



Fuels of the Future

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Maarten Wetselaar is Integrated Gas & New Energies Director and a member of the Executive Committee of Royal Dutch Shell. He is responsible for Shell's Integrated Gas business, including the industry-leading liquefied natural gas and gas-to-liquids positions. He also leads the New Energies business, including Shell's investments in new fuels, new energy carriers and new business models for a low-carbon future.

Maarten holds a master's degree in Economics from the University of Groningen and a post doctorate Controlling degree from VU University of Amsterdam in the Netherlands. After joining Shell in 1995 he held a variety of financial, commercial and general management roles in Shell's downstream and trading businesses in Europe, Brazil and Ghana.

He continued his career in Shell's Upstream business, holding financial and commercial Vice President roles in the Middle East and Russia/CIS.

In 2009, Maarten became Executive Vice President Finance in Upstream International. From 2013 to 2015 he served as Executive Vice President for Integrated Gas, based in Singapore.

Maarten Wetselaar argues that the future of transport fuels will show a new and evolving balance between different fuels, traditional and new, depending on customers' needs and local availability.

Ladies and gentlemen,

Anthony Lucas struck oil in Spindletop, around 80 miles from here, in 1901. Oil erupted from the earth at a rate of 100,000 barrels a day for nine days straight. This was a big moment for Texas ... a big moment for the USA... and a big moment for transport, as Dan [Yergin] has shown in his book *The Prize*. Because the oil drilling frenzy that followed went on to dramatically boost worldwide oil production and kick off a rivalry between transport fuels.

I think we all know which fuel won. Oil had many advantages compared to other fuels. Internal combustion engines started much faster than steam engines... they did not require a guy constantly shovelling coal in a furnace... and unlike a horse, an internal combustion engine could not run away or drop dead from an infection. The only limiting factors for gasoline were the price, that quickly went down... and the production capacity, that quickly went up. In 1901, when Anthony Lucas struck oil, there were around 4000 horse carriage builders in the US. By the end of the 1920s, only 90 were left. From planes to trains, barges to battleships and from MINI Coopers to monster trucks... every form of motorised transport eventually ran on oil.

Today, transport needs to change again... transport needs to radically reduce emissions to limit global warming and improve the quality of the air we breathe. Some say batteries will triumph this time. According to the International Energy Agency – or IEA – the total number of battery electric cars in the world will increase from about 3 million today to 280 million in 2040. This sounds like another Spindletop moment for transport... a moment of sudden change... but it is not. Because the IEA expects the total number of cars to grow to 2 billion by 2040.

The challenge for electric battery cars is that they are not yet as user-friendly as cars with an internal combustion engine. This is likely to change in the future, but for now, they take longer to charge, cannot drive as far and are more expensive. And that is just passenger cars. This does not even include trucks, let alone ships and airplanes. None of those can be easily electrified yet. The world needs many different energy solutions if it wants to achieve the goals of the Paris Agreement to limit global warming below 1.5 degrees Celsius. That is as true for transport as it is for other sectors.

We should not see this as a new rivalry to establish one single solution, but a new and evolving balance between different fuels depending on customers' needs and local availability. This is why Shell is investing in electric car charging, for example with the acquisition of charging company Greenlots here in the USA in January.

But Shell also invests in other new fuels for transport. Shell's Raízen joint venture in Brazil, for example, produces one of the lowest-carbon biofuels available today and is starting to develop advanced biofuels from waste. Shell is also helping to build the infrastructure needed for hydrogen to grow as a transport fuel, here in California, but also in Canada and Europe.

Electric cars, biofuels and hydrogen all have great potential. But it will take time before they can gain enough of a share of the market to substantially reduce emissions from transport. Time the world, quite frankly, does not have. Recently the UN's Intergovernmental Panel on Climate Change outlined the need for an ever more rapid transition to a lower-carbon world. Carbon dioxide emissions need to fall sharply. Not starting in 2040, when there could be 280 million electric cars on the road, but from 2020. Next... year.

“Internal combustion engines did not require a guy constantly shovelling coal in a furnace....”

So yes, I believe it is right to invest in cleaner fuels that can start to have a positive impact on reducing emissions in the 2020s or 2030s. But we must also focus on the transport fuels that nearly all of the 7.5 billion people on earth use today. Fuel makers, car-makers, policy-makers... we should all continue to improve the efficiency of internal combustion engines.

And we should grow the role of natural gas in transport. Liquefied natural gas – or LNG – is, for example, increasingly used for shipping. LNG is cleaner-burning than the fuel oil that is used for ships. Shell has signed a deal with ship cruise operator Carnival to supply the world's first LNG-powered cruise ships. Starting next year, Shell will refuel these cruise ships using a floating filling station in the south-east of the USA.

Another way to improve the use of traditional fuels is to store or offset the emitted CO₂. Shell helps with the development of techniques to capture and store CO₂ away safely and will

increasingly look for solutions in the natural world to reduce the concentration of greenhouse gas in the atmosphere.

Ladies and gentlemen,

The exceptional thing about Spindletop... was that it was exceptional. We are not about to see overnight change in transport, no matter how helpful that would be in terms of meeting the Paris Agreement. This does not mean we can lean back... on the contrary, we need to change urgently. But if we actually want to reduce emissions fast, we should not see the future of transport fuels as a fight with a clear winner, but as a partnership. I believe the future of transport will be shaped not by one, but by many solutions... some of them will be new, like electric batteries, and some will be traditional, like LNG, but they must all have one thing in common: they must all help to bring down the emission of greenhouse gasses and pollutants.

Thank you.

"The exceptional thing about Spindletop... was that it was exceptional."

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