



Driving towards more sustainable transport

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Session 1 Transcript

Meet the team

Dr. Selda Gonsel

Vice President of Fuels and B2B Technology

Selda Gonsel is Vice President of Fuels and B2B Technology in Shell's Projects & Technology business. She is responsible for a range of programmes across the Marine, Aviation, Commercial Fuels and Bitumen sectors. Selda has received numerous awards for her contribution to lubrication science.



Jose Bravo

Chief Scientist in Physical Separations

Jose is Shell's Chief Scientist in Physical Separations, leader of the global Physical Separations discipline and consults on separation matters to initiatives such as Novel Crude Upgrading, Unconventional Resources, Biofuels and CO₂.



Niel Golightly

Vice President, Downstream Communications

Niel joined Shell in July 2006, after a career at Ford where he looked at Sustainable Business Strategies among other duties. At Shell, his responsibilities include corporate communications, stakeholder engagement and issues management for our global Downstream business.



Andrew Harrison

Fuels Innovation Manager

Dr Andrew Harrison has global responsibility for Shells longer term fuels research and technology development. He has a background in combustion chemistry and has worked in diverse technical and managerial roles related to fuels and lubricants for over 25 years.



Nick Allen

Vice President, Downstream Management Consultancy and CO₂

Nick is responsible for developing Shell's low carbon and energy-efficiency customer solutions and oversees all of our Downstream low carbon initiatives. In addition, he leads our Downstream Management Consultancy team and has relationships with a number of vehicle manufacturers.



Webchat Transcript

Dr. Selda Gonsel

Hello everyone. Welcome to today's webchat, "Driving towards more sustainable transport". I'm Dr Selda Gonsel, Shell's Vice President of Fuels and B2B Technology. I'm joined today by my co-host Jose Bravo, Shell's Chief Scientist in Physical Separations.

Anonymous

Q. Are we seeing new solutions to cut emissions in the public transport in the near future

Jose Bravo

A. Public transport is seeing changes in the use of hydrogen for example which from the point of view of the bus emits only water. But also any emissions reductions achieved in electricity generation (for example by using natural gas) will be part of the transport picture as public transport becomes more electrified. Finally, efficiency gains in engines (diesel, jet, etc) are also contributing to the improving picture.

Introductory Questions

Q. Could regulation speed up a move to more sustainable transport?

Dr. Selda Gonsel

A. Thanks for your question. Reducing carbon emissions from road transport requires concerted and collaborative action by not only governments, but also fuel suppliers, vehicle manufacturers and road transport users. Certainly, regulation can play a part. Governments can implement regulations to promote the wider use of existing low-carbon technologies and the development of new ones. They also have the means to construct new transport infrastructure and influence consumer behaviour. We support CO₂ regulations that will provide a predictable long-term policy framework and stimulate market-driven innovation to develop the most efficient solutions.

Introductory Questions

Q. Can electric cars really help reduce carbon emissions?

Jose Bravo

A. Electric vehicles offer the potential to reduce carbon emissions from road transport. However, as for all fuel and vehicle options, there are several key challenges to be overcome. Although electricity produces no CO₂ emissions at the point of use in a vehicle, its overall 'well to wheels' carbon intensity depends on how the electricity is generated. Therefore reducing the overall carbon impact of electric vehicles will require massive investment in low carbon electricity generation, such as renewables, nuclear or fossil fuels combined with carbon capture and storage (CCS). Due to the timescales required to deliver new electricity-generation capacity, making progress on decarbonising power generation represents an even more urgent challenge than delivering the electric vehicle technologies. Also keep in mind that there will need to be more electricity capacity installed to satisfy the extra demand from road transport.

Anonymous

Q. Electric cars can be recharged by solar panels during the day, or by small wind generators mounted on a house or building day and night. Both are clean green renewable , environmentally friendly energy sources.

Jose Bravo

A. Very good points. But the rate of energy use in the car will probably exceed the rate of recharge under practical use circumstances. Nevertheless, your idea would represent a net saving of generated power.

