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A CALL TO ACTION

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PRESIDENT'S MESSAGE

A call to action

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A call to action

In the middle of the Pacific Ocean, there is a tiny nation called Tuvalu — an archipelago of nine islands that 11,000 people call home. As is true of many islands in that part of the world, Tuvalu is the picture of paradise, bordered by turquoise ocean and sugary white sand. Seen from above, its largest island — though dotted with close-quartered buildings — is lush with greenery, and the isle is so slender that most properties have stunning views of the Pacific.

The beach-lovers among us may dream of living so intimately with the ocean, but for Tuvalu, the sea's embrace is beginning to suffocate, as sea levels have been slowly rising due to climate change. The impact on the local population has been devastating and is getting progressively worse. Already, the coastlines are receding, and saltwater has seeped into the soils and groundwater reserves. Staple crops like cassava can no longer be grown, and the yield of fruits and vegetables has fallen. Most food must be imported, at a heavy price. Locals are now completely dependent on rainwater, but droughts are increasingly common. With sea levels rising in this region two to three times faster than the global average, some forecasters warn that the entire nation could become uninhabitable within the century. This was a point driven home at COP26, when one of Tuvalu's Ministers delivered his address standing in the ocean.



The very real story of Tuvalu is a cautionary tale for the rest of us who live on small island developing states. Everything that the country is experiencing now could become a reality for the Caribbean in years to come if climate change is not addressed urgently and effectively. In fact, we have already seen previews of the possibilities before us. We have been experiencing intense dry spells and droughts. In the past few years, historic floods have engulfed communities and highways here in Trinidad, swallowing property and agricultural produce. Critical infrastructure has been compromised — just last year, the Manzanilla Mayaro Road on Trinidad's east coast collapsed, when severe flooding undermined the roadway.

The need for action

Without question, we need to give climate change and broader sustainability issues our full attention.

Hearteningly, these are matters that our government and others across the region have acknowledged and are committed to addressing. A considerable share of the responsibility, however, lies with us as citizens. The choices we make on a daily basis in terms of what and how we consume, and how we manage our shared resources, can make a huge difference — for better or for worse.

In this issue of *GASCO News*, we focus heavily on opportunities for action on the sustainability front. As a point of departure, in appreciation of the need for a holistic understanding of the problems we are facing, we explore how climate change is affecting our oceans, and what that means for our planet. The case study of Tuvalu is just a précis of a larger narrative of impact.

From there, we consider the many simple adjustments we as citizens can make to help reduce our environmental footprint and support sustainability goals. Energy efficiency, more mindful use of shared resources, and more responsible consumer behaviours can all add up to big wins.

Our hope, as always, is to spread the message about the reasons for action and the small steps we can take to help bring about positive change.

A handwritten signature in black ink that reads "Mark Loquan".

