on explaining that some products we make have become so complicated, that they consist of parts from various separate supply chains. A mobile phone for instance consists of 1,500 parts. No one can build a mobile phone on their own. This makes it very complicated to make progress in the field of the sustainability of products.

The positive thing however, Mr Paulen continued, is that many designers are aware of the circular economy. The innovation of business models is also the domain of designers. A new breed of designers is emerging in the design schools, who are interested in the values of the circular economy. Design principles are being formulated. Design for longevity, designing products that last, design for leasing, new business models; design for reuse and manufacturing design for material recovery: these are the things that need to be taught to upcoming designers, Mr Paulen said. He mentioned the FairPhone project, initiated by Dutch designer Bas van der Abel as one of the most successful crowd funded projects in the field of circular economy and fair production. Another example of a successful project is Phonebloks, designed by the Dutch designer, Dave Hakken. He was offered a very nice job at Google, but he declined, saying: "I am not in for a fancy job, I want to change the world." That is what I really like about this new breed of designers, Mr Paulen said, and that we should support them.

As to the role of governments, Mr Paulen said that governments should use the stick much more firmly, rather than offering the carrot. "We cannot leave it to the market, because the market has been proven to fail", as evidenced for instance by the planned obsolescence, said Mr Paulen. Secondly, the government should encourage the new breed of designers, who work together via crowd sourcing and crowd funding to build new models. However, the market is not yet there to finance them. Governments, as big investors, should support these developments very strongly. Thirdly, Mr Paulen called on governments to "practice what they

preach", in procurement. Why not make sustainability or circularity a knock-out criterion? Mr Paulen asked.

### **Introduction by Mr Aart J. Roos, CEO Royal Auping**

Mr **Roos** started by talking about Royal Auping, its history and its business operations. He then stated his opinion that the linear system of "take, make and waste" should change. Although it brought great wealth to this part of the world, it also produced oceans full of plastic. The idea that the western way of doing business, consuming and producing has to change has been around since the report of the Club of Rome. This change from a linear system to a circular system requires a system change along the entire value chain, as well as interaction and collaboration from suppliers to end consumers and from governments to institutions.

Mr Roos pointed out that in the case of a company such as Auping the need to do things differently can become very personal: it is brought into the bedroom. He gave the example of the large amount of mattresses that is disposed of every year in the Netherlands, reaching a height of 1.000 Eiffel Towers. Just in the Netherlands only, this means a stream of waste of 1.2 million mattresses year after year, 24,000 tonnes of material and commodities going up in the air or down in a landfill, and 36,000 tonnes of CO<sub>2</sub> emission. This does not help to reach the ambitious and badly-needed targets that have been set to combat global warming.

Mr Roos said that producers as one of the parties in the total value chain should take their responsibility. Design is critical for that. As a producer of mattresses, Auping should look at its product as the ultimate in sleeping comfort but also needs to make sure that what is produced can be re-used. This re-usage should not just take the form of a second-hand product; at the end of the product's life all of its components and materials should be re-usable in a value-added manner.

Mr Roos explained that this is a long journey. Auping wants to look at the supply chain with radical transparency, using materials from suppliers that use less water and energy in their production. Auping is also looking at new innovations such as the use of bioplastics. It wants to close the loop in a micro-environment with the local supplier, ensuring that there is zero waste involved. The waste that Auping creates goes back to the supplier who re-integrates it in his production.

Mr Roos explained that the material integrated into the mattress should have the highest degree of recycled components. In the past, aluminium bed legs used to be produced in Vietnam and took 1.5 million kilometres to reach the Auping factory in the Netherlands. Now, in collaboration with institutions and companies these bed legs are created in the Netherlands out of waste aluminium from two regional Dutch companies. This has reduced the supply chain from 1.5 million kilometres to 30,000 kilometres on a yearly basis. Also, it has created labour in the Netherlands and restored added-value economic activities to Western Europe.

Mr Roos stated that thinking about how to design and produce is a fundamental part of the circular economy.

Mr Roos pointed out that a circular economy is not just about looking at materials and end products. To have an effective and profitable business in a circular economy has to do with energy, how that energy is used and how to move from fossil fuels to renewables. Also important is people orientation. The people in the system make a fundamental difference in creating the innovation and the value-added activities, according to Mr Roos.