Anonymous

Q. When you say "sustainable transport", what exactly do we mean by that? Is that CO₂ neutral? Or is that in balance with food vs fuel (1st and 2nd generation biofuels)? I would be interested to understand just what we are aiming for.

Jose Bravo

A. Anon, very keen. Sustainable covers both the issues you mention. It includes an approach to carbon neutrality, the use of renewable sources, the ability to make a business out of this and the responsible use of other resources like water, chemicals, etc.

abhi0syal

Q. Fuel cell research - Is Shell exploring alternatives?

Dr. Selda Gonsel

A. At Shell, we think that hydrogen fuel cell vehicles will play a role as one of the longer term options to diversify road transport fuel. To promote their development, we are actively involved in a number of public/private research collaborations. These include the California fuel cell partnership, the Japan Hydrogen and fuel cell demonstration projects, the European Union fuel cells and hydrogen joint technology initiative and the Hydrogen Mobility initiative.

Lawrie

Q. How much genuine promise does the full electric car offer in terms of sustainability or are the claims for it exaggerated?

Jose Bravo

A. Lawrie, Great promise and great hype.... In reality the solution itself can be very good. The path to implementation can be rocky though.

Anonymous

Q. When electric cars will become more widespread, how large investments are needed to upgrade the national electricity grids?

Jose Bravo

A. This will be an evolutionary process because you would not scrap existing vehicles and infrastructure overnight. So this will take a few decades. Upgrading the electrical capacity and grids will follow the increase in demand at the matching rate

Anonymous

Q. What timeframe do you see for a significant (more than 20 %) shift into renewables in transport energy sources?

Jose Bravo

A. I would say at least 10 more years. We are already approaching 10% in many places with the use of Ethanol. The issue is that the "renewability" of large scale biofuels needs to be correctly assessed and not only assumed.

Anonymous

- Q. Does Shell see drop-in biofuels as a real option for future supply? Does Shell see fuel demand dropping as a result of efficiency gains or will bounce back see demand remain the same? What engine technologies does Shell see as having the most potential for efficiency gains?

Andrew Harrison

- A. Thanks - three good questions:
We believe that Shell is already the largest supplier of biofuels and we are investing in advanced biofuels - so yes it will be very important for us in the future.
Fuel demand is already being reduced by efficiency gains, particularly in developed markets but overall demand will grow from growth in developing markets.
Gasoline (petrol) engines offer significant opportunities still for efficiency gains.
Downsizing and turbocharging and hybridisation are key technologies that are already starting to be used.

Anonymous

- Q. how demand of energy/feul can be fulfilled by the shell to the growing transport, in the upcoming years?and what steps shell will take to do so?

Niel Golightly

- A. Hi, you're right that demand for transport is increasing. As the world's population and economies grow, we could see the number of cars and trucks on the road double by 2050. The challenge will not only be fuelling these vehicles, but doing so sustainably - and especially with lower CO₂. Shell is tackling the challenge on a number of fronts: making today's fuels and lubricants more efficient... helping customers conserve fuel... expanding the availability of today's lowest carbon, most sustainable biofuels... researching and developing tomorrow's "next generation" biofuels that minimize the use of food crops... working with car companies to optimize the fuel-engine combination... exploring the long-term possibilities of hydrogen... and even promoting more sustainable generation of electricity (for example more use of natural gas and carbon capture and storage) to ensure that the growing fleet of electric vehicles can be powered more sustainably. Bottom line, there will be no "silver bullet" solution to the mobility challenge. And there may even be future answers that nobody has thought of yet!
Hope that helps.

Anonymous

Q. How do you see our role in developing biofuels?

Jose Bravo

A. I assume you mean Shell's role. Shell's role will be fundamental since we see biofuels as an essential part of the mix and as such Shell needs to be very proficient in producing and marketing these biofuels. SO we will endeavour to be leaders in manufacturing, distribution, and retailing of biofuels as part of our normal business.

Anonymous

Q. What are the barriers to hydrogen (from renewables) becoming the transport fuel of the future?

Jose Bravo

A. Producing H₂ from renewable requires energy. So you basically are talking about photons to fuel. The barriers are technological.