Mark Loquan
President

IN DEEP WATER – THE CONCERNING IMPACTS OF CLIMATE CHANGE ON OCEANS

Estimated read time:  9 min



KEY TAKEAWAYS

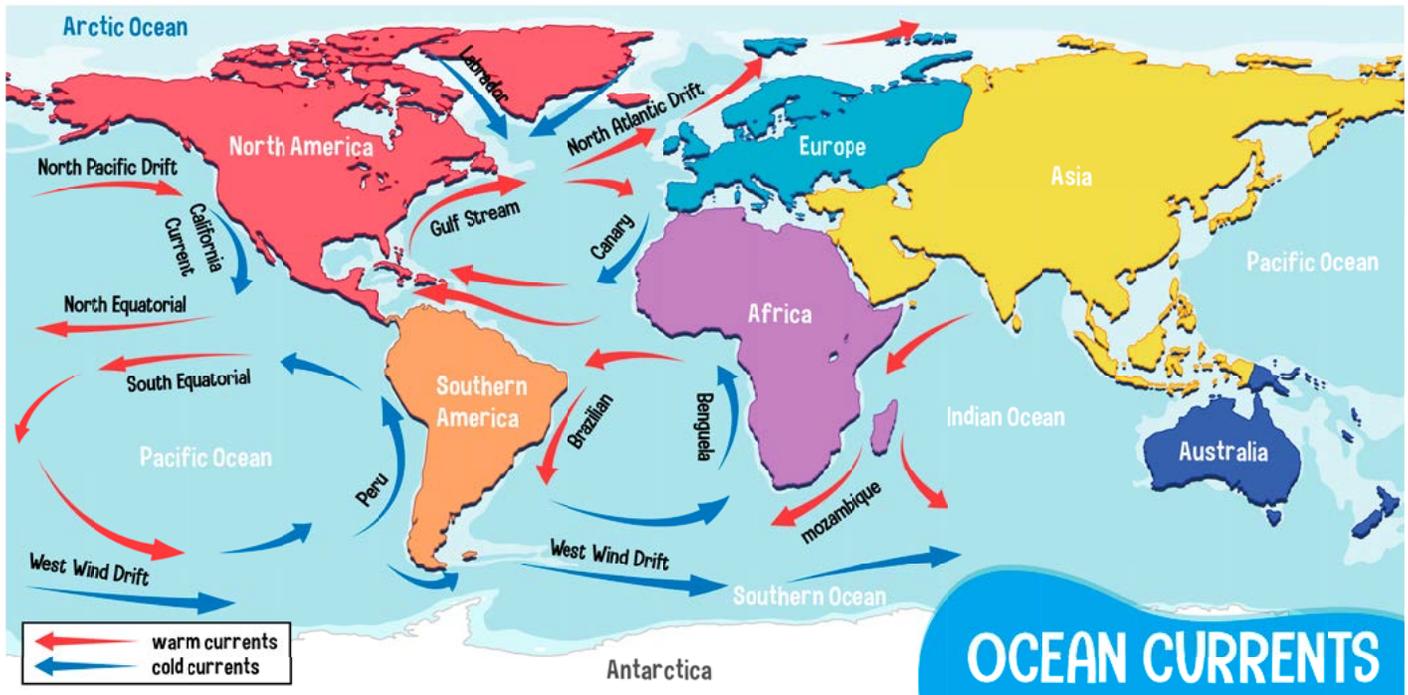
In recent years, global warming has been jeopardising the health and stability of the seas.

The changing climate has been impacting currents, disrupting aquatic habitats, affecting ocean oxygen stores and causing sea level rise.

Addressing the rate of climate change through emissions reduction is imperative, but a degree of adaptation will be equally necessary to ensure resilience.

The picture of our planet as seen from space once prompted author Arthur C. Clarke to declare: “How inappropriate to call this planet ‘Earth’ when it is quite clearly ‘Ocean’.” **More than 70%** of our planet’s surface lies underwater, and life as we know it is inextricably bound to the sea. Oceans are home to complex and diverse ecosystems; they help feed us; they facilitate intercontinental transportation; and they support millions of livelihoods across the globe. They also play an indispensable role in the regulation of climate and weather.





In recent years however, global warming has been jeopardising the health and stability of the seas, with dire implications for aquatic ecosystems and associated industries, coastal communities, and even global weather patterns.

SO, HOW EXACTLY IS CLIMATE CHANGE IMPACTING THE OCEAN, WHAT DOES IT MEAN FOR HUMANITY, AND WHAT CAN WE DO ABOUT IT?

IMPACT ON CURRENTS

Ocean currents are generated by surface winds, gravity, differentials in temperature and salinity. By enabling the lateral movement of water across the ocean and the vertical circulation of water through its depths, currents deliver invaluable services.

The majority of solar radiation that reaches the Earth is absorbed by oceans, with more sunlight hitting tropical latitudes than

the polar regions because of the spherical shape of the planet. The movement of ocean currents mimics a conveyor belt that helps carry heat from the warmer waters near the equator to the temperate regions. Ocean temperatures in turn impact precipitation patterns and shape regional climates. Without this conveyor belt redistributing heat energy around the globe, temperatures would be far more extreme and certain places would be uninhabitable.¹

CONCERNINGLY, IN RECENT YEARS, CLIMATE CHANGE HAS BEEN LINKED TO A WEAKENING OF GLOBAL CURRENTS.

