



Non solus: new energy for the Netherlands (and the world)

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Ben van Beurden became Chief Executive Officer (CEO) with effect from January 1, 2014.

He joined Shell in 1983, after graduating with a Master's Degree in Chemical Engineering from Delft University of Technology in the Netherlands.

Ben's career in Shell spans both Upstream and Downstream activities. He has held a number of operational and commercial roles, including some 10 years in the LNG business, and a variety of positions in Downstream. He has been based in The Hague, Sudan, Malaysia, London and Houston.

In January 2005, he became Vice President, Manufacturing Excellence, based in Houston, USA. In this role he was responsible for standards in operational excellence and high-performance initiatives in refining and chemicals manufacturing.

In December 2006, he was appointed Executive Vice President, Chemicals, based in London, UK.

During his tenure in the role, Ben was appointed to the boards of a number of leading industry associations including the International Council of Chemicals Associations and the European Chemical Industry Council.

He is a visiting Professor of the International Studies Institute, the Party School of the Central Committee of the Chinese Communist Party, and a member of the Advisory Board of the School of Economics and Management Tsinghua University in Beijing (both since 2015).

From January to September 2013, he was Downstream Director and had regional responsibility for Europe and Turkey. He has been a member of the Executive Committee since January 2013.

Ben, a Dutch citizen, is married and has three daughters and a son.

The only way to deal with climate change is by collaborating, argues Ben van Beurden during the first annual Elsevier Economics Lecture. No one can answer all the energy challenges the world faces alone but everybody has their own role to play. And if we work together there is every reason to be optimistic about the future.

Ladies and gentlemen,

'Non solus.' This is the motto on publications from Elsevier since the early seventeenth century. 'Not alone.' It reminds us that we always stand on the shoulders of our predecessors. It doesn't just remind the reader, but also all those authors who have published their work with Elsevier over the past three hundred years. From Grotius to Lipsius. From Molière to Multatuli. From Stevin to Schoo. The work of these giants is marked with the acknowledgement that, you cannot do it alone.

Personal meaning

For me, 'non solus' has two more meanings and today, I would also like to talk to you about these two. First, non solus is the best way to face climate change and the energy transition. Because no one can answer the energy challenges the world faces alone. No government. No NGO. And definitely no energy company. We will have to collaborate. There is a second, more personal meaning. Because 'non solus' could also have been the summary of my youth. I was born in the 1950s in Roosendaal. I lived there until I moved to study in Delft in the 1970s. It was a very communal environment – everyone was involved in each other's lives. Families, friends and neighbours. Everyone knew each other through and through. And everyone helped each other. It was an environment in which everyone chipped in when help was needed. When people fell ill, when they moved home or when someone's house needed rebuilding. It was a close, informal neighbourhood. When we visited others, we went into their homes through the back door. These doors were never locked. And help between neighbours and family happened naturally, easily and was clear for all to see. Everyone joined in. Because everyone knew they could also need help in the future. When I was small, it seemed that an aunt and uncle lived in

every house in my street. And in my mother's street, this was literally the case. They could have called the street "non solus".

Coal furnace

At home, I was also not alone. There were four of us. My father, my mother, my sister and I. Apart from the stove in the kitchen, we had one coal furnace in the entire house. I hated that furnace. Because I was the one who had to fill the coal-scuttle. This meant regular visits to the shed in the back of the garden. During the winter, this was especially unpleasant. I can still feel the wet, freezing cold creeping up my legs from my ankles. I also hated the coal furnace because of the way we used to have to clean ourselves next to it with a 'wash cloth'. Come to think of it, I hated the wash cloth even more than the furnace. Because it cooled off much too fast. No matter how fast I tried to get it over with, I always ended up shivering.

And then, in the 1960s, our lives changed. Coal went and gas arrived. That ended the cold ankles. And there was an even bigger change: we got a shower. And that was the end of the cold wash cloth. Getting gas meant great progress for my family. At the time, three billion people lived on earth. And we witnessed the rise of a new technology: in 1960 there were 34 computers in the Netherlands. Just compare that to now, more than fifty years later. Now, there are more than 7.5 billion people on earth. And worldwide 55 million computers have been sold... ... during the first three months of this year.