Anonymous

Q. with the small number of electric cars proposed to be sold in the next twenty years, would the best result be to convert existing ICE vehicles to hybrids ?

Nick Allen

A. A good question. Firstly, we definitely expect to see a diversity of fuel products and vehicles over the next 20-40 years, and it is also clear there is no silver bullet solution. Like many, we do see electric vehicles being an important technology for the future, accompanied by the development of low carbon electricity generation.

That said, between now and 2025 we see the biggest impact on emissions coming from developments in energy efficiency in the ICE and biofuels. Within ICEs, hybrids will grow as the technology rolls out across more vehicles platforms to further drive efficiency.

Finally, if the question is whether we see the potential for converting existing ICEs on the road today to hybrid, this is less of a practical option.

Anonymous

- Q. Transport has a multiplier effect on economic development. Degradation of transport will stall economies and could actually cause contraction. The direct effect of transport in all its forms and the indirect effect through its positive impact on economic growth leave an ever increasing negative environmental legacy. Talking of carbon intensity as regards GDP may be useful for individual countries to assess their own fuel efficiency; it has no bearing on that country's actual carbon footprint.

Every little helps but focusing on increasing transport fuel efficiency may still not have a desired effect on world fuel consumption if the positive economic effects of transport lead to an economic growth which is not totally decoupled from carbon emissions.

In fact unless carbon emissions reach a plateau in spite of economic growth, we are nowhere near resolving the problem. Do you not think that most governments legislate and control personal transport only because it is economically suited for them when all their other economic activities keep increasing their carbon emissions and nowhere match the efficiency gains displayed by new vehicles in the past decade?

Jose Bravo

- A. You make good points but I could not tell you why governments legislate the way they do.....

Anonymous

- Q. Hello. Do you think gasoline engines efficiency can be improved? Or do you think diesel consumption will be growing in Europe? Thanks a lot, Eduard.

Dr. Selda Gonsel

- A. Hi Eduard, yes, absolutely they can be improved. Internal combustion engines have been around for over a century, but there is still room for improvement through advanced engine controls, emission controls, lighter weight materials and more fuel efficient lubricant/fuel products. Diesels are more efficient than gasoline engines and new advances in diesel technologies and fuels are making these vehicles even more attractive.

Panos

- Q. How far away (time-wise) are we from really revolutionary biofuels (ex Algae production for example)? And how competitive do we expect these technologies to be?

Jose Bravo

- A. We are, in my opinion, at least 10 years away from algae to fuels commercial implementation. These technologies will have to be competitive to flourish, by necessity. It will take this long to make them competitive

Introductory Questions

- Q. How can we all help reduce vehicle emissions in emerging markets?

Nick Allen

- A. An important question.

The number of vehicles on the road could increase from 900 million to more than two billion by 2050. Developing countries in particular are expected to experience sharp rises in vehicle numbers as their economic development continues. When it comes to reducing these emissions there is no “silver bullet” option that will deliver sustainable mobility over the coming decades. Instead, we expect to see a more diverse range of fuel and vehicle options, with the preferred set of options varying by market. All options will be needed and all will have a place in addressing the challenge of sustainable mobility. For example, liquid fuels, including fossil fuels, will continue to play an important role, but we also expect to see an increase in the use of other options such as electricity and hydrogen.

Addressing this challenge globally will require cooperation, communication and collaboration. Governments, industry and consumers alike will all play a role.

Amir

Q. What is Shell doing to be a part of the sustainable mobility solutions?

Niel Golightly

A. Hi Amir,

Great question. Mobility is a big part of our business. Fuel, lubricants, bitumen, even plastics have a role to play. So part of our role is making these products as efficient and sustainable as we can. That's why you see us developing and offering fuel efficient petrol and diesel, for example, and more efficient lubricants, and even asphalt for roads that use less energy to produce and use. It's also why we're involved in biofuels and other alternatives.

But we also think there is a role for us to play in helping governments create policies to encourage more sustainable mobility. And we think there is an important role for us to play in helping customers use our products more sustainably and efficiently.

Hope that helps.

