When it comes to industry advancements, one of the biggest misconceptions is that breakthroughs - technological or otherwise - will arrive all at once, having an overnight impact on the way a sector operates. We are so often looking ahead to the future innovations that promise to transform business in the long-term, that we sometimes overlook the gradually emerging and improving technologies that can be implemented now, for an immediate impact on day-to-day operations.

As such, the real secret to leveraging technology is to conduct regular checks on your business to identify where available technology can be effectively integrated in a fit-for-purpose manner. Just like technology itself, it is this well-planned, incremental progress that will help lead to significant improvements for your business and the industry as a whole.

As this bulletin explores, the fuel that powers your fleet can play an increasingly significant role in this calculation, especially as we move toward the consideration of a new energy mix, as outlined in our opening piece. Supplemented by the appropriate technologies and industry insights, your energy choice - if made effectively - can help to elevate business through efficiency gains, emission reductions, or greater control over the fundamental Total Cost of Ownership (TCO).

However, an underlying commonality exists between each article; the need to balance a forward-thinking perspective on tomorrow’s advancements with a pragmatic approach to implementing existing technologies, today. With the energy landscape evolving, this dual approach will not only help to future-proof your business but will also work to benefit operations in the more immediate future.

But, navigating toward this future will take more than simply choosing the correct products, be that fuel or digital technologies. Engaging with strategic industry partners will be equally as important. This is why, at Shell Commercial Fuels, we view our role as more than a fuels supplier. Rather, we aspire to be a collaborative partner to our customers. A partner who is keen on continually forging a path toward a better and more sustainable future, for individuals and businesses alike.

I hope you will enjoy reading the following articles as much as we enjoyed creating them and that they are able to provide you with an effective roadmap for future success.
A NEW WORLD, A NEW ENERGY MIX

Energy lights, heats and cools homes and businesses. It enables opportunities for a growing population seeking to improve their quality of life.

Energy use goes hand-in-hand with economic activity: it transports and connects people and goods. It powers industrial processes that create the world’s infrastructure and material footprint.

A NEW ENERGY SYSTEM

But businesses face a dual challenge: how to stay competitive and produce more output, whilst using less resources and making a transition to a low-carbon energy future. This is an ambition that requires a change in the way energy is produced, distributed and used, while drastically cutting emissions.

Many industries are emission intense and play a key role in the decarbonisation journey. For example, transport accounts for 36% of global final energy use and one in seven of global energy-related CO₂ emissions, while buildings and construction together account for 36% of global final energy use [1]. This means that a range of different fuels, vehicle and equipment technologies are required to meet this growing demand while reducing emissions [2].

Capital investments are required to achieve most of the decarbonisation potential, but certain measures, such as the adoption of renewables, electrification, and operational efficiency, are economical today for many mines [4].

A NEW ENERGY MIX

We have been part of the development of the mobility sector for well over a century, helping fuel the essential journeys people make every day — to do business or to see family and friends. Today, there are significant changes taking place in the sector: at different paces in different countries. To succeed, we now must deliver what customers need both now and in the future. This means providing more efficient fuels and lubricants, and lower-carbon alternatives. It means taking advantage of opportunities in areas like digital technology, and recognising that regulations are working quickly.

BETTER EXISTING FUELS AND LUBRICANTS

We’re working hard to make products from today’s technology as good as they can possibly be — more efficient and reliable. Demand for liquid fuels, such as petrol and diesel, is projected to grow globally in the next two decades as the number of vehicles increases [3].

Over time, most vehicles will continue to be powered by internal combustion engines and as such, we are working to help improve the efficiency of these engines by optimizing the use of these traditional fuels. This is demonstrated by our initiatives and added value fuels — such as Shell FuelSave Diesel — that are specially designed to enhance engine performance by not only helping to prevent build-up of carbon deposits, but also by actively cleaning them up.

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INFRASTRUCTURE IS KEY

To drive widespread adoption, the development of new fuels must be backed up by the necessary fuelling infrastructure. After all, just as with the passenger car sector, there’s little point in encouraging vehicle fleet operators to convert to LNG if they can’t get access to the necessary fuelling stations.