No one could have predicted this fifty years ago. Just as we cannot predict what will happen fifty years from now. No one can precisely predict the future. But we do have a good idea of the general direction, of the broad trends. Firstly, there will be more people in fifty years. A lot more. The UN estimates that there will be almost 10 billion

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people on earth around 2050. At the end of the century, the UN says it might be over 11 billion. That's four billion more people than now. The biggest growth is expected in Africa and Asia. And there is a second trend. The living standard of millions of people in Asia and Africa have improved since the 1970s. Because more and more people have climbed in to the middle class. This is a great victory for prosperity in the world. The average person in China earned \$58 a year in the 1960s. Today the average is some \$8,000. Several countries are about to go through a similar development. Millions of people worldwide are climbing towards the middle class. And I haven't even mentioned those who are yet to start their climb. Currently, over a billion people in the world have no access to energy at all.

Growing energy demand

As you might understand, I feel empathy with people seeking a chance to improve their lives and the lives of their children. But the growth of the average living standard in the world also means higher energy demand. A lot higher. This makes sense. People move into their first house. They buy their first car. Or their first refrigerator. All of that requires energy. This is why Shell invests in ways to make energy possible in areas where access to energy is limited like in India, Tanzania and Uganda. For comparison: in the United States, each person uses an average of over 300 gigajoules of energy every year. That's much more than the average person in the Netherlands, who uses 150 gigajoules. But an average Kenyan only uses 10 gigajoules. That's a big difference. The rising population and living standards in the world are expected to cause total energy demand to grow. According to the International Energy Agency, demand will be 30% higher by 2040. And at the end of the century, it could have doubled. Meeting this demand will be a big challenge. Especially because this is still only half the story. Here, also: non solus. Not alone.

Second challenge

Because there is a second challenge. While the world needs to find a way to meet rising energy demand, the CO₂ emissions need to fall to counter climate change and keep the warming of the earth below 2 degrees Celsius. We can quickly agree that this is not an easy challenge. But there is also positive news. Look at the Paris Climate Agreement and the pledges countries have made, such as during the Climate conference in Bonn last year. It is significant that countries that are sometimes regarded with a raised eyebrow, are showing their best side. China, one of the countries with the highest emissions, is showing serious ambition and results. Currently, for example, half of all electric vehicles on the planet are driven in China. China also produces a large proportion of all the solar panels and wind turbines in the world. China has identified opportunities within the energy transition. This is a side of the change underway that is often overlooked: Shell also sees many opportunities. Business opportunities that will be appealing to investors. But in the long term, we can only keep earning money if we provide the kind of energy that society asks for. We must provide relevant products. I am also convinced a company cannot survive in the long run unless it is valued by society. And not just because, if society does not, people won't buy your products, but also from the point of view of an employee. Shell is always on the search for the best talent. But who wants to work for a company that is not appreciated? Shell has worked hard to remain among the most popular employers in the Netherlands for years... and I want this to remain unchanged. Ultimately, I would like everybody to feel we all share the same goal. Shell, the government, NGOs and the rest of society. In the end, we all want the same thing. Because the energy transition affects everyone. From a builder in Beijing to a baker in Budel. We all want a world with cleaner energy for everyone.

Collaboration

I am convinced collaboration is the best way to achieve results, both societally and financially. Shell's strategy of collaboration

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comes with an open attitude, towards society and our investors. We seek intensive collaboration. In the Netherlands for example, Shell is co-founder of the Transition Coalition, that is pushing to speed up the energy transition in our country. And we also collaborate with Dutch government. With Erik Wiebes, the first Dutch minister for climate and economy. But also through the Climate and Energy Agreement, with which the coalition has reached out to collaborate with a large number of businesses and organisations. On a European level, we also collaborate with several organisations, on a variety of issues, including government-led CO2 pricing mechanisms. And I also think of the Task Force for Climate-Related Financial Disclosures. The TCFD is a global initiative convened by Mark Carney, governor of the Bank of England and led by Michael Bloomberg, the former mayor of New York. This group wants companies to share more information, so it becomes clear how resilient companies are in the face of the risks involved in climate change. This prevents companies from not addressing risks connected to climate change. And it is designed to help prevent another financial shock, like the banking crisis in 2008. As CEO of Shell I support this initiative. And we are working together with the task force on best practices for companies from different industries to show they are ready for the energy transition. Collaboration is crucial. Non solus.

