



The close connection between

Emissions Trading
and
CO₂ Capture and Storage

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Madrid
The 19th World Petroleum Congress
Plenary Session on:
“Delivering energy for Sustainable Growth. The European perspective”
30 June 2008



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Jeroen was born in the Netherlands, and is married with three daughters. He has two degrees – one in mechanical engineering from Delft University and another in economics from Rotterdam University.

He is a Non-executive Director of Unilever.

How can the European Union achieve its aim of a 20% greenhouse gas emissions reduction – or 30% in case of an international climate agreement – by 2020? In this speech, Jeroen van der Veer argues that cap-and-trade mechanisms like the EU Emissions Trading Scheme need CO₂ Capture and Storage (CCS) as a supporting technology to reduce emissions drastically. Likewise, CCS can only materialise with the CO₂ price that is delivered by cap-and-trade mechanisms. Government and industry each have a role to play: while industry should work hard at maturing CCS technology and develop projects, governments could devise funding mechanisms for capture and storage as part of the climate conference in Copenhagen next year.

Introduction

Devising a good strategy for the future is not an easy thing to do. You have to define a clear, reachable goal . . . and you have to identify and take the appropriate actions to reach it.

A Japanese proverb explains what happens if you fail on either account: “Vision without action is a daydream. Action without vision is a nightmare.”

When it comes to the European Union’s 2020 goals, the vision is clear. It’s a good vision for the future.

But, as always, the devil is in the detail. Deeds, not words, will determine the outcome.

In Shell speak, the 2020 goals are: “difficult, yes – impossible, no.”

This applies especially to the EU’s overarching aim of reducing greenhouse gas emissions by 20% compared to 1990 levels . . . or possibly even 30% in case an international agreement on climate change is reached next year in Copenhagen.

Roughly half of that reduction has to be achieved by the power and industrial sectors through the European Union’s Greenhouse Gas Emission Trading Scheme, or ETS.

The relationship between ETS and CCS

Emissions trading is one of two crucial pillars supporting Europe’s sustainable energy framework.

The other pillar is CO₂ Capture and Storage, or CCS for short.

We really need both . . . Cap-and-trade mechanisms cannot be successful without the only technology that can drive down emissions drastically. Likewise, that technology will not mature without the price on carbon dioxide that is delivered by international

cap-and-trade mechanisms.

In the European context this means that the ETS and CCS go hand in hand. One cannot become a success without the other.

This may seem obvious, but to many people it is not obvious at all.

Some people believe that the sole purpose of cap-and-trade mechanisms is to penalise fossil energy in order to boost the growth of alternative energy, in particular wind and solar.

They are wrong: given the rapid increase in the global demand for energy, we will need to deliver all the energy we can get . . . from many different sources.

Yes, we need to grow renewables, and Shell is a participant in that growth.

But regardless of how much the world invests, renewables cannot by themselves make a dent in emissions large enough and soon enough.

Capturing and storing CO₂ is the only realistic way to reduce emissions drastically while continuing to deliver the energy the world needs to grow and prosper.

EU governments have recognised this and called for a flagship programme of 10 to 12 large-scale CCS demonstration projects across Europe by 2015.

Storing carbon dioxide underground in empty gas and oil fields or aquifers would allow us to make fossil fuels greener. If the same level of emission reductions is sought *without* capture and storage, it is hard to see how coal, and the expected growth of coal, can be accommodated in the energy mix.

For the oil & gas industry, capture and storage is a new challenge and a new opportunity. Our industry is well positioned through its know-how and

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experience to sequester carbon dioxide safely and responsibly.

Shell's scenario team studied the potential contribution that capture and storage could make to reducing emissions worldwide.

They reckon that by 2050, if 90% of the coal-and gas-fired power stations in OECD countries and half in developing countries have become zero-emission plants, overall CO₂ emissions will be 30% lower than in a world without capture and storage.

The obvious question is: if capture and storage is such a good technology, then why isn't it already happening at a large scale?

As many of you know perfectly well, the main hurdle is that capture and storage is "investment and running costs, but no revenue".

Without the price on greenhouse gas emissions that is delivered by cap-and-trade mechanisms, CO₂ capture and storage will remain a daydream.

So there's a close connection between capping and capturing, and between trading and storing.

Whether this connection will develop into a happy marriage depends on technology and policy.

Pre-combustion technology

The notion that new power plants must be built "capture ready" is part of the policy proposals currently on the table in Brussels.

That's a good thing, because it allows us to move quickly.

At the same time, we must be careful, because the technology choices we make today should also be appropriate for future generations.

It would not surprise me if power plants were to evolve into industrial platforms that bear similarities with chemical plants: They will continue to generate electricity and heat, of course. And, using synthesis gas as a platform, they will provide feedstock to the chemical industry . . . and hydrogen.

How can we make this work? In the European context, the "capture ready" concept that best fits these criteria is to

build natural gas-fired plants that are later retrofitted to become plants that gasify coal or biomass.

Coal gasification technology is proven technology – and it generates a concentrated stream of CO₂ that is easily captured.

Over the next 40 years this combined gas and coal pathway could reduce CO₂ emissions by as much as 50% compared to approaches that capture CO₂ from exhaust gases after coal is burned.

And it would allow operators to switch between natural gas and coal or biomass, a useful flexibility in a volatile energy world.