And, we are investing in developing engine oils that can thrive in the harsher, more extreme operating conditions of modern-day truck engines. Like the Shell Rimula R6 series, these are specially formulated for vehicles running on natural gas, as well as Shell Rimula R6 LME Plus, a truly global heavy duty engine oil designed to comply with the latest ambitious industry specifications in many countries.

In addition, RedStar — a joint venture of Shell and Shaanxi Yanchang Group Company — opened an LNG retail station in northwest China. China is the largest ING for transport market in the world, with more than 200,000 heavy-duty trucks and buses using LNG.

COLLABORATION, COLLABORATION, COLLABORATION

Yet all the interconnected factors influencing the success of the sector’s transition to a low carbon future, arguably the most important is nothing to do with vehicles or even fuels. It’s about people. Because this is a challenge that affects all of us. One that requires transformation at a scale not seen since the industrial revolution.

Of course, this transformation will look and feel slightly different according to where in the world it’s taking place, not to mention the specific sector involved. But behind it is an inescapable reality: no single government, organisation or industry can do this alone. From the technologies we develop and the energy sources we unlock, to the policies we use to inspire people and businesses to embrace change, only by working together can we build the energy future our world needs while avoiding a climate legacy our planet cannot afford.

3. IEA Energy Technology Perspectives 2019 (https://www.iea.org/publishing/IEA_Reports_and_Pubs/ETP/2019/)
DIITAL TECHNOLOGY - THE DISRUPTION THE CONSTRUCTION INDUSTRY NEEDS

SHELL COMMERCIAL FUELS IN COLLABORATION WITH FRED MILLS, CO-FOUNDER AND DIRECTOR OF THE B1M

The dear, old construction industry has remained the same for a long time now and is becoming increasingly amenable for it to stay as it is. When Fred Mills, co-founder of what is now the world’s most subscribed-to video channel for construction, The B1M, looked to help bring the industry more in line with the disruptive business models around it, such as perception and performance.

The challenge he faced was how to enact such substantial changes in an industry that has traditionally been relatively rigid and slow moving. Over the last 20 years, global construction has grown by only 1% compared to 3.6% in manufacturing industry. In 2018, CO-FOUNDER AND DIRECTOR OF THE B1M, FRED MILLS’ TOP 3 TIPS FOR APPROACHING DIGITAL TECHNOLOGY IN CONSTRUCTION

1. Focus on what these tools and techniques can do for your business.
   - Ask yourself: How can we do this better through digital technology? Read the urge to simply tick the box and move on, back to the business case and decide on a path to investment.

2. Compel people, don't tell people.
   - You need to help people on the ground to understand the benefits these technologies can have on their working lives and on the processes they’re engaged in. Better understanding the operations of your built environment can be very powerful.

3. Don’t be afraid to fail, but fail fast and move on.
   - The traditional construction culture is a reluctance to fail, to totally at odds with the way technology companies work. Take a lesson from them and learn to throw on making mistakes and continuously improving.

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A global Shell study reveals that for every 10 farmers, eight say unreliable equipment has led to avoidable costs and lost profits, while six want to keep their equipment working for as long as possible. Despite the nearly half of all respondents say maintenance is not a priority — until something breaks.

Around 60 per cent of respondents to our study believe maintenance staff on their farms would benefit from additional training, external support and expertise from a trusted supplier. Many feel they lack the time to tackle it themselves because they are under constant pressure to cut costs. Others report having too few maintenance workers, or insufficient information on how to maintain new equipment and keep up with the latest trends.

Clearly then, there’s more farmers could do to get better value for money from their equipment.

Now consider these opportunities in the context of the economic realities farmers around the world are facing today — such as the increasing pressure of competing in a globalised market. The availability of cheaper, imported grain, produce and other staple crops means many farms must find new ways to compete and stay in business.

The key components of a successful maintenance plan include high-performing fuels and lubricants. Research shows how important it is for farmers to have the right equipment immediately, when they need it.

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THE ROAD TO A DATA-DRIVEN FUTURE

WHAT WILL MANAGING THE SMART FLEET OF THE FUTURE BE LIKE?

Did you know:
The benefits of blockchain technologies are not only being felt in the transport industry.