Panos

Q. Besides electrical vehicles, F-cells, biofuels etc is there something that can be done today/tomorrow to make the fuel we consume more environmentally friendly (lower CO2 emitting perhaps?)

Jose Bravo

A. Oh yes, reduce the weight. Another one is replace coal fired electricity with natural gas fired electricity. A further move to diesel is another way.

Panos

Q. What is the latest thinking regarding and around Fuel Cells? How does Shell think about them?

Andrew Harrison

A. Thanks for the question Panos

Fuel cell for hydrogen powered vehicles have overcome many of the technical issues and are now much more robust. The challenge is to get them to be economically competitive - I suspect that this will take quite some time. Obviously the take up of fuel cell vehicles is dependent of the development of a hydrogen supply infrastructure - preferably renewable hydrogen.

Shell is involved in a number of partnerships in this area but we still see this as a longer term option.

abhi0syal

Q. what do you think will be the fuel for the cars that would be able to fly?

Jose Bravo

A. I think you mean airplanes right. Airplanes will be the ones needing very high energy density liquid fuels.

Anonymous

Q. Is the Shell/Qatar plant scalable so that this advance can take advantage of other smaller finds?

Jose Bravo

A. It is. The economics are dependent on scale, but the feedstock price and availability and the products connection to the customer also play a role. We have experience operating a much smaller plant in Bintulu.

Introductory Questions

Q. What can be done to ensure vehicles built today are still efficient in 2020 and beyond?

Andrew Harrison

A. Engine efficiency relies on maintaining engines as close to new condition as possible so using high quality fuels and lubricants that keep engines clean and free from wear is extreme important.

Anonymous

Q. Why is there such a focus on the sustainability of biofuels, when the current paradigm is clearly not, and when the cost of production will inevitably weed out the less efficient routes?

Jose Bravo

A. Biofuels offer great promise and the expectations are high. The sustainability question is one that needs to be always at the forefront. They do have a chance to become competitive under the right conditions

inspector gadget

Q. Is shell aware of innovations in small wind turbines, that can be situated on top of your house to charge an electric car ? check out www.ettridgewindturbine.com

Jose Bravo

A. Oh yeah. We are. Very elegant. Thanks for the link. Do you know what their cost is?

Anonymous

Q. The automobile companies are all now working on part electric/part fossil powerplants. As this is not applicable for aviation – are Shell working with Aviation engine manufacturers to reduce their dependence on fossil fuels?

Nick Allen

A. Good question.

Aviation travel is definitely front of mind at the moment. We believe that action needs to be taken in all transport sectors. With aviation accounting for 2% of global man made CO₂ emissions, the sector clearly has a role to play.

Answering your question directly, yes as with the automobile companies in road transport, we have an active R&D programme with aviation engine manufacturers on fuel and engine developments for the future.

Stepping back, we see the solution to reducing emissions from aviation coming from a combination of efficient operations, engine technology, and alternative fuels, with efficient operations providing the earliest material opportunity.

Farooqi

Q. hydel electricity using high pressure electrolysis of water at outlet exit points of the used water after fall for compressed hyderogen and its storage in cylinders for automobile use could save electricity transmission losses and be environmentally friendly. besides being sustainable

Jose Bravo

A. Sorry, what is hydel electricity?

Eric Holthusen

Q. Looking at gas a transport fuel, will CNG or GTL be the preferred option from emission and CO₂ aspect.

Jose Bravo

A. Eric, The heat content of CHG and say diesel from GTL is vastly different. I have not compared the energy balance but I suspect it may be close. I will check into it.

Anonymous

Q. how to you see the role of transport, especially heavy duty transport. do we need here new technology ?

Dr. Selda Gonsel

A. In heavy duty transport, I believe there is room for improvement, particularly with respect to engine efficiency and fuel economy. One solution we have recently offered to our customers in the road transport sector is "FuelSave Partner". This is a new fuel management solution that can save up to 10% on fuel consumption, whilst also reducing CO₂ emissions. It combines an onboard telematics unit, which provides customers with data about their vehicle, engine and fuel use, thus helping them to cut their fuel consumption.

abhi0syal

- Q. doesn't biofuel have this problem: to grow crops you need to replace either the forest cover which means cutting on biodiversity, and introducing monocultures, or replace agricultural crops? how do you strategize to increase biofuels and prevent from increasing food shortages or ecological collapse?

