

## UN – TWENTY-SIXTH SESSION OF THE COMMITTEE ON SUSTAINABLE ENERGY

*Speech by Trude Sundset, 28<sup>th</sup> September 2017, Geneva*

Thank you for inviting me here.

### **SLIDE 2 (Follow the money)**

There is an old strategy in investigative journalism – and in law enforcement:

**“FOLLOW THE MONEY.”**

If you **follow the money** nowadays, you will pretty likely end up somewhere green. It is actually one of the truly *amazing* developments in human history. A few years ago, investing in the green, low-emission economy was something for **idealists**. Not capitalists. But now, “everyone” seems to be going green. Google is powered by one hundred percent zero-emission energy. Many others follow suit. On the flip side: In the U.S. three out of four major coal-companies have been filing for bankruptcy over the past six years.<sup>1</sup> And in Australia, Carmichael, one of the world’s largest coal mining projects, has serious trouble finding investors. No one wants to be the last company stuck with a portfolio inflated by greenhouse gases. The economy is **changing**. A new generation of business leaders find their place on the stage. They **know** that in the future, the **key to growth** is going green.

### **Slide 3 (Gassnova)**

Gassnova is Norway’s state enterprise for carbon capture and storage. Since 2005 we have worked on research and development of capture and storage technology. Our work is made up of three interconnected parts, (1) research, (2) testing and (3) full-scale CCS-implementation. Through the CLIMIT research program, we finance **research** into all aspects of CCS. Together with other national research institutions and international collaborators, we have funded more than 500 CCS-research programs over the past 12 years. At Technology Center Mongstad that we call TCM, is where we test capture technologies – some of which are nurtured through the CLIMIT-program. TCM, is also the world’s largest and most complex testing facility. It is the last stop to demonstrate capture technologies to ensure that we can scale to an industrial size. At TCM, we are experiencing more of a global demand than ever before and completed a testing campaign this year with an American company supported by US Department of Energy. TCM is also a global competence center. The center is open to Norwegian companies, as well as international enterprises who need to test technology or troubleshoot solutions. Earlier this year, TCM signed a cooperation-agreement with the planned CO<sub>2</sub>-capture testing facility in Guandong, China. In addition to the Norwegian Government, the energy companies Statoil, Shell and Total are partners with shares in the center. Finally, and as I will elaborate on shortly, Gassnova, is currently working to develop and complete full-scale CCS at three industrial sites in Norway. We are about to build the world’s first CCS value-chain for environmental reasons. Before I say more on this very exiting project, allow me to say a little bit more about **why** we need to succeed with CCS.

As you all know, carbon capture and storage is not a new technology. Far from it: Since the 1970s, oil companies have successfully captured carbon dioxide from gas production. In many countries around the world today, captured CO<sub>2</sub> is utilized for enhanced oil recovery. But CO<sub>2</sub> capture and storage has also been initiated as a climate technology by the oil industry.

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<sup>1</sup>Peabody Energy (largest) Arch Coal (second largest) and Alpha Natural Resources (fourth largest)

#### Slide 4 (Sleipner)

In my home country Norway, for instance, Statoil, has captured and safely stored 17 million tons of carbon dioxide at one single gas field called Sleipner. The Sleipner-project came about as a direct consequence of deliberate decisions by policy-makers. It was indeed a real breakthrough, when in the early 1990's Norwegian policy makers introduced an offshore CO<sub>2</sub>-tax at 50 dollars per ton. Only then did investments in CCS become a rational concept. The Sleipner-project makes a real contribution to reducing CO<sub>2</sub>-emissions in Norway. Even more importantly: this project proves that the technology works. And we need CCS to work. Both the IPCC and the IEA are **crystal clear**: Without widespread deployment of CCS – reaching the 2-degree target will become more than twice as expensive. And perhaps not achievable at all. CCS will have to play a role in several sectors. We believe that the industrial sector is one of the areas where CCS is most needed, and where it is easier to find the accept and support for this technology

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The reason for this is quite simple:

#### Slide 5 (One quarter)

25 % of CO<sub>2</sub>-emissions is coming from industry. One quarter of the global emissions. Without reducing these emissions, we will not be able to stop global warming While much of the world's power generation can be switched from fossil fuel to renewables, CCS is crucial for making industry carbon free. It is simply not possible to remove all greenhouse gas emissions from industry merely by shifting to renewable energy sources. Why? Because large parts of the emissions from the industry stem from chemical processes in the production itself. This means that even if all cement-factories in the world were powered by solar-panels...