The innovations we’ve seen today are only the start. Tomorrow, we can expect fleets to run using ‘smart contracts’, built on technologies such as Blockchain. Fulling data from telematics, the fleet-management solution will work out in advance what the vehicle’s optimum route should be, and automatically factoring in the weather, fuel costs, and other parameters.

While the driver is on the road, the fleet-management solution will integrate automated negotiations with all the truck stops identified. Based on pre-negotiated bidding information, it will enter into the auction for the services for which the driver and vehicle are qualified.

While the truck is on the move, the system will communicate with other service providers, comparing their prices and dynamically factoring in other variables such as traffic congestion on each route, the distance and the price of fuel at each refuelling station. This information will be used by the automated bidding system to get the best deal on the basis of price and efficiency.

The vehicle will be a connected device

By 2025, experts estimate that big data will help fleet managers drive down costs by around 3%. How will it help and what will the fleet of 2025 look like?

Vehicles will fix themselves

Mechanics will find faults faster

Fleets will do their own paperwork

Brokerages will maximise vehicle utilisation

The vehicle will be a connected device

Up to 200 sensors will be installed to collect fleet data and improve efficiency. This will help in deciding the best route to be taken based on real-time traffic data and fuel prices.

Mechanics will find faults faster

With sensors continually monitoring all systems, for example, technicians will be able to identify where to look for a fault, reducing repair costs between 11% and 13%.

Fleets will do their own paperwork

Fleet management software will cut data entry costs by up to 28%, while complete vehicle information such as service history, registration details and emissions will be available at all times.

Brokerages will maximise vehicle utilisation

At-drawn freight brokerage apps will help keep drivers on the road and vehicles utilised at all times, rather than waiting for the next loads, reducing empty mileage by up to 10%.

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brokerage platforms. Then factor in the ability to use smart contracts to charge fuel to each vendor. All this information will be communicated with the different service providers, which will provide competitive bids, and help optimise fleet utilisation.

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How mining companies are measured is changing. Historically, performance was gauged on resources extracted but the industry’s value proposition may be shifting to how well a company acts on information to optimize production, reduce costs, increase efficiency, and improve safety [1]. Industry 4.0 technologies employed at mine sites will require new skills from people—frontline employees and managers alike—ranging from new and tightly specialized capabilities, especially in software development, data analytics, and Artificial Intelligence (AI). This has potential to drive great value for companies. For example, surveys and drones could enable robotic machines to self-diagnose operating conditions and schedule preemptive maintenance, thus contributing to sales, more productive, more environmentally sensitive mines.

Additionally, embedding vast numbers of sensors is equipment, which will churn out large volumes of data for analysis and communications among machines, is becoming increasingly affordable and accessible. As a result, many companies have already embarked on the Industry 4.0 journey and are producing large amounts of sensor data, potentially enabling them to observe a more accurate and consistent picture of reality [2].

Frontline workers already handle sensor data before equipment breaks down, increasing equipment uptime. Similarly, shift supervisors can pinpoint the location of equipment in real time, improving worker safety. With interactive dashboards, mine managers and supervisors can electronically interact with engineers with greater precision.

“Mining management will need to make concerted efforts to identify people who are comfortable with Industry 4.0 technologies and think through how to reskill and retrain them. Not only can jobs be redesigned to take better advantage of people’s skills, but technology can be redesigned, too, so that it makes almost no training in use.”

Mike Longbottom, Product Application Specialist, Shell says: “Mining management will need to make concerted efforts to identify people who are comfortable with Industry 4.0 technologies and think through how to reskill and retrain them. Not only can jobs be redesigned to take better advantage of people’s skills, but technology can be redesigned, too, so that it makes almost no training in use.”

However, there is a known need to recruit and retain as well as train. Big data and advanced analytics are exciting but make changes that require experience. Shell research found that 69% of staff lack understanding of the technologies and the ability to interpret data [3].

Shell research found that 69% of staff lack understanding of the technologies and the ability to interpret data [3]. This knowledge gap is to be expected, with manual workers needing to learn how to integrate technology into their jobs. In the back office, the convergence of information technology [IT] and operational technology [OT] is driving an emergence of a new kind of professional, one who combines traditional mining and advanced technology skills.