Melting ice and greater precipitation in some regions have dumped more freshwater into the ocean. Usually, the sinking of higher-density cold and salty water near the poles helps power currents, as warmer, 'lighter' water is pulled poleward to take its place. However, climate-driven inflows of freshwater are interfering

with ocean salinity and water density, disrupting the cyclical overturning of water, and slowing currents.



WHAT THIS MEANS IS HEAT ENERGY FROM THE SUN IS NOT BEING AS EFFECTIVELY DISTRIBUTED AROUND THE WORLD, WITH KNOCK-ON EFFECTS ON WEATHER.

The 2015 European heatwave has been linked to an anomalous 'cold blob' – an isolated region in the subpolar North Atlantic that experienced record cold ocean temperatures that year.² Weaker Atlantic currents have also been implicated in projections of drought increases in the Sahel.³

¹<https://oceanexplorer.noaa.gov/facts/climate.html>

²<https://os.copernicus.org/articles/18/953/2022/>

³<https://www.carbonbrief.org/atlantic-conveyor-belt-has-slowed-15-per-cent-since-mid-twentieth-century/>



Little Tobago, Northeast Coast Tobago
Copyright© Underwater Earth, Maritime Ocean Collection

That said, it is hard to forecast with certainty how ocean currents will behave as climate change intensifies, because of the complexity of the system. Precipitation patterns – notoriously difficult to predict – will both influence and be influenced by

currents; plate tectonics can change the surface of the ocean floor and redirect flows; atmospheric warming could decrease the temperature gradients between latitudes and upset the physics behind the conveyor belt.

WHAT IS CLEAR, HOWEVER, IS THAT THE GLOBAL SYSTEM OF CURRENTS IS CHANGING, AND THE EFFECTS WILL BE FELT AROUND THE WORLD.

IMPACT ON OCEAN LIFE

Deoxygenation

The churning of the ocean through the action of currents has another significant function. Gases and nutrients that are vital to marine flora and fauna are circulated from the surface layers of the ocean to deeper strata, and vice versa, through 'downwelling' and 'upwelling' currents. Downwelling is particularly important for moving oxygen dissolved from the atmosphere through to organisms in deeper waters.

Climate change is hampering this process. The ocean is getting warmer in certain regions due to rising atmospheric temperatures. Warmer water can hold less soluble oxygen and is more buoyant, leading to less vertical mixing of shallow and deep water. Both these factors – along with pollution from agricultural runoff and sewage – contribute to deoxygenation of the ocean.

STUDIES HAVE FOUND THAT THE OCEAN HAS LOST **2%** OF ITS OXYGEN INVENTORY FROM 1960 TO 2010, AND THE NUMBER OF LOW-OXYGEN REGIONS IS EXPANDING GLOBALLY.⁴

Increased ocean temperatures also change how quickly organisms metabolise and respire, which increases consumption of marine oxygen.⁵ This means demand is higher and supply is lower.

In coastal waters, climate change is also driving deoxygenation by creating more ideal conditions for the proliferation of algal blooms. Nutrients washed into the ocean from farmlands and human settlements can lead to overgrowth of algae in



In recent years, toxic blooms have been blamed for many dead sea animals washing up on beaches

surface waters, which eventually die and decay, consuming oxygen in the process and suffocating life in lower layers.

In recent years, toxic blooms have been blamed for many dead sea animals washing up on beaches,

and have triggered mass crustacean 'walkouts' – where tonnes of lobsters and crayfish have literally walked out of the sea to escape low oxygen conditions.⁶

The warming of coastal waters is projected to make such algal blooms and marine deaths more common.

⁴<https://www.carbonbrief.org/guest-post-how-global-warming-is-causing-ocean-oxygen-levels-to-fall/>

⁵ibid

⁶<https://www.timeslive.co.za/news/sci-tech/2022-03-04-in-pics-dramatic-images-of-cape-rock-lobster-walkout-after-red-tide-on-west-coast/>

Coral bleaching

Coral reefs are biodiverse ecosystems that are found in tropical and semi-tropical waters. Thousands of aquatic species depend on reefs for shelter, spawning grounds and food.