...Even if all fertilizers produced on the planet received its energy from wind mills...

...the production process itself will continue to cause massive emissions of greenhouse gases. Hence, regardless of the effects of the switch to renewable energy, we need to deploy CO<sub>2</sub> capture and storage in order to combat climate change. It is not as if we can simply erase these industries from the map. The world needs clean industries:

Aluminum for electric cars...

Cement for zero emission houses...

Fertilizers to ensure food production on a planet where fertile soil is eaten by deserts...

... and crops are destroyed by flooding.

As I mentioned in the introduction, Norway's industrial leaders are already responding. Loud and clear. Gassnova now works with three industrial partners in Norway to complete full-scale carbon capture. **The three industrial candidates are: Norcems** cement factory in Brevik, a part of the Heidelberg group, **Yaras** fertilizer-production plant at Herøya, and; the **City of Oslo's** waste-to-energy facility at Klemetstrud.

These industries have one thing in common: Each of them represent global industries with considerable CO<sub>2</sub>-emission challenges. For instance, cement production contribute to 5 % of global emissions! Five percent! Alone. Combined, the three industrial emitters also represent something else: A substantial part of Norway's annual emissions of CO<sub>2</sub>. If we complete all three CCS-projects, we will reduce emissions roughly comparable to removing one out of four fossil fueled cars from Norwegian roads. This is an important contribution to Norway's climate policy. But our plan is far more ambitious than that. We are determined to establish the world's first complete CCS-value chain developed for environmental reasons. We call it a "CCS-highway". And this lays the groundwork for other projects. And now I am going to show you a film about these projects:

## Slide 6 FILM

Isn't it inspiring...

...to hear how these industrial leaders take responsibility and work really hard to complete this project?

And it doesn't stop here:

## Slide 7 (CCS Highway)

From the industrial plants, the CO<sub>2</sub> captured will be transported by ship to Norway's West coast. There, the carbon will be stored in an intermediate storage facility. From this facility there will be an off shore pipeline where the CO<sub>2</sub> will be injected into a geological formation in the North Sea. This, ladies and gentlemen, is the VALUE CHAIN.

Then there is the issue of – is this safe? Yes, it is safe.

These are the same geological formations that have been holding on to large quantities of gas and oil for millions of years. The Norwegian Petroleum Directorate has concluded that it is technically possible to store the astronomic amount of 80 billion tonnes of CO<sub>2</sub> in the North Sea. That is roughly comparable to 1000 years of Norwegian emissions at the current level.<sup>2</sup> We can store all the CO<sub>2</sub> created in Europe for many, many years. Now we are in the process of opening one storage, called Smeaheia. This storage alone represents a significant capacity. In fact, the CO<sub>2</sub> from the three industrial companies partaking in the project, will not fill more than 1 % of the Smeaheia storage. Once we have the transportation system and a storage in place, we believe Norway is on track to having established a working infrastructure. On this CCS-highway – as we call it – we have room for cars with international license plates.

## Slide 8 (golden opportunity)

CCS can provide low-emission infrastructure that makes Norwegian industry competitive in a low-carbon future. However, on a global scale, CCS might be even more essential for emerging economies that are in the middle of building up their industrial sector. This is of great significance. By mid-century a full two-thirds of the world's energy consumption will take place outside the OECD.<sup>3</sup> This impressive growth is one of the most positive developments in human history. But if this new industrial revolution is not to become the **last**...the world urgently needs to find ways to grow industry **while** cutting CO<sub>2</sub>-emissions. In this perspective, CCS becomes a golden **opportunity**. Because it enables growth in production without increasing emissions. Additionally, CCS offers opportunities for the continual operation of existing factories and power plants. Retrofitting, for example, a relatively new coal power plant with CCS can reduce greenhouse gas emissions by 90 %. It would be troubling for many emerging economies, if thousands of newly opened factories and power plants would have to shut down in order to cut emissions.