Integral to driving this will be developing expertise in-house or working with trusted partners able to provide the right solutions, be they products, services or advice, when needed. Shell has developed training for many industries that a services—such as transportation, power and manufacturing— INCLUDING MINING, where it has decades of experience. Additionally, high-performing products such as Shell FuelSave Diesel can help businesses to save operating costs and improve their equipment’s performance, therefore maximizing the potential gains from digital technologies. Integral to driving progress will be working with trusted partners able to provide the right solutions.

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1. Deloitte, Tracking the trends 2018 (Mining) page 5
3. This survey, commissioned by Shell lubricants and conducted by research firm Edelman Intelligence, is based on 350 interviews with mining sector staff who purchase, influence the purchase or use lubricants, in seven countries (USA, China, India, Germany, Russia, Indonesia and the UK) face March to April 2018. For more information, please visit www.edelmanintelligence.com
FUTURE FUELS UNDER THE MICROSCOPE

DR WOLFGANG WARNECKE, CHIEF SCIENTIST MOBILITY, SHELL

No matter where in the world your fleet operates, you cannot afford to ignore the energy transition. Most countries now have ambitious plans to reduce greenhouse emissions. The EU, for instance, aims to cut its greenhouse gas emissions by 80% before 2050. The US, by 50% before 2050 and India by 33% before 2030 (1) (2) (3).

Transport is responsible for 29% of global energy consumption, making it a major contributor to greenhouse emissions (4). That means fleet managers and drivers will have to find ways to reduce their use of fossil fuels and cut their greenhouse emissions.

We look at different types of powertrain technology on the market — in particular battery-electric, fuel cell electric vehicles (FCEVs) and liquid natural gas (LNG) and biofuels — and consider the pros and cons of each.

BATTERY-ELECTRIC OR FUEL CELL ELECTRIC VEHICLES

From a haulier’s perspective, electric vehicles (EVs) or fuel cell electric vehicles (FCEVs) are probably the greenest of the three fuel types, with emissions as close as possible to zero — as the fuel is based on renewable electricity.

Electric engines also have one of the highest well-to-wheel (WtW) efficiency ratings — much of the energy in the vehicle’s fuel is actually delivered to the wheels of any fuel type and in the range of 60% compared to around 33-40% for diesel (depending on use cycle and vehicle size (5)).

The range of EV commercial vehicles depends on the battery size. For some bigger vehicles, batteries can be as heavy as up to 15 tonnes (depending on range required) — a significant portion of the potential payload.

In many places, the charging infrastructure for commercial fleets need simply doesn’t exist today. These two factors limit both the local and range of commercial EVs.

For HGVs (vehicles of more than 16 tonnes) — electric battery solutions are simply not there to meet the size, weight and range challenges, particularly given that most of the mileage is for long-distance duty cycle (5).

That doesn’t mean that it’s not worth investing in electric now for short-haul journeys. For instance, the fleet owned by municipal garbage fleets — EVs are already the most energy-efficient option. As battery technology matures, the available range will only get better. And most major markets have committed to switching their power generation to renewables within the near future.

For long haul operations especially, fuel cells fueled with hydrazine are very attractive. They deliver the best range, fast refueling and low down-weight — and are almost emission free (6). The hydrogen required is produced from renewable electricity. The fuel cell works by converting the chemical energy in hydrogen, combined with oxygen, into electricity. The only waste product produced in this process is harmless water vapour.

To get the best environmental impact from this switch, and to prepare yourselves commercially for the future, fleets should consider converting to EVs or FCEVs when they feasibly can, considering practicalities such as energy use for other cases, the range of current EVs, the availability of charging infrastructure, cost and so on.

BIOFUELS AND E-FUELS

Today, plant-based biofuels are mostly used as supplements, added to conventional fuels to help fleets hit their sustainability targets. In Europe, fuel content can legally be up to 7% biofuel. The limit is set to help prevent damage to engines but also to stop competition from fuel producers driving up food prices.

Both the cap and the limited amount of raw material — including crop crops — mean that today’s biofuel will never be more than one of a number of ways to marginally reduce a fleet’s greenhouse gas emissions. But it may change in the future.