IN FACT, APPROXIMATELY **25 PERCENT** OF ALL MARINE LIFE, INCLUDING FISH, DEPEND ON CORAL REEFS AT SOME POINT DURING THEIR LIFE CYCLES.⁷

REEFS SUPPORT FISHERIES, ECONOMIES AND FOOD SUPPLY CHAINS IN MANY COUNTRIES, AND AS WE KNOW IN THE CARIBBEAN, THEY ARE LUCRATIVE TOURIST ATTRACTIONS.

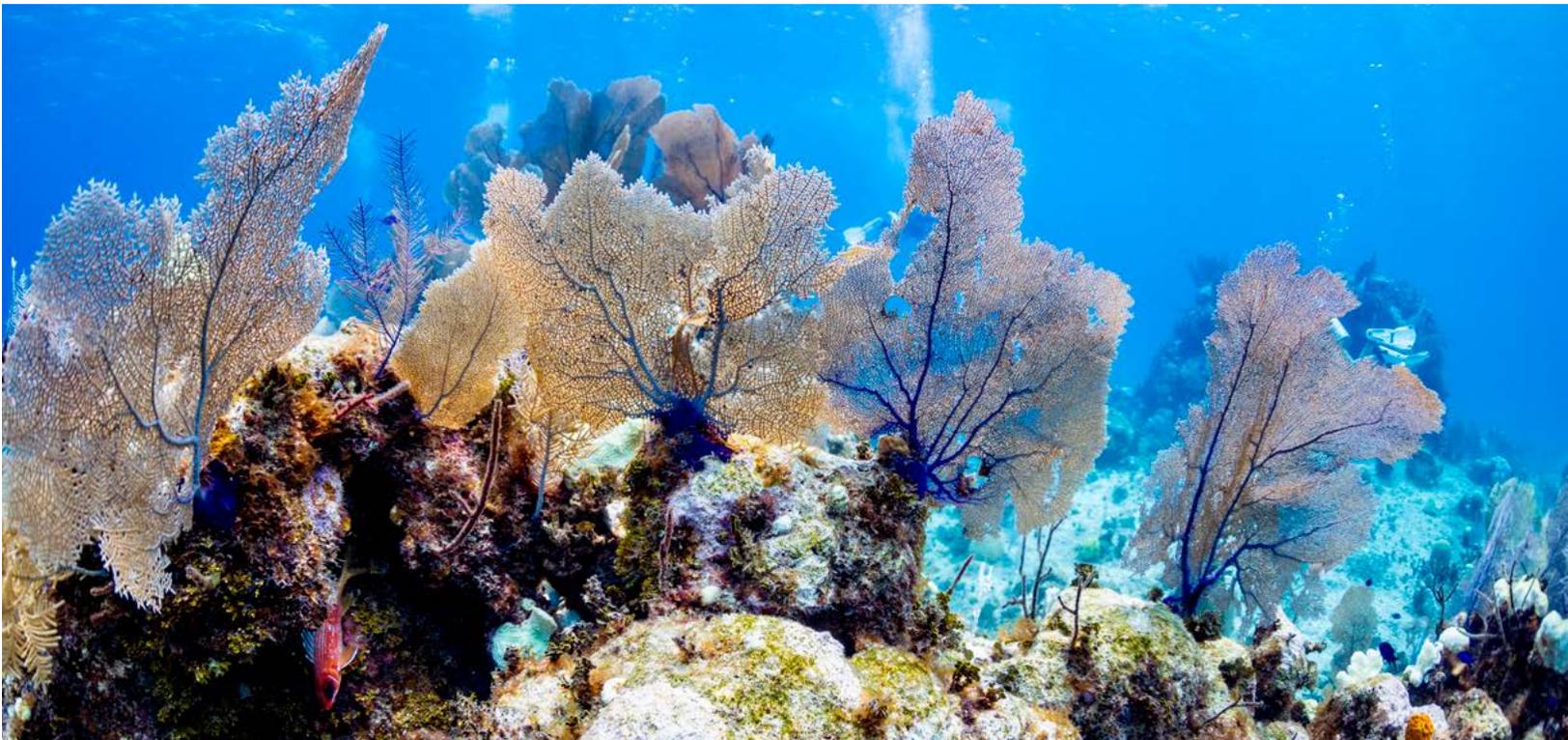


Additionally, reefs serve as natural seawalls, protecting coastal communities from waves and storm surges.⁸

Among the threats facing coral reefs today, climate change is a critical one. Higher ocean temperatures are causing coral bleaching, or the expulsion of the algae that give corals their colour. Bleaching can cause corals to eventually die.

