

How have Shell changed the way they operate to improve their actions towards a more sustainable planet.

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Stop Pollution! Now That's, A Solution.

'Global warming is the gradual rise in the earth's temperature caused by high levels of carbon dioxide and other gases in the atmosphere.'

No one had ever imagined what damage can be done to our oceans by what we put in it or by what we take out. It seemed years ago, a sea of beauty, but now we are facing a loss of paradise.

No matter where on Earth you live, most of the oxygen in the atmosphere is generated by the sea. The ocean drives climate and weather changes, stabilizes the temperature and shapes Earth's chemistry, providing the home for about 97 percent of life in the world. No water, no life; no blue, no green.

Global climate change has already had visible effects towards our environment. Effects that scientists had predicted in the past would result from global climate change have occurred, continue to occur through this century and will continue beyond into the future. Such effects include; changes in rainfall seasons and patterns, temperatures will continue to rise, hurricanes will become stronger and more intense, more droughts and heat waves, sea level will rise 1-4 feet by 2100 and the Arctic will most likely to become ice-free, affecting the many animal that face extinction that live in these areas, such as; Polar Bears, the Arctic Fox, Beluga Whales, Pacific salmon, Seals and many more.

The constant release of greenhouse gasses into our atmosphere is causing temperatures in places like the Arctic to warm at a rate, or twice, the rest of the world. This then causes the sea levels to rise throughout the world. This results in serious implications for marine mammals that depend on the ice for their survival for animals such as the Polar Bear. By burning the number of fossil fuels, we are making the Arctic waters more acidic and harmful towards zooplankton species which lay at the very base of the Arctic's rich food chain alongside corals and shellfish.



Above. A Map of North America, highlighting the areas affected most by climate change, due to the high demand for the oil reserves that lie beneath the Arctic's waters.

Oil spills have covered the rocks in these vulnerable areas during the Shell oil spill. This oil spills, left fish, birds and marine many mammals killed, that provide food for these larger species. These challenges to help protect these species are even greater in the extreme conditions of the Arctic, where storms occur frequently, non-existent daylight during the winter and any sort of response help or infrastructure is more than 1,000 miles away.

The Arctic's waterway channels are now open for travel and commercial transportation. Ship trafficking in the Bering Strait, the narrow waterway between Alaska and Russia, is likely to double in volume in the coming years. By allowing more ships to transfer within these channels mean a greater risk of; noise disruption, pollution, spills and also the potential chance of cargo and shipwrecks disrupting these waters.

Global warming is an ever-increasing topic for discussion. However, many people respond; 'it's too late', 'I can't change the world', 'it won't affect me in my lifetime' but indeed, it will affect us and

there are things we can do and responsibilities we can take to change the way we behave towards this problem.

There are also larger scale solutions, in which many global companies have anticipated and moving to a greener outcome. Companies such as Umicore, Adidas, Nest Oil, Outotec etc. with the main one, that I wish to concentrate on and explore is Shell. Shell have influenced, adapted and changed the way they perform to create a more sustainable outcome for their company towards the planet, especially global warming and related concerns. Shell prove, how investing in projects and developments can help the future of the world.

Royal Dutch Shell PLC, is a global energy company specialising in the production, refining and marketing of oil and natural gas, distributing worldwide in over 70 countries.

For an insight into how big this company is, within its sector, here are a few facts to help you understand the scale of which this company operates. In 2016, Shell produced 3,668 barrels of oil equivalent per day, used around 9.5 billion litres of biofuels in petrol and diesel, sold over 57.1 million tonnes of natural gases, produced 1,232 gigawatt hours of energy from its wind business and invested \$26.9 billion in projects around the world improving communities, habitats and helping to shape a greater sustainable energy future.

"Sustainability at Shell touches on all areas of their operations. Shell aims to deliver the energy needed for a growing population in a responsible way; respecting people, their safety and the environment. Sustainability is essential to the longevity of our business and our role as a member of our society."

Shell approaches sustainability throughout their company based on three areas that cover what they stand for; Running a safe, efficient, responsible and profitable business, sharing wider benefits where they operate and also to help shape a more sustainable energy future. At Shell, they set annual goals and aspirations, with the 2016/17 challenge as their toughest yet. Shell aimed to achieve an operational spillage amount into the oceans at a volume of 0.7 ('000 tonnes) or below. This meant drastically reducing the hydrocarbons reaching soil or water from accidental spills, explosions and pipeline punctures, which in time, put animals in

these areas at major risk, destroying habitats and contributing majorly to climate change from the gases and pollution emitted from each extraction plant and location.

Shell continued to reduce the number of operational spills significantly from 108 to 2015 down to 72 just a year later, with an average oil spilling pouring 210,000 gallons of oil a day into our oceans. During this journey of improvements within the company, Shell's sustainable progress accounted for 20% of the company's scorecard. This score helps determine the annual bonus levels for their employees depending on this score. This truly shows how committed Shell as a company is, to improve the sustainability approach throughout the company. This score covers the spill volume of any leaks, use of fresh water, energy efficiency spills or hazardous material. These annual scores reflect Shell's Goal Zero ambition, of no leaks and no harm to protect our waters, our safety and most of all the world we live in.

Shell use sanitation improvements and clean water projects, to help protect and preserve our waters and manage its use, in a sustainable way. Shell constantly continue to invest in new technologies to use this much valuable freshwater resource in a more efficient way. It is clear from Shell's ethos and aspirations that as a company they carefully consider the potential environmental impact and how local areas may be affected during the lifetime of a project.