Fuel companies are developing the second generation of biofuels. Produced from non-food crops and other sources, these range from hydrogenated vegetable oil (HVO), through to advanced ethanol to advanced bio diesel types of fuel.

These fuels can be produced in far greater quantities than current biofuels, and do not have the same negative environmental impacts. These second-generation biofuels, if we can perfect their production processes, promise abundant, green fuel which we can distribute using existing infrastructure and use in today’s vehicles.

Another possible new energy source is e-fuels. With renewable generated electricity, the fuel manufacture uses the process of electrolysis to produce hydrogen. Next, the manufacturer takes carbon dioxide filtered from the air, and combines it with the hydrogen to generate a liquid fuel. The result is a carbon-neutral fuel — with a similar energy content and consequently a similar range to today’s fuels — which could be used in existing vehicles and distributed through the infrastructure we have today. This sounds like the Holy Grail of alternative fuels. And in time, we hope, it will be. But today it’s still in early development. Current experimental e-fuels only have a well-to-wheel energy efficiency of around 15% (6) (7). The best improve before the fuels can be commercially viable.

LIQUID NATURAL GAS (LNG)

Today, if you want to cut your emissions, the easiest gas-based fuel available is probably compressed natural gas (CNG). It’s readily available, produces less greenhouse gases than most alternatives, and reducing your vehicles to use it is relatively responsive.

In the longer term, liquid natural gas (LNG) is likely to be both more cost-effective and greener in many use cases. LNG has an very high energy density. This lets you store more energy in your tank, which helps increase range.

LNG also has the benefit of being highly efficient at delivering power to the wheels. An LNG engine can deliver 40% more efficiency than a diesel. This compares with the same range as diesel.

But there are complications. Because LNG must be kept at -163°C below zero, both storage and refueling are more difficult that in the case with other fuels. Tanks for LNG must be double-walled, insulated and meet rigorous safety standards in countries or regions such as the EU.

LNG is to become a viable part of the heavy-duty fleet mix in the immediate future and fuel providers will have to invest heavily in infrastructure. They also will have to work together to train drivers on how to handle LNG safely.

References:
Building industry up today's agenda. Rising greenhouse-gas (GHG) emissions responsible for 4 – 7% of worldwide energy use [13]. Between 2018 and 2023, analysts predict that investor demand for green construction will grow by 10.26% each year [4]. Rising investor demand for green construction [2]. Little wonder then, that public and investor demand for green construction projects is growing.

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FUELLING CRT FLEETS TODAY: THE PARAFFINIC PORTFOLIO FOR A CLEANER TOMORROW

SHELL COMMERCIAL FUELS IN COLLABORATION WITH KATRINA MCDONnell, HEAD OF SPECIALTY FUELS AND SERVICES, CERTAS ENERGY AND MOUSA BARAKA, GTL MARKET DEVELOPMENT MANAGER, SHELL

Today, freight transport accounts for 8.8% of all global carbon emissions, a number which is expected to grow further due to a projected tripling in freight demand by 2050 [1]. The International Transport Forum estimates that, by this time, there will be an 11% increase in emissions, resulting in 6.2 billion tonnes of CO2 [2]. Additionally, a study is not very sustainable due to the high fuel consumption across the transport sector, which will account for less than 5% of the market by 2040 – meaning conventional diesel is seemingly in it for the long haul [3].

IHS Markit projects electric vehicles will account for less than 5% of the market by 2040 [4]. If these numbers prove anything, it’s that the transport industry needs to start thinking beyond traditional diesel, no businesses can operate more sustainably. However, this is not a straightforward question to tackle. As a recent global Shell Commercial Fuels survey shows, 82% of commercial road transport businesses are actively becoming more committed to deciding which fuel is best for their business [5].

If metal companies switch to hydrogen and biofuels as energy sources, demand for metallurgical coal will weaken [9].

APPLICATIONS FOR THE PHASED PARAFFINIC FUEL

Because paraffinic fuels can replace conventional diesel without requiring engine or infrastructure changes, they have a wide range of potential applications throughout the transport sector. Their status as a conventional diesel alternative means they are highly suitable for public transport vehicles, where focus on local air quality is constantly increasing. “We’re seeing the greatest uptake in the areas where mobility is currently extremely non-renewable,” McDonnell says. “For GTL fuel in particular, the added-value benefits are especially attractive to transport business running through urban centres.”