THE UNITED NATIONS ENVIRONMENTAL PROGRAMME REPORTED THAT BETWEEN 2009 AND 2018, THE WORLD LOST ABOUT 14 PER CENT OF THE CORAL ON ITS CORAL REEFS.⁹

The outcome is a cascade of impacts on the species that depend on them. When breeding grounds and habitats are destroyed, fish and crustacean populations are impacted, as are the animals that feed on them. Fisheries deteriorate and fishing industries are affected. Coastal areas become more vulnerable to the ocean. In countries where reefs are tourist draws, bleaching can undercut revenues. These are all imminent risks facing the Caribbean, with the National Oceanic and Atmospheric Administration (NOAA) predicting severe coral bleaching throughout the region from July to October 2023.¹⁰



⁷<https://www.fisheries.noaa.gov/feature-story/how-are-fisheries-and-coral-reefs-connected#:~:text=Overfishing%20Threatens%20Reefs&text=Fish%20need%20healthy%20coral%20reefs,to%20the%20death%20of%20corals>.
⁸<https://www.worldwildlife.org/pages/everything-you-need-to-know-about-coral-bleaching-and-how-we-can-stop-it>
⁹<https://www.unep.org/news-and-stories/press-release/rising-sea-surface-temperatures-driving-loss-14-percent-coral-2009#:~:text=release%20Nature%20Action-,Rising%20sea%20surface%20temperatures%20driving%20the%20loss,percent%20of%20corals%20since%202009&text=Nairobi%2C%205%20October%202021%20%2D%20The,the%20world's%20coral%20since%202009>.
¹⁰<https://newsday.co.tt/2023/07/06/caribbean-coral-reefs-at-high-risk-in-2023/>

Disrupted polar habitats

As in tropical waters, life in polar regions is similarly threatened by global warming. In one tragically ironic example, in late 2022, warmer temperatures led thousands of penguins in the Antarctic to freeze to death.¹¹ The event was linked to the loss of sea ice, which the emperor penguins used as a breeding ground and platform to raise their young. The rapid melting and breakup of a sea ice shelf meant an estimated 10,000 chicks fell into the ocean before they developed the waterproof feathers to swim in the frigid ocean.

AT THE NORTH POLE, LOSS OF SEA ICE HAS AFFECTED SEALS IN THE SAME WAY, AND THE POLAR BEARS THAT RELY ON THEM FOR FOOD SUFFER IN TURN. BESIDES LOSING HUNTING GROUNDS AND EASY PREY WITH THE MELTING OF SEA ICE, BEARS ALSO LOSE 'OVERLAND' TRAVELLING ROUTES, MATING DENS AND REFUGE FOR REST.¹²

Land-based animals aren't the only ones affected by the loss of sea ice. In the Southern Ocean, krill – tiny crustaceans that form the basis of almost every Antarctic food chain

– feed on algae found under the surface of sea ice.¹³ A loss of ice therefore reduces the food source for these creatures.

ACCORDING TO RECENT RESEARCH, KRILL POPULATIONS ARE PROJECTED TO DECLINE BY ABOUT 30% THIS CENTURY DUE TO A COMBINATION OF HUMAN-DRIVEN CLIMATE CHANGE AND NATURAL CLIMATE VARIABILITY.¹⁴

This will put competitive pressure on all species dependent on krill for their own sustenance.