Dutch utility Nuon is a good example. Having gained experience with coal and biomass gasification at its Buggenum plant, it is now building its 1300 MW Nuon Magnum: a multifuel power plant that will first run on gas and be equipped for connection to a gasification plant that can co-gasify coal and biomass and capture the CO₂ before combustion.

The synthesis gas produced from gasifying coal and biomass, in turn, opens up chemical and hydrogen value chains.

In summary, the combined gas and coal pathway is the easiest and most cost-effective capture-ready route to zero-emission power from fossil fuels.

Globalisation of cap-and-trade

The other pillar of the EU's policy framework is the Emissions Trading Scheme.

Since 2001 Shell has stood firmly behind cap-and-trade as the principal tool for delivering emissions reductions in Europe's industrial sector.

But Europe cannot change the world all by itself. Energy security and minimising climate risk require a truly global effort.

So Europe must always strike a balance between moving forward and helping others to catch up.

When industry feels this balance is at risk, we speak out. And this is what I have done in my capacity as chairman of the energy and climate working group of

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the European Round Table of industrialists, where Europe's largest industrial companies come together.

In a letter to the Commission, we expressed concerns about a too speedy introduction of auctioning of CO₂ allowances – as opposed to free allocation.

Shell recognises that auctioning is an integral design feature of the ETS. We do not oppose auctioning.

However, some industries, notably the chemical, paper and refining sectors, are exposed to intense global competition, often with competitors that do not face a CO₂ penalty in their home markets.

For these industries, auctioning should be phased in over a period of time, giving other parts of the world time to adopt CO₂ pricing mechanisms of their own.

Demonstrating leadership in the global battle against greenhouse gas emissions is a good thing – isolation from the rest of the world is not.

To guarantee a level playing field for industry worldwide, we need a market for carbon dioxide that is also global.

Cap-and-trade must eventually cover all of the key global markets, including all OECD countries, plus Brazil, Russia, India and China.

Greenhouse gas certificates should be fully convertible across countries, across cap-and-trade zones, and across industries.

Fortunately, there is scope for optimism about international cooperation:

In the United States, there are several emissions trading schemes at state-level, and it is only a matter of time before federal legislation will introduce a nation-wide cap-and-trade system.

China and India, for their part, are keenly aware of the need to increase energy efficiency and reduce CO₂ emissions per unit of energy. They have been important beneficiaries of the Clean Development Mechanism.

Meanwhile, in the Gulf region, countries are increasingly enthusiastic about capture and storage. They want to

use the carbon dioxide that is currently released into the atmosphere for enhanced oil recovery, freeing up the natural gas that is used for this purpose at present. The natural gas could then be used for domestic consumption.

The 30% target

As indicated, Europe's aim of a 20% reduction in emissions by 2020 is already quite ambitious.

If the EU would like to see a 30% reduction by 2020, the risk of getting stuck halfway between a daydream and a nightmare increases substantially. So the 30% target makes a truly global approach even more important.

In total, the extra 10% amounts to a further reduction of around 400 million tonnes of CO₂.¹ Half of that extra reduction will have to be achieved under the Emissions Trading Scheme. Which means we would have to capture and store CO₂ from at least 24 large, 1000 MW power stations.

This represents nearly a quarter of total installed capacity in the UK and would be double the number of CCS projects foreseen in the EU's Flagship Programme.

Clearly, moving from 20% to 30% would be very difficult to achieve.

Also, the question is, should all projects be developed within the EU's own borders, or should EU money also flow to CCS projects in, for example, China or India?

And how could "Copenhagen" help? I can think of two outcomes that would indeed be helpful:

- First, an international CCS project mechanism that delivers a fully convertible certificate for one tonne of CO₂ stored underground. This could be established under the Clean Development Mechanism or as a separate instrument.
- Second, a global Clean Technology Fund could be created to provide additional funding for the earliest capture and storage projects.

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The price on CO₂ delivered by cap-and-trade – while vital in the medium to longer term – will by itself not be sufficient to get these projects off the ground in time to meet the 2020 deadline.

Conclusion

My conclusion is that there are a number of interdependent relationships at work that will make or break our efforts to reduce emissions, in Europe and elsewhere.

The first concerns the relationship between CO₂ capture and storage and cap-and-trade: Capture and storage cannot succeed without the price on CO₂ that is delivered by cap and trade mechanisms. Likewise, cap and trade cannot succeed without the only technology that can reduce emissions drastically.

Secondly, government and industry each have their part to play: while industry must work hard at maturing the technology and developing projects, governments need to deliver effective emissions reduction mechanisms.

The oil & gas industry for its part will be called upon to demonstrate that we can store CO₂ in the ground as safely and responsibly as we extract oil and gas from it.

Third, there is a connection between efforts made in Europe and efforts made elsewhere. It would be enormously helpful if North America and other key markets were to buy in to the concept of cap-and-trade and fully convertible emission certificates.

But the most important relationship is the one I started off with: the one between vision and action.

When it comes to mitigating climate risk, we need both.

Thank you.

Notes:

¹ *Europe's total emissions amount to around 4 billion tonnes of CO₂ per year. A conventional 1000 MW coal-fired power plants emits around 8 million tonnes of CO₂ a year.*

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