Circular ambition is fundamental for a profitable business, according to Mr Roos. It forces the company to get an outside-in view, to open up and to look outside. It drives innovation both in processes and in third-party collaborations. It drives new thinking in product innovation and

creates new business opportunities. It creates creative agility and brings employees into a flow of meaningfulness and fulfilment. This helps the company to go forward energetically, with focus and excitement. In the end, this is good for the company's bottom line.

Mr Roos said that ambitious goals in the form of transparent, integrated European and international legislation are needed for a successful implementation of a circular economy. From a business perspective, just taking on circular economy from the starting point of an individual country will not work. Ambitious goals are needed from a European perspective. There is much to say about regulations and policies in terms of how to create transparency for the end user and how to understand the value of product durability and the impact of purchase. Mr Roos mentioned the example of the introduction of energy legislation in the white goods sector in the Netherlands, which helped consumers to determine whether a product is energy effective.

Finally, Mr Roos pointed out that governments should act on sustainability and circularity in a true manner and that circular economy in a business setting should be fuelled by research and innovation.

## **Debate**

Ms **Yngwe** from Sweden expressed her happiness that all three speakers had mentioned the importance of design. While hopefully consumers will buy environmentally friendly and sustainable products, it is not always easy to be a consumer. Therefore, it is important that by designing them in a good way products are made sustainable by default. Ms Yngwe also stressed that politicians can be a driving force in innovation and sustainable design.

Ms Yngwe went on to address two perspectives on circular economy from a Swedish point of view. Firstly, she said that a non-toxic lifecycle is needed. There are still products that cannot be recycled due to the amount of chemicals they contain. The EU should work on this. Ms Yngwe said she looked forward to the EU strategy for a non-toxic environment, which will be developed by 2018. She expressed the hope that this strategy will not just contain goals but will also include ambitions and legislation that allow the member states to move forward.

Secondly, Ms Yngwe stressed the bio-based circular economy. Sweden is in direct contrast to the Netherlands, because it has a large amount of land and forests that can be used. Biomass is at the heart of the new climate economy and could be good for economic growth. It is important that bio-based products are seen as part of the circular economy. Also, bioplastics are very important and may be used in a good way.

Finally, Ms Yngwe said that there are certain focus areas in the Commissioners' plan for the circular economy. She expressed the hope that textiles will also be discussed, because they take up much energy and water and use many chemicals. It is important that a common market is found. Common legislation should be made on how to deal with textiles.

Baroness **Scott of Needham Market** from the United Kingdom said that she particularly liked the way HRH Prince Carlos put the theme of today in a philosophical context; how it really is about the future of the world that we want and that whilst terms like circular economy are used, this is not an accounting exercise; it is about the sort of planet we want to live on. She said that this made her think about the disconnect between behaviour and its outcome. The simple act of going to bed at night and using a mattress, results in a pile of several times the Eiffel Tower. However, people do not think about it in this way. Ms Scott of Needham Market said that she did not know how to deal with this challenge of reconnecting the way we behave as individuals and the outcome. She said that this is particularly true in the case of the "tyranny of the €7 toaster". While a good washing machine may outlast the

marriage, the problem is that only people who are better off are able to buy the expensive washing machine, which lasts longer and is better. Those who do not have much money buy the €7 toaster and throw it away when it is broken. Ms Scott of Needham Market said that she does not have an answer to this problem and that she would be interested in hearing observations about how society could deal with this issue.

Mr **Vaccari** from Italy explained the action taken by the Italian Senate in order to ensure that the objectives of the Circular Economy Package are not limited to European industry and the member states of the European Union. Hearings have been held with representatives of the European Commission (EC), the Italian government, research institutes and the Italian trade and industry sector. A resolution was drafted based on these hearings, which the Senate and fifteen national chambers subsequently submitted to the EC as a contribution to the Circular Economy Package. The EC has adopted several recommendations outlined in the resolution. Once the EC had elaborated upon the Package, they also organised an online consultation regarding the EC text. An enormous number of public institutions completed a questionnaire to participate in this consultation, the results of which will be published in May. Mr Vaccari expressed his ambition to share the results with other parliaments. “We have highlighted themes that we hope will contribute to an improved text following the debate on the circular economy still to be organised by the European Parliament,” said Mr Vaccari.

Mr **Glebocki** from Poland said that as Deputy Chair of the EU Affairs Committee he was not a specialist in the field of the protection of the environment. He said he supported the introduction of a circular economy and perceived it as an opportunity for the Polish economy because a growing dependency on suppliers from third countries can be a serious threat to the economic development of Poland and the EU.