Ladies and gentlemen,

I think there is no one in here anymore who doubts that the world faces huge challenges. But before I start talking about solutions – the cheerful part of this story – I want to test our assumptions a bit more. To do this, I must explain how I ended up in the energy business. That story starts at the comprehensive school in Roosendaal. With the nuns of the Gertrudis college. That was not an obvious school for me to go to at the time. It was, in fact, a school for girls. I was part of the very first group of boys who went to the Gertrudis. Everyone had to get used to that. Including the nuns. Secondly, I was the first of my family who was allowed to

‘study further’ as my mother called it. My father was a bench worker in a biscuit factory in Roosendaal. Guys in my family usually learned how to work with their hands. Just like their dads. But my youth happened to be during a time when everyone in society could aim higher. Including a bench workers’ boy who liked to study. So, I got to go to the comprehensive school. The reactions from my family were not always enthusiastic. Some of them couldn’t understand what I was doing. Why would anyone ‘study further’ if they could learn an actual trade and make money instead?

Why study?

After the comprehensive school, I had to make a similar choice. On whether to study still further. But I knew what I wanted to study. Whenever I travelled by train to the Randstad, a flash would always catch in the corner of my left eye, just before the train reached the Hollands Diep. Those were the pipes of the chemical plants at Moerdijk that – literally – shined. The industry was mystical and modern to me. The wealth of the Netherlands after World War 2 was made possible by the petrochemical industry. Making new materials from old molecules. I thought this was magical. Later I found out it wasn’t magical. It was chemical. Which was even better. So, I decided to become a chemical engineer. And that meant studying in Delft. The reactions were now familiar: ‘Why would you go to college, if you can also make money?’ Or worse: ‘All those students are trained to be unemployed.’ But I understood some of it. Finding a job at sixteen was normal in my family. Going to a university was not the norm in a city the size of Roosendaal. The idea there was a world outside of West Brabant, where things were different from what we were used to, was uncomfortable to many in our neighbourhood. Even then, there were information bubbles. During my youth they were often caused by regional boundaries.

Perspective

They still exist today. And I see this in the current debates about the energy transition.

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Because the common perspective is perhaps not 'Roosendaal's', but it is Western and at times outspokenly Dutch. From this Dutch perspective, the solution for climate change seems straightforward. The solution sounds like this: 'In not too long, everyone will drive clean cars and will get power from solar panels on the roof of their homes or from wind turbines in the sea.' The idea is that if we embrace renewables as quickly as possible, we can stop using oil, coal and gas. Problem solved, some say. If you walk outside here in Amsterdam, indeed you see more and more electric cars in traffic or charging their batteries on the side of the street. To increase the number of electric vehicles swiftly, we see many initiatives from the market and governments. And they work. According to Bloomberg's New Energy Finance Forecast one in three cars will have a plug by 2040. The Boston Consultancy Group expects things to go faster. They say that by around 2030, half of all cars will be (partly) electric. This development will, indeed, go fast... but not everywhere and not for everyone. We can all understand that light transport could quickly change over to electric vehicles. Taxi drivers, for example, drive many kilometres and rapidly earn back their investment in an expensive car. But what about an elderly lady. One who is not wealthy... she just gets by. She only uses the car for going shopping once a week. So, she doesn't drive enough to justify the investment of an electric car. And in such circumstances, reality dictates that certain people are less prone to make such an investment. Is this good news? No. Is this how it works? I'm afraid so.