Above, the Kroonborg. The first vessel in the world to sail on GTL fuel. The cleanest-burning hydrocarbon, which contributes to half of Shell's total production. A liquid fuel, Shell promoted, composed of natural gases with fewer emissions than any other conventional fuels for vessels currently available.

Shell design and operate their facilities largely to help reduce their use of fresh water and manage this water use very carefully. In areas where water is scarce, Shell develops water management

plans for their facilities which help local. These strategies highlight any long-term risks to the water and outline measures to minimise the use of fresh water or recommend alternatives to fresh water, such as recycled water, processed sewage water and desalinated water.

An example of Shell implementing these strategies is in the Qatari desert. One of Shells gas to liquids plants, where they clean and reuse industrial processed water. By doing so, this allows them to avoid using the country's scarce natural water resources. Another case study of these freshwater protection strategies is Pulau Bukom. A small island south of Singapore, a country with serious water supply limitations. Here, Shell uses recycled water converted seawater and treated contaminated dirty water for a steam generation process at their plant. This means they rely less on water from mainland Singapore, resulting in freeing up resources for use by the local residents.

Adapting to the climate change around us. The world is continuously adapting to extreme weather events linked to climate change, particularly flooding and water shortages caused by droughts. As the world experiences, more extreme weather conditions linked to climate change, such as floods and water shortages caused by droughts, it is the reliability of governments, businesses and local communities to think seriously about their adaptation strategies towards these events. Adaptation strategies are produced to help reduce the vulnerability of assets, infrastructure, environmental systems and communities to extreme variability in weather due to climate change. Within Shell's company, are worldwide plants with individual operations in a situation that they take towards being more resilient to climate change.

Creating a green infrastructure. A green infrastructure is defined as, "Natural systems used to complement man-made infrastructure, making the overall system more resilient." Within Shell, they constantly look into ways to integrate natural systems into the design of their projects. Shell take into consideration the following green infrastructure values; to reverse the decline in biodiversity, to mitigate and adapt to climate change, to promote sustainable growth and economic development and to support healthy living and well-being.

One example of how Shell has focused towards creating a green infrastructure is in

Louisiana, USA. Where Shell have explored the use of nature-based solutions within the areas where coastal erosion is visible. These systems allowed the stabilisation of embankments near Shells pipelines, prevented shore side erosion and also created a new habitat for water organisms, including aquatic animals and migratory birds.

Climate change and energy transitions. Our lives depend on energy wherever we live. Shell recognise the significance of climate change, along with energy to achieve and maintain a good quality of life. A key role for society and for Shell is to provide as much energy with less carbon dioxide as possible.

Their natural gas business allows governments the option to reduce emissions from electricity, by replacing coal, with wind business with over 1,000 megawatts of capacity. Shell has also invested in the lowest carbon biofuel and continue to explore second-generation biofuels options for future generations to come. Last year, Shell created 'New Energy', a business to explore and invest in opportunities for energy solutions that combine wind and solar power with gas.

There are also ways not only businesses like Shell, but the society can move towards a lower-carbon future. Some of these methods include; switching from coal to natural gas, increasing electrification and the use of renewables, improving energy efficiency. Other options like increasing use of low carbon fuels, redesigning land-use and improving low-carbon infrastructure planning within cities, will all help towards making our planet, a better planet. Producing and using oil and gas can affect the air quality. Shell continue to tackle this issue by developing more efficient transport fuels for consumers, focusing on improving motorists' fuel efficiency. Shell also work to reduce the air pollution from its operations, including limiting emissions of sulphur dioxide, nitrogen oxide and volatile organic compounds. Shell continues to invest more than \$1 billion to produce a wider choice of lower sulphur fuels for ships and heavy vehicles. Shell also produce liquefied natural gas for use as ocean and land transport fuel.



Pictured above, a Polar bear family clinging on to the remains of their ice floe caused by us. Pictured sourced from WWF website.

Biodiversity is under threat all around the world with more than 22,000 species at risk of extinction in 2015, which continue to rise each year. We have already lost 27% of the world's coral reefs. If these destruction rates continue, 60% of the world's reefs will be destroyed in the next 30 years.

Shell is helping to protect the oceans by exploring ways in which we can protect the planet's marine risks. This is shown in the Philippines. A part of the world's most biodiverse marine environment, known as the Coral Triangle. Shell support research programmes to increase the understanding of marine mammals and their behaviour. This will then allow Shell to find ways of avoiding the disruption to animals whilst working in marine environments.

To conclude, climate change will always continue to happen due to the scale it is occurring on. However, I believe it is up to us as individuals to reduce the number of impacts that are affecting these changes. It is encouraging to see companies like Shell who are conscious of sustainability and how they want to make a difference, by the various projects, research and actions in place as discussed in the text above. I also believe that it is now down to the government and company owners to implement rules and regulations that companies must follow, regarding these concerns, that will force companies to act accordingly and will therefore not only benefit the planet but will also save companies, money too. Personally, having done this research paper, I now feel more educated about the issues, factors and consequences regarding climate change and believe that people and companies are not taking the issue as serious as they should. Such small changes like switching to energy-efficient lighting and disposing of rubbish (mainly plastics) correctly would make such a difference in the long run, saving hundreds of marine lives and thousands of pounds in cleaning and sanitation processes. One future change that we can all do is switching to a hybrid car. Using efficient gas-electric engines are cheaper than petroleum cars and can in time cut global warming pollution by 30% or more within 5 years if 25% of the population went for electric cars.

We may not be able to make significant changes in a short time but we can most definitely all contribute to making smaller changes every day that will create a more positive attitude towards this

ever-occurring situation. Finally, I think we should have a single mission; to protect and hand on a greater, greener planet to the next generation.

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