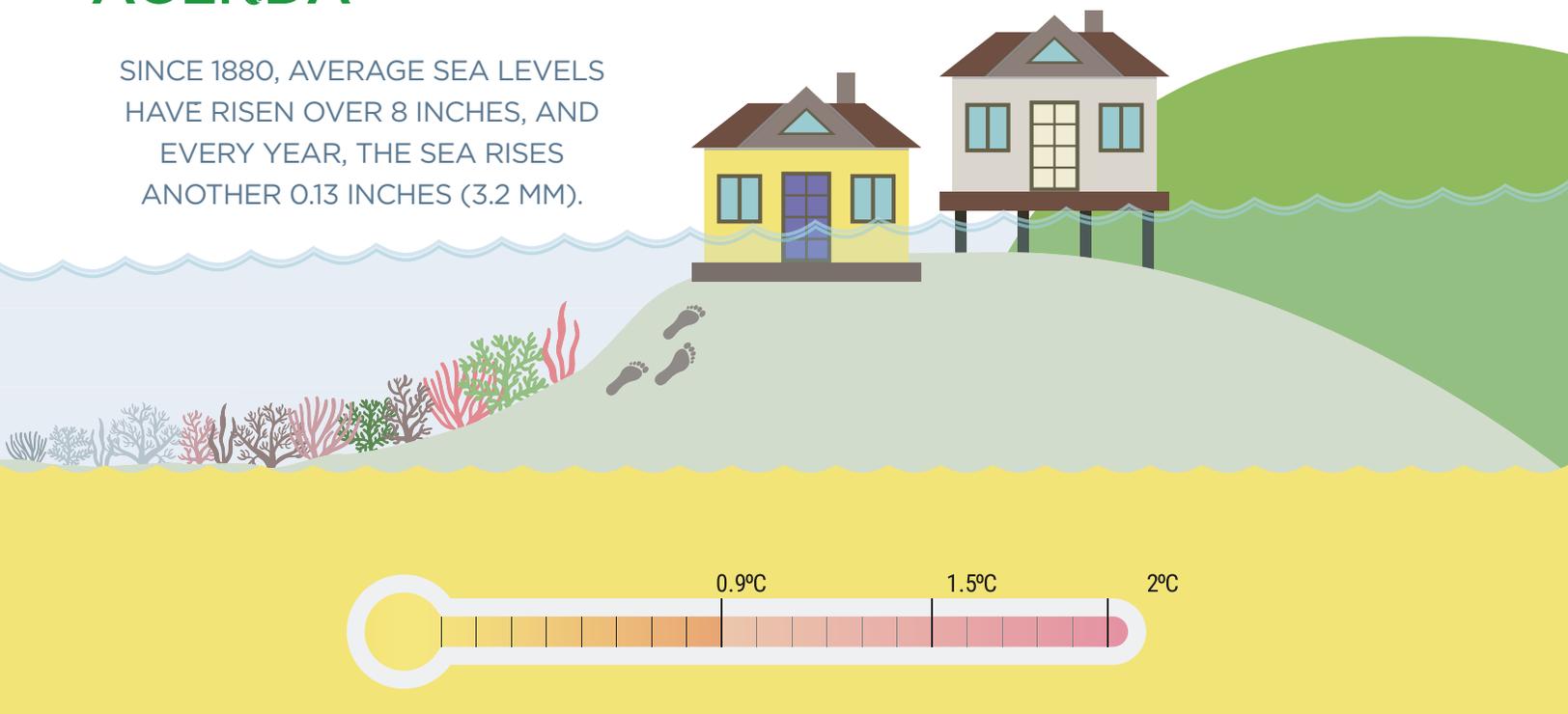
¹¹<https://www.bbc.com/news/science-environment-66492767>

¹²<https://www.worldwildlife.org/pages/polar-bears-and-climate-change>

¹³<https://discoveringantarctica.org.uk/climate-change/impacts-of-climate-change/>

¹⁴<https://www.colorado.edu/today/2021/06/15/human-driven-climate-change-only-half-picture-krill-key-species-southern-ocean>

SINCE 1880, AVERAGE SEA LEVELS HAVE RISEN OVER 8 INCHES, AND EVERY YEAR, THE SEA RISES ANOTHER 0.13 INCHES (3.2 MM).