Niel Golightly

- A. Hi, you've put your finger precisely on the most important challenge around biofuels. I'm convinced that biofuels can be one of the most effective, short term ways of reducing the CO₂ content of fuels. But only if we're careful about what feedstocks we use, where they are grown, and how they are produced. We are part of a number of multi-lateral, international groups (or round tables) that are developing and agreeing standards necessary to ensure that, in fact, production of biofuels does NOT lead to deforestation, to soil and water degradation, to pressure on food production, and to stresses on social fabric. Across all of these criteria, we've introduced strict performance standards for our suppliers, we have implemented clear guidelines for our own participation in biofuels production, and we're working with governments to encourage high standards of sustainability and CO₂ performance in the growing biofuels market.

By the way, we also see biofuels production in some parts of the world as a way to strengthen local economies, connect them to global markets, and make better use of otherwise idle land. So there is opportunity here, as well as challenges.

Of course, we're also aggressively researching and developing future biofuels that further minimize the risks you've identified.

Thanks for the question.

Anonymous

- Q. Diesel engines are a popular motor used in vehicles, because of their economy, but in the seventies and eighties were going to be banned due to the nitric oxide making the ozone layer larger. Again the short term fix wins out against the planet's long term survival. what do you say to the nitric oxide or nitrogen monoxide gas created and the long term effect on the ozone layer, the ozone holes are increasing.

Andrew Harrison

- A. Thanks for your question. You are right that particulates and nitrogen oxides (NO_x) are the key challenges of compression ignition (diesel) engines. Technology has a fantastic track record of dealing with the local emissions issues and this is no exception. Particulates have been dealt with by particulate traps and NO_x is being addressed by advanced engine control as well as by new exhaust gas treatment such as selective catalytic reduction. Cleaner high quality diesel fuels have enabled the introduction of these technologies.

Prof. Krumdieck

Q. There are 900 million vehicles now. That means that maybe 1/5 people on the planet use a car. So far this discussion has been totally focused on "10 years in the future" maybe-technologies to keep North Americans and Europeans driving like they are now because there will be some answer in the future for their unsustainable transport system. After the next 10 years pass and there are 50 fuel cell cars in California, then what? Will the Shell discussion about sustainable transport change from biofuels and electric and hydrogen?

Jose Bravo

A. The discussion in Shell about sustainability always includes efficiency and focuses on global as well as regional issues. It also includes the concept of less carbon intensive sources (natural gas) and the fact that the solution needs to be based on diversity of supply.

LS

Q. Is urban waste being considered as an alternative fuel for cars?

Jose Bravo

A. The conversion of waste to fuels is being explored in many ways. From bio waste, to discarded oils, etc. It can be a component and the trick will be to make it economic at scale. But indeed there is energy to be recovered.

K. Gerber

- Q. Most of the improvements suggested for sustainable transport are technological. What about personal behaviours e.g. one car per family, car pooling, use of public transport, etc. This would require policy changes by governments. What is Shell doing about this?

Nick Allen

- A. K - an enlightened question.

We see the solution to sustainable transport being a combination of smart products, smart infrastructure and smart usage, or as you call it - personal behaviours.

Customer usage has been an area we have focussed on for many years. In 2004 we launched a global programme to educate our customers on fuel saving driving tips. Building on this, in 2007 we partnered with 10 companies around the world to demonstrate the best fuel and fuel efficient driving techniques, and then in 2009 more than 150,000 people participated in an on line tutorial programme to help them learn how to drive more efficiently.

Looking forward we have an active programme to learn more about additional ways to help customers save fuel through how they drive, and as you identify, a number of these solutions would be enhanced by government incentives.

Anonymous

- Q. Why so much focus on electric cars - in my country 61% of the liquid fuel consumption is NOT in cars and light vehicles - clearly they help but where is the solution to jet fuel and heavy transport fuels?