## Slide 9 “Climate cost and risk”

Some people say: “But why commit all this money to CCS when there are cheaper and easier ways to cut emissions right now?” We also hear people who say: “Yes, perhaps CCS is needed in 2050 – but by then we might have discovered technologies that makes carbon capture redundant?” There are many questions, and predicting technological development is certainly no easy task. BUT: in my opinion, it all boils down to what level of *risk* we are willing to take. And in my opinion: We need all the solutions we can find! If we are willing to gamble, there might be some financial upside to putting all our investments in a few already commercially matured technologies: The downside, however, is gloomy. The more limited our technological scope is, the greater risk we face if the development of certain solutions fail to meet

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<sup>2</sup> <http://www.npd.no/en/news/News/2014/New-compiled-atlas/>

<sup>3</sup> U.S. Energy Information, International Energy Outlook 2016.

expectations. And here is the crux of my argument: If we are to have CCS as an option...there is simply no way we can wait until 2050 to invest in research, development and infrastructure. NO WAY!

I believe, simply closing our eyes and hoping that some magic new technology that upends the climate scenarios is dangerously naïve. Or quite simply dangerous.

Investing in climate technology comes with a prize but it pales compared to the cost of choosing not to invest. Hurricanes “Harvey”, “Irma” and “Maria” Need I say more?

Because CCS is so essential to stopping global warming, Norway is willing to continue taking the lead. But we believe more countries need to follow. For years to come, CO<sub>2</sub>-prices are likely to remain too low to create sufficient incentives for business to invest in CCS. So, policy-makers need to create those incentives. Therefore, Gassnova’s mission is to demonstrate that such technology is viable on a large scale. According to our plan, the final investment-decision on both capture and storage will be made in 2019. If all goes as planned, the world’s first CCS Highway will become reality in 2022. I believe this can change the way the whole world looks at CCS as an essential climate technology.

### Slide 10 (Time for change)

Almost a hundred years ago, the British Prime Minister, Lord Salisbury, said

*“whatever happens will be for the worse, and therefore it is in our interest that as little happens as possible.”*

It is not hard these days to find reasons to be pessimistic about the future. Although recent reports suggest we have some more time at our disposal, we remain in a hurry to find the solutions. Climate change is accelerating and the world is certainly not on track to stopping global warming. Still there are signs that we have crossed a road over the last few years. Because if we **follow the money** – we see that a new green economy is developing with increasing speed. And please excuse me for sounding cynical: But the really promising part of this development is that it is **not** driven by idealism and good will alone. It is driven by cold calculation and market forces. By the desire to make money, investors look for the technologies that will drive the future. This realization is not only made in business, but also in politics. And for profound change to take place, we need both capitalists and politicians. This summer I paid a visit to Lord Salisbury’s contemporaries at the House of Lords in the UK. I came there to talk to these politicians about why carbon capture is **possible, necessary** and perhaps **the most important climate technology**. In that Mecca of tradition, I met dignified Lords who were almost childishly enthusiastic to learn about the latest development in climate technology. For them change could not come soon enough. Our job in Gassnova is to use that wave of initiative, optimism and opportunity to create technologies that open the door to the future. My hope is that you, as policy makers, have been be inspired today... and that you will have the passion and desire to go home to your countries and start carving out the legislation: Legislation needed to resolve the liability issues and put a framework in place for a safe and publicly accepted storage. Legislation needed to put economic incentives in place. Incentives to stimulate investment in technology and infrastructure, enabling cost reductions and technology development. Because: The costs must come down, the technology still needs refinement. Be creative, dig deep for the right incentives. And please accept my invitation to learn from our projects.

Any time!

Thank you for listening!