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“If GTL fuel in particular, the added-value benefits are especially attractive to transport business running through urban centres.”

“The best way to think of GTL, is as a transition fuel.”

McDonnell acknowledges that GTL fuel is more than an alternative solution for diesel-heavy duty engines. It is a practical real-option for the world of commercial transport where it comes improving air quality, and is indeed – with an increase in OEM acceptance in regards to their vehicle specifications – companies are already wont to reduce local emissions without experiencing any performance or productivity losses. This includes Amsterdam Airport Schiphol, which now runs all of its 4,000 ground vehicles on Shell GTL fuel.

Effective and lasting alternative to conventional diesel, with many companies already using them to reduce their carbon footprint without experiencing reduction in performance or productivity.

Furthermore, companies are not alone on this transitional journey. Working with an energy expert, such as Shell Commercial Fuels, can help fleets find the right solution to their particular circumstance as we all offer clients the technical knowledge and support required to get the best out of the fuel(s) they choose.

For another fuel, for heavy duty truck operators, paraffinic power offers an immediate option today to a more sustainable future. Rather than focusing squarely on fuels of the future, McDonnell concludes, what we should be advocating is the Fuels for now that will forge the ‘fuels of the future’.

3. Shell Global, ‘Shell TCO Phase 2, Mining’, Global Report, Factoring Inking 42, 2018
4. Shell Global, ‘Shell TCO Phase 2, Agriculture’, Global Report, Factoring Inking 42, 2018
5. The Fischer-Tropsch involves a collection of catalytic processes that use a combination of oxygen and hydrogen to convert carbon monoxide and carbon dioxide into long-chain hydrocarbons (waxes, methane, petroleum) with a low environmental footprint. (https://www.sciencedirect.com/topics/engineering/fischer-tropsch).
8. Katrina McDonnell, “the source of the feedstock (waxes, methane, petroleum) is directly available as residual from second generation biofuels, not require additional use of biomass, biofuels as energy sources, demand for metallurgical coal will weaken. (https://www.sciencedirect.com/topics/engineering/substituted-for-petroleum-products).
11. Shell Global, ‘Shell TCO Phase 2, Mining’, Global Report, Factoring Inking 42, 2018
12. Shell Global, ‘Shell TCO Phase 2, Agriculture’, Global Report, Factoring Inking 42, 2018

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WHAT COULD THE ROADS OF THE FUTURE LOOK LIKE?

This piece is contributed by Shell Specialities

From Glow-in-the-Dark Motorway Lanes to Surfaces that Take Harmful Substances Out of the Air, Scientists and Artists Believe Roads Offer an Opportunity for Energy Innovation

For Daan Roosegaarde, it was the frustration of being stuck in traffic on a major dual carriageway in the Netherlands that first sparked curiosity about the role roads could play in harnessing energy. “I was sitting in my car and it hit me,” he says recalling that moment. “Why do we talk about energy efficiency cars and invest billions into their research and development? Yet roads themselves are rarely ever considered.”

The Dutch artist was already known for imaginative projects fusing technology and energy. In 2008, he created a dance floor transforming energy generated from the impact of dancing children to produce electricity. As he listened to the buzz of traffic, he wondered whether roads could play a similar role.

The result was Glowing Lines project, three light-emitting lines painted along a major highway in Oss, southern Netherlands. The 300-metre long lines absorbed light during the day and glowed at night for up to eight hours. “I think anyone who may otherwise have relied upon overhead lighting,” says Roosegaarde. “Energy is everywhere,” he adds.

His team is behind a new bitumen product that will allow new road surfaces to be laid with a reduced impact on air quality. Shell Bitumen FreshAir allows new road surfaces to be laid with a reduced impact on air quality.

Shell Bitumen FreshAir works by directly interacting with chemical compounds in the bitumen as well as odour-releasing molecules.

It can reduce the levels of specific gases such as sulphur dioxide, nitrogen oxides, carbon monoxide and particulate matter, which is a common pollutant, by an average of 40%, compared to conventional bitumen. The product has been tested with road constructors and as quality experts in field trials in France, the Netherlands, Thailand and the UK.