Dr. Selda Günsel

- A. We believe that there is no single solution for meeting the energy challenge, and a diverse set of fuels and vehicle technologies will be needed. The preferred set of options will vary by market. Electric cars offer the potential to reduce CO₂ emissions significantly, so they are considered as an important long term option, provided that we can reduce CO₂ emissions from power generation, and improve battery range. In the area of jet fuel, we have demonstrated the viability of clean fuels such as GTL jet fuel. In the marine sector, we are drawing on our experience from heavy duty road transport to reduce emissions.

Anonymous

- Q. Since transport is the theme of this webchat, what role do you see for Shell or other petroleum-based companies in local or intercity mass transit (other than aviation previously discussed). I am a petroleum geologist, so I realize how fine the resources are.
Thanks

Jose Bravo

- A. As suppliers of energy for the population, Shell will endeavour to supply sustainable fuels to transit systems and will support and advocate for gains in efficiency and of such systems.

Anonymous

- Q. The price of the Ettridge Wind Turbine will be about half the cost of an equivalent size propeller wind turbine, as there is no tower, on high tech propeller, no gearbox. Negotiations are under way to get them into production.

Jose Bravo

- A. Thanks, I see them as a serious part of the mix, especially if they can be coupled with extended range electrical vehicles.

LS

- Q. Will Shell become involved in fuel discounts to encourage car pooling?

Nick Allen

- A. Thanks LS.
In every country where we operate we strive to provide a consistent supply of competitively priced fuel and help our customers get the most out of every drop. In many of these countries we operate fuel card programmes that provide discounts for customers, both individual customers and fleet customers. Separately we also have an active programme to help customers use less energy so they emit less CO₂ through driver education programmes, and look for new ways to be more efficient.

Shahnas

- Q. A more fundamental issue would actually be introducing large mass transport solutions in developing countries like India so that there is a reduced use of personal vehicles. Do you see any role for Oil/Energy majors in this - at a policy level

Niel Golightly

- A. Hello Shahnas,

You're spot on. We cannot assume that the only answer to the mobility challenge is more cars, more roads and more fuel.

Much of the cutting edge thinking on mobility is taking a systems approach - for example, looking at how cities are designed, how traffic is managed, how people can work virtually, even about creating more rewarding, locally-based lifestyles. And of course mass transit - affordable, convenient, and powered sustainably - must be part of the picture.

Anonymous

- Q. What about Marine fuels - anything happening there other than lo sulphur versions of regular heavy oil products?

Dr. Selda Gonsel

- A. There is a lot happening in marine fuels, with particular focus on reducing the emissions of sulphur and nitrogen oxides. Various technology options are being considered, including on-board scrubber technologies, which remove sulphur oxides from emissions. Technologies such as Exhaust Gas Recirculation and Selective Catalytic Reduction, first developed for road transport, are likely to be incorporated in marine applications.

Anonymous

- Q. Hello. Do you think that petroleum fuels will remain as the main transport fuel for a long time? Do you also think that Europe should use more gasoline and reduce dependence on imported diesel from Russia?

Dr. Selda Gonsel

- A. We believe that petroleum fuels will play a significant role in the foreseeable future, as internal combustion engines will be the primary power source for many years to come. Significant improvements in energy efficiency and the emissions characteristics of internal combustion engines are still possible through advances in engine designs, materials, energy efficient fuels, lubes and advanced engine controls.

Prof. Krumdieck

Q. I work with city and regional councils on 50-100 year plans. I help them to plan for continuously reducing fuel demand. We are a remote country where Shell has just sold out of it's retail operations. The average car here is 10 years old. We will never be in the market for hydrogen or electric cars. For us, more sustainable transport is clearly about reorganising our urban areas and investing in infrastructure that continuously facilitates access to activities and markets while reducing fuel demand. Please talk about what a big oil company is doing to plan for reduced demand for its main product.