He stressed that the different levels of advancement in the various countries should be taken into account when talking about the implementation the package of new provisions from the European Union. Many aspects of the EU action plan are very good.

Mr Glebocki concurred with previous speakers that design is very important. In his childhood a washing machine was intended to last a lifetime but right now people buy a new one after only a couple of years. One of the reasons for this, according to Mr Glebocki, is the non-existence of a service market where you can call someone when the machine is broken, who then turns up and changes the broken part so that the machine can go on working. Mr Glebocki also mentioned the example of a printer that stopped working one month after the end of the guarantee period, when it turned out it would be cheaper to buy a new printer rather than just a new part. So the problem is not only with consumers, it is also very much a problem of producers. Products should be designed in such a way that broken parts can be easily exchanged.

Mr Glebocki said he found the example about Schiphol Airport and the idea of buying services rather than products very interesting. He referred to an example from his home town, where energy was bought via the producer of the bulbs rather than from the energy company. Eventually, Mr Glebocki remarked on public procurement. According to different estimates, public procurement might be 20% of the market as a whole. Since the Polish elections last autumn there has been a discussion about new public procurement and a change from relying on price as a top priority to relying on quality, Mr Glebocki asserted. He said that from the discussion he would take with him an additional thought, namely that the priority of circularity might be more important than price.

HRH **Prince Carlos** said that he completely agreed with the remarks about the non-toxic lifecycle and the bio-based economy. With regard to regulations regarding textiles he said that

in his experience businesses are pleading for rules and are not afraid of change. What they are afraid of is inconsistency. Businesses are willing to listen to rules, as long as these are consistent and provide a long-term perspective. If that is the case, businesses can run with it. Prince Carlos addressed the issues of reconnection and ethics raised by Ms Scott of Needham Market. He said reconnection might be possible by looking carefully at the present definition of waste. Right now, everything is waste, except ... It should be: nothing is waste, except ... With that perspective, the people and the producers will look at their materials in a completely different way.

Prince Carlos then addressed the point of Ms Scott of Needham Market about people being too poor to choose wisely. He said that in the past people saved to buy a toaster because they wanted it to be the best toaster they could buy with their money. Nowadays there is the prisoner's dilemma of the €7 toaster, which he proclaimed completely ridiculous. The mentality that you have to choose and save until you have the best quality product has to come back, according to Prince Carlos.

In response to Mr Vaccari's intervention, Prince Carlos commented that Italy and the United Kingdom are the only two countries to have implemented the Circular Economy Package in legislation. He said that this is extremely positive for the development of these pertinent issues in Europe, emphasising the vital importance of the practical application.

Prince Carlos said he found Mr. Glebocki's point that all countries come from a different starting point very interesting. However, countries now have the chance to look very carefully within their legal structure how they can regulate in such a way that they go in one big step to the "best in class" of today, rather than having to go through all the stuff that other countries had to go through in between.

As to the issue of buying services rather than products Prince Carlos pointed out one problem that has to be solved first, namely that going towards a circular economy presents a problem between long-term financing and short-term financing. He gave the example of a washing machine. Even if sharing the service rather than buying the product is to be financed, the machine is still on the balance sheet of Miele. Also, the bank will be unwilling to take this construction as collateral. So banks can do short-term financing but not long-term financing. Also, we are talking about products and machines that should last up to 50 or 100 years, so the income is very stretched out. This means that regulations should be looked at in order to be able to finance such a project, because today it is illegal. Prince Carlos said that he does not have the solution but that the big problem coming up right now is how to finance this focus on service rather than product. He said he hoped that those present might be able to find solutions within their immense European knowledge base.

Mr **Paulen** explained that a lot of companies in the textile industry were financing innovations in the field of reusing textiles as a raw material through the Cradle to Cradle Products Innovation Institute and the Ellen McArthur Foundation.

In answer to Mr Vaccari, Mr Paulen called it really important to involve the public. The public, designers, producers and the legislators must jointly come up with solutions. The more involvement of the public, the better, said Mr Paulen.