Time will tell how new road technology evolves. For Roosegaarde, the pace of progress and scale of success will depend on imagination and investment. “We need a mindset change,” he says. “We need gypsy people to revel in new ideas.

Shell Bitumen FreshAir allows new road surfaces to be laid with a reduced impact on air quality.

While liquid hydrocarbon fuels are projected to remain the predominant fuel of choice for the next few decades, there is a growing acceptance among many industries that the current fuel matrix needs to evolve. In response to this reality, Shell believes that many of the biofuels available today offer a practical, commercial solution to reducing CO2 emissions in sectors such as transport.

Several types of biofuels exist in today’s market globally, as a first, effective step for many fleets can be the integration of biodiesel to their operations. Biodiesel (or FAME) is a type of diesel fuel that is made from vegetable oil, rather than fossil crude oil. FAME, or ‘fatty acid methyl ester’ - is produced via a chemical transformation of vegetable oils, such as rapeseed, coconut or palm oils into their corresponding fatty acids. While biodiesel can be used in neat form, it is most often used as a blend component up to a level of approximately 5% (ASTM D975) or 7% (EN14214).

The use of biodiesel can bring benefits that align with increasing sustainability initiatives, such as reducing fossil fuel dependency and import bills and increasing local farmer income. There can also be a positive impact on reducing CO2 emissions on a well-to-wheel basis – depending on feedstock and production, when compared with fossil-fuel based diesel. Biodiesel also offers some operational benefits – most noticeably improved fuel stability and higher cetane number – however it does raise other issues around engine performance and lubricant stress levels.

The use of biodiesel can bring benefits that align with increasing sustainability initiatives, such as reducing fossil fuel dependency.

Nevertheless, operational challenges can be regulated by strict quality control of biodiesel specification, proper storage and handling and lubricant solutions specially designed to help heavy-duty fleet operators use fuels with high bio-concentrations.

From a supply chain perspective, the biodiesel brought to the market by Shell is first tested for compliance with relevant specifications to ensure high performance before being checked, for example for density, conductivity and visual appearance at the depot. Furthermore, Shell’s Terminal Operations Standards result in advanced housekeeping and product management practices, ranging from regular water draining and ensuring fuel stability to risk-based sampling and testing. This experience can also be leveraged by industries for smooth operations when using biodiesel.

Shell has over 30 years of involvement in the distribution of biofuels and long-standing experience in how to store, blend and handle biofuels. As bio mandates increase in some countries, Shell is well positioned as a valuable partner in helping customers use biofuels, while finding new and innovative ways of reducing costs and maximising equipment availability.

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Pavenergy is the latest in several solar road projects that have been trialled in the last five years with varying levels of success.

The Road Ahead

Several projects around the world have been exploring whether roads can play a greater role in the production of energy. The company has two pilot programmes underway: one involving buses in the basin city of Toulon and the other with heavy trucks in Sweden.

Shandong Pavenergy has laid solar panels on a reduced impact on air quality.

63,200 square feet of a major highway used by heavy trucks in Sweden.

Pavenergy is the latest in several solar road projects that have been trialled in the last five years with varying levels of success.

The French company Colas, in partnership with the National Solar Energy Institute, previously installed 2,800 square metres of solar panels along a kilometre stretch of road in a village near Toulon, France. But some say solar roads still remain very expensive to implement with relatively small return of energy.

Smart Surfaces

That, of course, could change. Shell’s General Manager of Specialties Technology, John Read, believes the work being done on road technology could “transform the highway into smart surfaces of the future.”

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Energy innovation. Today, for example, there are three million electric cars on the world’s roads. That number is expected to rise to 125 million by 2030, according to industry predictions.

With an ever-increasing global population, there is a similarly rising demand for more energy to help power this growth. As many of the key industries that support the global economy – infrastructure – from transport and construction to mining and agriculture – rely on fuel to perform their day-to-day responsibilities, supplies of conventional energy will continue to be stretched. This is especially true in a society that is being made increasingly aware of the need for the energy to be produced in an economically, environmentally and socially responsible way.

Biodiesel: An energy solution for the future?

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https://www.eia.gov/outlooks/ieo/