Jose Bravo

A. Prof Krumdieck, Shell believes that at the global level, the energy demand will continue to increase mainly because of the population and development growth in the East. Coupled with we see that the energy sources available (fossil and non fossil) are increasingly difficult to access and exploit. We also see that the environmental stewardship is a requirement. In this context we need to be prepared to fulfil these three conditions with technology and responsibility. The products we make will need to be competitive in this environment.

You may be right, and in some areas we may see a decrease in demand, but that will be local market phenomena that we would adjust for.

Amir

Q. Will Shell be involved in producing biofuels in the future? And if so, what is the preference for gasoline and diesel substitute?

Andrew Harrison

A. Amir - good question. We are doing a lot of research into the development of new advanced biofuels for the future. We are looking at a range of processes for producing gasoline and diesel replacements from a variety of feedstocks. The biggest challenge is to produce diesel biofuels because it is more difficult to produce molecules that have the right carbon chain length from biofeedstocks.

inspector gadget

- Q. I am the inventor of the orbital engine, the wet sump two stroke engine and the Gemini Electric Motor & Generator. You are right to say innovation will answer the problems of powering the next generation, but financing innovation has been a real problem in the last couple of years. Has Shell considered offering a meaningful prize, more than one million dollars for the inventor who can offer a solution ?

Jose Bravo

- A. Inspector. We have a system called Shell Gamechanger that is designed to fund innovative solutions inside and outside of Shell. Email me after the webchat at **j.bravo@shell.com** and I can put you in touch with them. Competitions present are mostly local and not at the prize level you mention. But your idea is a good one.

Anonymous

- Q. Which biofuels /feedstock do you feel have the most long term potential?

Andrew Harrison

- A. Thanks for your question - I'm afraid that there is no simple answer because much of the R& D on advanced biofuels is at a very early stage. In the short to medium term ethanol from sugarcane has great potential due to its ease of manufacturing and ability to deliver very high well-to-wheel greenhouse gas reductions. In the longer term, cellulosic material (e.g. straw and woodwaste) is a very attractive feedstock as is marine algae. We are active in developing processes for biofuel development from each of these feedstocks but it is too early to say which will be the winner.

Prof. Krumdieck

- Q. Have there been any ideas at Shell about becoming transportation providers rather than commodity fuel providers? Consider this scenario: Shell invests in property development along transport corridors, train vehicles and infrastructure, mixed use, high density developments at rail stations, and bus networks. Then Shell increases the price to the "competition" (e.g. private car users) driving the demand toward the Shell transportation system. Shell could then stretch out the oil supply over several hundred years and provide the transportation needed to keep economic activity going rather than allowing the rush to flush the one-time endowment of fossil oil through personal vehicles. Plan to sell tickets not gallons. You don't have to wait 10 years for that technology!

Jose Bravo

- A. Very creative!!!! I will pass it on to our strategy people. We are not experts at this though.....But your idea is a fine one. Thanks.

Anonymous

- Q. Beyond road transport, there was some news of Shell successfully fuelling aircraft with gas rather than Jet A1. Any idea where that will go and what the impact of that could be in terms of sustainable transport?

Dr. Selda Günsel

- A. Yes, we are actively working on expanding our aviation product offerings. In the area of aviation gas, our focus is on the development of unleaded options.

Inspector Gadget

- Q. With the world's population set to increase dramatically, does Shell see an ethical problem with using biofuels?

Niel Golightly

- A. Dear Inspector Gadget,
Ethical "problem," no. But there is clearly an ethical "challenge." Biofuels, done right, represent one of the best ways today to help reduce the CO₂ content of the world's fuel supply. But doing it right means taking great care with the choice of feedstock, the method of production, the management of supply chains, and the development of government policies that ensure that biofuels - by solving one problem - do not create a host of others.
Shell advocates vigorously for the high standards of sustainability and CO₂ performance to ensure that biofuels can, in fact, play a meaningful and responsible role in fuels markets.
Can I also suggest that a similar ethical challenge is ensuring that the world's growing population you rightly refer to has enough energy. Energy does not just power cars and living standards in the developed world - it is also literally the lifeblood of people in the developing world. Clean, affordable energy is vital to cooking food, lighting homes, creating economic opportunity, connecting people with markets, providing access to education, and on and on.
Providing that energy efficiently, sustainably, affordably, securely is a challenge of global proportions. It's one we certainly take seriously here.
Hope that helps.