And the spread of electric cars will also differ between countries and regions. This also depends on the price of the car, the numbers of kilometres driven, the state of infrastructure and the cost of electricity in comparison to other fuels. I might be wrong, but I don't believe, for instance, that the billion people without access to energy will use their first power to charge a Tesla. Electric cars are certainly part of the solution in populous areas. But if the world seeks a full solution, a broader perspective is

necessary. A perspective that considers all players and circumstances. The same goes for renewable sources of energy. In some countries, there is not enough wind for turbines. In other countries, the sun doesn't shine enough to depend on solar panels. There are also countries that don't have the funds for a quick, massive change. And a small number of countries lack the political or societal will. The point is: the world doesn't act or think exactly like we do. Circumstances differ. Perspectives differ.

Generations

My youth in Roosendaal can again serve as an example. My parents did not have a car. They did not need one. Family and friends lived nearby. And the Liga factory where my father worked, was a five-minute walk from our house. To us, today, that can seem a bit weird... when someone does not have a car. Or no driver's licence. I remember this was kind of a race for my generation. A moped when you turned sixteen. A car when you turned eighteen. And then the world – or at least parts of Brabant and South-Holland – lay at your feet. My son is 23 now. He has only just decided to get his driver's licence. Perhaps he will stand on a stage somewhere in the year 2050 and make the audience smile by saying: 'My parents had their own car.' My point is: what is normal differs from place to place, but also from time to time. When I was a teenager, owning your own car was a symbol of independence and freedom. In hindsight, that thought was perhaps a bit too simple. It takes more to be free than transport. For the teenager today, an electric car is a symbol of a cleaner future. This is perhaps also a bit too simple. A cleaner future needs more than more electric cars. Because electricity is not the same as energy. This point is so important I am going to repeat it... electricity is not the same as energy. Of all the final energy the world currently uses, less than 20 percent is electricity. Less than a fifth. Imagine lining up the five original members of the Rolling Stones. Imagine this quintet represents all the energy usage in the world. Keith Richards would be electricity. Of the five greatest Dutchmen ever, only

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Erasmus would be electricity. Of all the Village People, only the Native American would be electricity.

Electrification

So, if we use renewables to power everything with a plug in the world right now, about eighty percent of our energy demand remains. That is why it is not a good idea to say energy companies should stop extracting gas or oil from the earth immediately. And this will be true for some time.

Don't get me wrong, the world is moving in the right direction when it comes to electrification of the energy system. According to calculations by Shell's scenarios team, the percentage of electricity in the total energy consumption will grow. Around 2035, it could be as much as 30%. And it could be 50% by 2060. It is a growing market and Shell wants to play a more active role in electricity. People can already charge their electric cars at home, at work and on forecourts with Shell's help. And Shell wants to play a more active role in all aspects of the power system. With the acquisition of the British electricity company First Utility, for example, Shell is about to start supplying power directly to people's homes.

Despite the growth, electricity is only one of the four main sectors in energy. Transport is the second sector. And with transport, the limits of electricity quickly become clear. Everyone knows you can drive electrically, but I also think everyone understands we cannot use a battery to launch a rocket. Even if the rocket is used to place an electric car in our solar system. People who want to use batteries to transport heavy freight over long distances on the road or over water, currently have a choice: they can transport the batteries but have no room for the freight, or fill the ship or truck with goods but have no room for the batteries needed to move them. And yes, we can fly a plane without passengers on solar energy. But flying a solar plane filled with people from Schiphol to Beijing is not possible yet.

The third sector, buildings, is even harder, because this involves personal choices. Should solar panels, for example, be mandatory from now on? This requires regulation from government. And it might sound like a good idea, but not everyone likes the look of solar panels and not everyone can afford them, which could lead to social friction.

The fourth, last and most difficult sector is industry. Here, the limits are most clear. The production of glass, steel, cement, plastic and chemicals is, for now, only possible using traditional fuels. Because of the high temperature, high pressure, or the required chemical reactions involved. The significance of the chemical industry, especially, is much bigger than some people realise. Because the chemical industry is necessary for nearly every other industry. Whether we talk about lightweight plastics, insulation or better batteries for our iPhones.