With regard to the use of toxic substances Mr **Roos** commented that in a circular economy it was essential to understand what we use in our products. The entire production process must be based on materials that can be used in a safe and healthy manner, materials that can be reused at the end of the lifecycle of the product. Focusing on this aspect adds to the efficiency and effectiveness of doing business. At Auping, for instance, oil-based spray-paint in 17 colours was used previously, Mr Roos explained, until the introduction of the circular-economy concept incited Auping to look for alternatives. In six years Auping made the



transition to water-based paint from a German supplier, which removes the toxics, making sure that at the end of an Auping bed's lifecycle, the materials can be reused in a much more responsible manner. How did this promote Auping's business? The transition to water-based paint resulted in a reduction of the production downtime from 20 minutes to 1 minute and a reduction of waste from 32 to 0.5 glasses, whereas the starting point was the removal of toxics. So, the circular economy has a positive effect on a company's bottom line, making it profitable and agile, Mr Roos concluded.

Mr **Balsys** from Lithuania raised the issue of taxation. Tax policy is the domain of the Member States. How can we change the taxation system and harmonize it throughout the European internal market? Countries doing this on their own might lose the competition, Mr Balsys said.

Mr **Nevens** from Belgium said that the circular economy is about working together, but added that we also need a level playing field. How can we protect the thin line between reuse and recycling? Should we reuse or recycle a ten-year old refrigerator, for instance, which has a poor energy consumption performance? Do we send a ten-year old car, emissions standard Euro4, to Africa, or do we sell it for reuse? How far should we go? Mr Nevens asked.

Mr **Roos** agreed that we have to look for European solutions and legislation at European level instead of national level. That is a hard fact if you want to run a profitable business from a country's perspective.

How long is reuse sustainable and better than disposal? Mr Roos said he did not have the answer to that question. It requires a lot of insight into and understanding of the various aspects, which have to be thought through. The transition is also based on alternatives and innovative new solutions. It is not a matter of reuse for the mere sake of reusing.

Mr **Paulen** stated that at the moment, most products are not designed for reuse, recycling or mineral harvesting. So we have a long, long way to go, Mr Paulen said. The whole chain is involved, but design for reuse would be the first step.

HRH **Prince Carlos** stated that we have to shift our taxation from labour to resources. As to the aspect of competition he said that the shift in taxation from labour to resources provides opportunities, because it leads to an increase in service jobs, for instance: people will have more money to spend. The first country to implement this shift will have a competitive advantage over those who do not. A European VAT system on resources could be an initial starting point in the discussion. Prince Carlos said that it is up to the politicians to say: from now on, design must include a proper end-of-life solution. In Shanghai Prince Carlos recently visited a garbage dump, he told his audience, of three kilometres filled with AA batteries. Next door there was a dump filled with bicycles. These are strategic resources, supplied by the Europeans, who even paid for them. Ridiculous, Prince Carlos said.

The **Chairperson** thanked the three excellent speakers for their introduction and the participants for their contribution to the debate during this very interesting session. She summed up the main issues discussed: the importance of smart design, non-toxic lifecycles, a bio-based economy, affordability, the prisoner's dilemma of the €7 toaster and the question why buying a new product is cheaper than repairing it. The service market does not yet exist. This should be addressed by implementing legislation and by taking measures such as circular public procurement, tax incentives and funding. The chairperson concluded by stating that the

circular economy is about involving all the stakeholders, including the public, and about innovative ways of cooperation. "We can change the world if we want to", she said.

## **Plenary closing session**

The moderators of the four parallel sessions briefly summarized the main topics discussed during the various sessions.

### **Closing remarks by the chairperson of the standing committee on Economic Affairs of the House of Representatives, Ms Roos Vermeij**

Ms **Vermeij** said that the contributions made by a number of high-level speakers and the discussions that followed had led to interesting insights and had accentuated the participants' awareness of and thinking about energy issues. "Especially due to the great variety of topics under discussion we have envisaged the challenge of a cost-effective transition to clean energy in a broad perspective", Ms Vermeij said. She continued by pointing out that the challenges were not confined to one area of expertise and that European cooperation could make a difference in the field of energy policy and the circular economy. Ms Vermeij said that the transition to a circular economy was a process that every Member State had to go through. "So why not dot this together?" she concluded.

On behalf of the Dutch Parliament Ms Vermeij thanked all the delegations from the national parliaments and the European Parliament for coming to the Netherlands and for participating in a lively debate. She also thanked the observers for their interest in this meeting. Ms Vermeij gave special thanks to the staff of the Dutch Parliament, who had worked tremendously hard to make the conference a success.