Anonymous

Q. In addition to technological improvements and Governmental initiatives, what are the other key drivers in your opinion that can accelerate the shift towards cleaner vehicles

Niel Golightly

A. Hi,

We have to sign off in just a few seconds, but let me offer a short answer, and that is efficiency. The cleanest barrel of oil is the one that is not used, and we're very active in developing products, services and techniques for helping customers - both individual consumers and big industrial customers - use less energy. I think the bottom line is that getting the most out of every drop of energy -- using it as a precious resource - is the biggest opportunity for more sustainability mobility.

Richard Niven

Q. Are you seeing a convergence in any of the approaches adopted internationally, or is it still very diverse eg CNG in Argentina, Ethanol in Brazil and the USA etc.

Nick Allen

A. Richard, a good question and one that occupies the minds of many right now. The simple answer is that we see the future as a mosaic of solutions, depending upon the energy demands, the available supply options, and their policy preferences of each country. This will lead to a mix of solutions for each country - between biofuels, liquid hydro carbons, gas and ultimately fuel cells and electric vehicles.

Going back to your question, whilst the world won't converge to a single set of solutions, I expect you will see convergence amongst countries that have similar characteristics.

inspector gadget

Q. has shell got the technology to help out BP with its gulf crisis? or is Shell just lucky this time? What pollution methods are in place to prevent it happening again?

Jose Bravo

A. Thanks for your question. It is really not within the topic of this webchat but I would like to offer you an answer.

Shell Oil Company continues to monitor the oil spill response following Transocean's Deepwater Horizon incident. According to the US Coast Guard, the cause of the incident is unknown. We're confident that the incident will be thoroughly investigated and findings will be communicated across the industry to prevent such events from occurring in the future.

The Gulf of Mexico has not experienced an incident of this magnitude in many decades of offshore drilling and production, and our thoughts continue to be with those affected by this tragic event.

We are closely monitoring the response of this incident and the movement of the oil spill itself, and neither our Upstream or Downstream operations have been impacted to date. Our Na Kika pipeline was briefly shut-in following the start of the incident on April 20, but it has returned to production. Safety is, has been, and forever will be our number one priority. It is our core value. Shell has never had a significant offshore well incident or platform spill in the Gulf of Mexico related to its exploration and production business.

Anonymous

Q. There seems to be an assumption that biofuels leads to de-forestation, which is not necessarily the case. If biofuels are made from ligno-cellulosic material then we should get more forests to provide the feedstock. What is shells view on wood to fuel (eg Choren)?

Andrew Harrison

A. You are right that it is possible to produce biofuel feedstocks in a sustainable way and this is one of the key challenges associated with the production of biofuels. Wood waste is a good example of using a waste material for biofuel production. Producing fuels from lignocelluloses can be done in several ways and we are active in researching a number of alternatives - it isn't yet clear which will be the most energy and cost efficient of these routes.

warren

Q. Would you be able to tell us what's the latest developments in terms of efficiency gains - improvements in CAFE standards, lowering CO₂ emissions per km travelled etc? How do countries stack up on this, say Europe compared to US, China, and India?

Dr. Selda Gonsel

A. Hi Warren. There is a lot of activity in this space. In the US, government agencies such as Environmental Protection Agency and National Highway Traffic Safety Administration have proposed harmonized greenhouse gas and fuel economy standards for passenger cars. For example by 2016, car models will need to achieve a CO₂ emission level of 250g/mile, and a Corporate Average Fuel Economy standard of 34.1 mpg. In Europe, the European Union has proposed a target of 120 g/km fleet average for new cars by 2012, which would be a significant advance on current standards.

Dr. Selda Gonsel

Thank you all for your many interesting questions. We have tried to answer as many questions as possible, but there were a lot, so we are sorry if we didn't get to yours within the session.

Dr. Selda Gonsel

We will be holding a second session this afternoon at 15.00 GMT and look forward to receiving more questions then. Thanks everyone for taking part!