Moore's Law

I know some people think the world could do without traditional fuels tomorrow – or perhaps the day after. If this were the case, I would support them, because I believe Shell can be successful in any energy system. But it is not as straightforward as sometimes perceived. Even if everyone drives electric or hydrogen vehicles, we still need gas or oil. Even if every machine with a plug is powered by solar or wind, we still need gas or oil. Even if every house, office or factory is perfectly insulated from now on, we still need gas or oil.

I know what many of you think right now. 'They will find something.' There is a specific idea that is the solution to climate change. A new - still to be discovered - answer... A disruption... Something with an app... Perhaps this expectation comes from Moore's Law. Gordon Moore was one of the founders of chipmaker Intel. In 1965, he predicted that the power of computer chips would double every 18 to 24 months. This prediction became the standard for information technology. And our perception of innovation has changed accordingly. This

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has become the norm for change: a revolutionary technique that wipes out the old in an instant. Facebook crushed MySpace. Spotify crushed the record store. And email did not only crush the fax, but also the letter.

Attainable goals

The energy system, probably the largest and most intricate infrastructure in the world, behaves differently. Moore's Law demands a performance growth of 46 percent a year. That is necessary to build a new generation of computers every 18 months. Energy scientist Vaclav Smil has made similar calculations for the energy sector. He looked at how long it took before a new source of energy grew from 5 to 25 percent of the market. After oil touched 5 percent in 1905, it took 28 years to reach 25 percent worldwide. Gas took 33 years. Despite the huge attention and fast growth of wind turbines and solar panels during the last years, these renewable sources of energy have yet to reach 5 percent. We are only at the beginning. Even the biggest disrupters of them all, the tech companies of Silicon Valley, have experienced that the energy transition works differently. In Vaclav Smil's most recent book, there is a nice example of this: in 2008 Google launched an initiative - with the best intentions - to reduce the use of coal and oil in the USA. By calling for a reduction of the amount of electricity generated from coal and oil to zero. And a reduction of the use of traditionally-fuelled cars to 44 percent. Google gave up this campaign in November 2011. It did not adjust the plans, but gave up on them.

If we want to successfully navigate the energy transition, we must guard against such huge disappointments. Because if the disappointment is too big, you don't adjust your goals, but you quit. We cannot afford that. The energy transition is too important. Big changes take little steps to achieve. We must aim high, but our goals should also be attainable. With enough ambition to keep global warming below 2 degrees Celsius. With enough attention for the fact this will not be taken care of in the world tomorrow because more than a billion people are

fighting their way out of poverty. But also with enough of an eye for the need for the market to offer people a proper choice of lower-carbon products.

This brings me to the good news. Because I believe the world can succeed. How are we going to do this? You have already heard my answer: non solus. We must collaborate. Everyone with their own role, but together nonetheless.

Net zero emissions

I have a clear idea about what Shell's role should be. According to the scenario Shell is working on, the world can emit net zero emissions by 2070. In this scenario, society still emits CO₂, but these emissions are caught and captured or offset. Net zero emissions. The Dutch government has the ambition to reach this in 2050. As I said earlier, the speed of change differs all over the world. And not every country in the world follows the Dutch path of economic and industrial development and preservation. But no matter whether we talk about the world in 2070 or the Netherlands in 2050, these ambitions demand huge changes from everyone. From governments, individuals and companies.

And because we can only proceed in steps, Shell has put down some markers on the path to this future. In step with society's drive to align with the Paris Agreement, the company's ambition is to reduce the net carbon footprint of the energy products Shell sells by 20% by 2035 as compared to now. For 2050 the ambition is a reduction of 50%. That means half the CO₂ compared to today for every unit of energy delivered. And every five years Shell will check whether we are still in line with the rest of the world. If not, we will adjust our pace to be in line with society's pace. The emissions this covers is divided in three parts, when I explain it as simply as possible. Or better, when I explain it in a non-technical way, without all the official definitions. First: emissions from the energy Shell uses itself. Second: emissions from use of the energy products by Shell's customers.

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And third: emissions that are hard to prevent.

Solutions

Let me begin with the energy Shell uses itself. We are addressing the CO₂-intensity of our production. This is, for example, the reason we are building the largest solar park in the Netherlands in Moerdijk. The 50,000 solar panels will provide cleaner energy for the production processes at our own chemical facility. Tackling the emissions of our own plants is necessary, logical... and completely insufficient. Just as the impact on the transport sector would be tiny, if car manufacturers improved their factories and did nothing about the cars they sell.

This is why, secondly, we aim to lower the emissions caused by each unit of the energy products we sell. Our New Energies business, started in 2016, helps with this. This part of the company is constantly searching for new opportunities in new energy sources. With investments of up to \$2 billion a year until 2020. New Energies concentrates on two areas. First of all, new fuels. Shell, for example, has been for some time the biggest producer of low-carbon biofuels from sugar cane through our joint venture Raízen in Brazil. And we are currently researching how to bring a new generation of biofuels to the market. In Bangalore, for example, we have an advanced demonstration project creating biofuel from waste. Shell is also closely involved with the development of hydrogen as a source of energy. In Germany, we are helping – as one of the partners in a joint venture – to set up a national network of 400 hydrogen filling stations. Moreover, Shell is co-founder of the Hydrogen Council. This is a group of energy companies and car manufacturers that wants to invest 10 billion euros in hydrogen as a fuel for the future over the next five years. Moreover, Shell is one of the biggest producers of LNG in the world. LNG means liquefied natural gas. LNG is, for example, a good alternative for shipping. And the market is catching on to this. According to the Dutch 'Harbourman of the year', Pieter van Oord, sea ships will

make the change from oil to LNG on a massive scale during the next decade. I believe he is right. Sovcomflot, one of the biggest shipbuilders in the world, is currently building tankers that can be powered by LNG. And next year Carnival, one of the biggest cruise operators in the world, will introduce the first LNG-fuelled cruise ship. This is why Shell has already placed an LNG refuelling ship in the harbour of Rotterdam, to help the shipping fleet make the transfer from diesel to gas.

Power

Besides new fuels, New Energies also concentrates on power. This makes sense because, as I said before, electricity is expected to grow as a percentage of the entire energy system. This offers opportunities for Shell. For example, by offering fast charging for electric cars at our filling stations. And with the acquisition of New Motion, Shell can also offer charging at home or at the office. Moreover, Shell has a system that can help make sure local power grids can handle the extra load placed on them by plugging in electric cars. I think everyone has had the experience of plugging in one appliance too many in their life. When the on button on your blow dryer becomes the off button of every other machine in the house. Unless we do something, this is likely to happen more often and on a larger scale. Green Alliance, a green think tank in the UK, calculated last year for example that it takes only six cars to be plugged in simultaneously in the same area to cause localised power shortages. So, Shell has developed a smart charging system for cars that communicates with the grid. The system makes sure cars charge at times when there is enough power available. Which also means customers can pay less. And, separately, Shell is starting to work on making sure power itself is also cleaner. An example is the large offshore wind farm near Borssele that Shell is co-developing with several partners.

A different angle

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Then the third part: what does Shell do about emissions that are hard to stop? Some sectors cannot reduce their emissions to zero yet. As I mentioned earlier, it is still impossible at this moment to make steel or cement without traditional fuels. So, the world needs a solution that approaches the problem from a different angle. This solution exists. This requires us to think of a future that is low carbon, when carbon free is not possible yet. And it requires catching the CO₂ we emit or removing it from the air. This can be done by investments in nature. This is why we offer our business clients in the Netherlands the option of offsetting the CO₂ impact of their fuel for a couple of cents per litre. Shell invests this money, for example, in the Kasigau Corridor project in Kenya. It is used to protect more than two hundred thousand acres of threatened forest. It has been used to plant more than fifty thousand new trees in the area. Before the end of this year, Shell wants to extend this possibility to all of our clients in the Netherlands.

We also combat part of the CO₂ we produce through Carbon Capture and Storage – CCS. You may have heard about this when the Dutch coalition agreement was presented. Because the Rutte III coalition expects a lot from CCS. And I think these expectations, with the correct conditions, are justified. Because CCS removes CO₂ from the source of the emissions and stores them away safely. The International Energy Agency and the Intergovernmental Panel on Climate Change agree that restricting the warming of the earth to two degrees Celsius or lower needs CCS. Currently, Shell is part of a project led by the Rotterdam harbour company which is researching how to store CO₂ from industry in Rotterdam in empty gas fields in the North Sea. This is a good idea, because if the Netherlands wants to reach the environmental ambitions of the coalition, we need to start capturing and storing CO₂. We are also looking at how to recycle CO₂. This is already happening on a small scale. We deliver some of the CO₂ from Shell Pernis to the soft drinks industry. And in the Westland, entrepreneurs in agriculture

and horticulture use some of the CO₂ from Pernis to help crops and flowers grow faster. And through the Dutch Chemical Building Blocks Consortium, a cooperation between universities, government and large companies, we are investing in a new way of thinking about chemical production, in which CO₂ is not the residue at the end of the chemical process, but a necessary input at the beginning. This road is long, but the project offers great opportunity. And I hope we can inspire young people along the way to study chemistry. By the way, in Canada Shell has shown that CCS works. We have a facility called Quest. It is a huge project, that would not have been possible without the help of Canadian authorities. And now the Dutch government has also embraced the potential of CCS, I have every reason to be even more positive about reaching the Dutch climate goals.

Ladies and gentlemen,

You can find it on all publications from Elsevier, but it is also true for the energy transition and growing up in Roosendaal... non solus. You cannot do it alone. Collaboration is crucial. Because no matter how big Shell may seem in the eyes of some, the energy transition is many times bigger. And whatever Shell does, it can only be a fraction of what must happen. The Netherlands has everything it takes to excel when it comes to energy. It is almost a tradition for the Dutch to passionately disagree with each other and get results nonetheless. This, for me, is the essence of 'polderen'. And I think we should cherish this. Despite disagreements about the route to take, acknowledging we have the same goal. But this is not what I see now. In the Dutch debate, we waste too much energy telling the other side they're wrong. This feels un-Dutch to me. We must make sure the debate remains focused on results. Because if you put all your energy into blocking someone else, you don't move forward yourself.

Not a lump

Let me give a last example of collaboration that seems useful to me. A healthy

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investment climate for new sources of energy needs an effective price on CO₂. And this price needs to be instigated by government. It is important to get going with this, preferably on a European level. The EU Emissions Trading System, that was reformed last year, is promising. The carbon price in the EU has doubled since the summer. It stands at around 10 euros per tonne of CO₂ right now. This is not a sufficient level to deter emissions and encourage innovation, but analysts forecast an average price of 25 euros in the next decade. This can help consumers and companies choose lower carbon alternatives over the long run. This happened in the United Kingdom, where the government increased its carbon floor price in April 2015 from 5 to 18 pounds per tonne of CO₂. Aurora Energy Research calculated this helped to increase the demand for gas produced electricity by 56%, while the demand for electricity from coal dropped by

73% during the first half of 2016. The result of this change, at least in part, was that CO₂-emissions caused by the production of electricity decreased by 24%. And in April last year the UK went an entire day without using a single lump of coal for electricity. For the first time since 1882. This can be the effect of a serious, government-led CO₂-price. Consumers and companies can be encouraged into making the right choice. These kinds of collaboration, especially when more countries are involved, have results. So, if you remember anything of my story, I hope it is: 'non solus'. Because I know for sure that with the right collaboration, we can reach the other side of the energy transition... a world with cleaner energy for everyone and without wash cloths that are just too cold.

Thank you.

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