Impact on sea level

Perhaps the most commonly cited and most easily observed impact of climate change on oceans is the rise in sea levels. According to NASA, “sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers, and the expansion of seawater as it warms.”¹⁵

SINCE 1880, AVERAGE SEA LEVELS HAVE RISEN OVER 8 INCHES, AND EVERY YEAR, THE SEA RISES ANOTHER 0.13 INCHES (3.2 MM). HOWEVER, THE RATE OF RISE IS ACCELERATING, AND RESEARCH PUBLISHED IN FEBRUARY 2022 PROJECTS THAT LEVELS WILL RISE BY A FOOT BY 2050.¹⁶

This is alarming news for the millions of people who live in coastal settlements around the world, and particularly for small island developing states with limited geographical room to escape encroaching seas. In the Caribbean, many nations have built critical infrastructure on reclaimed land, such as at the waterfront and port area of Port of Spain in Trinidad and Tobago.¹⁷ This makes such areas highly vulnerable to rising sea levels, and the concomitant destruction of property, habitats and livelihoods.

Additional impacts include destructive erosion, wetland flooding, and aquifer and agricultural soil contamination with salt. In some territories, services such as Internet access can also be impacted, as communications infrastructure lies in the path of rising seas.¹⁸

Adaptation and mitigation

Given humanity’s dependence on and proximity to the sea, it is clear that climate change impacts on the ocean are a global concern. Addressing the rate of climate change through emissions reduction is of course the most urgent imperative, but a degree of adaptation will be equally necessary to ensure resilience. To protect against sea level rise, proper planning will be vital. Coastal settlements will need to consider appropriate coastal protection, and will need to be equipped with resilient transportation networks, proper drainage and innovative architecture to help with water catchment as well as elevation of homes and buildings above projected water levels.

¹⁵<https://climate.nasa.gov/vital-signs/sea-level/#:~:text=Global%20sea%20levels%20are%20rising,of%20seawater%20as%20it%20warms.>

¹⁶<https://www.nationalgeographic.com/environment/article/sea-level-rise-1>

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In deep water – the concerning impacts of climate change on oceans | CONTINUED



Green infrastructure solutions such as mangroves and other coastal vegetation can help buffer against storm surges and rising tides

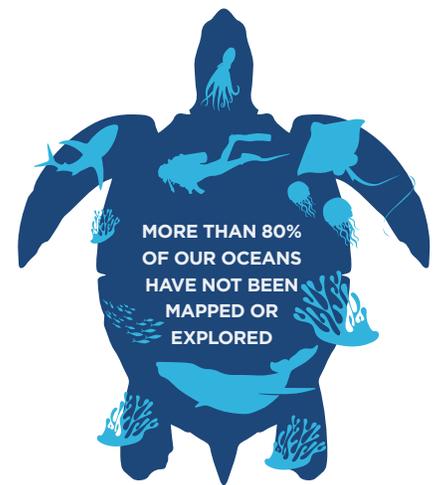
Green infrastructure solutions such as mangroves and other coastal vegetation can also help buffer against storm surges and rising tides. In addition, where feasible, due consideration should be given to relocating critical infrastructure and even at-risk settlements to higher ground further inland. Where this is impractical, early warning systems can help provide a measure of protection against damage and even loss of life from coastal flooding events.

In light of the impacts on marine life and sensitive habitats, fishing industries and tourism can be adversely affected. Economies dependent on these industries must

seek to sustainably manage their natural marine resources and invest in protection and rehabilitation where possible. Compounding stressors such as pollution and destructive fishing must be reduced to prevent further damage.

Most importantly, we need to constantly monitor our oceans to register any significant changes likely to have an impact on humans.

THE FACT THAT MORE THAN 80% OF OUR OCEANS HAVE NOT BEEN MAPPED OR EXPLORED MAKES THIS A DIFFICULT TASK, BUT IT IS A CRITICAL AREA FOR RESEARCH.



Understanding how our oceans are changing is the necessary first step to managing the fallout. ■

WHY THE WORLD IS STILL INVESTING IN OIL – AN EXPLAINER





Estimated read time:  7 min



KEY TAKEAWAYS

Despite efforts to achieve net-zero, there is sustained investment in oil due to its importance as a commodity, its cost and infrastructure advantages, and its profitability.

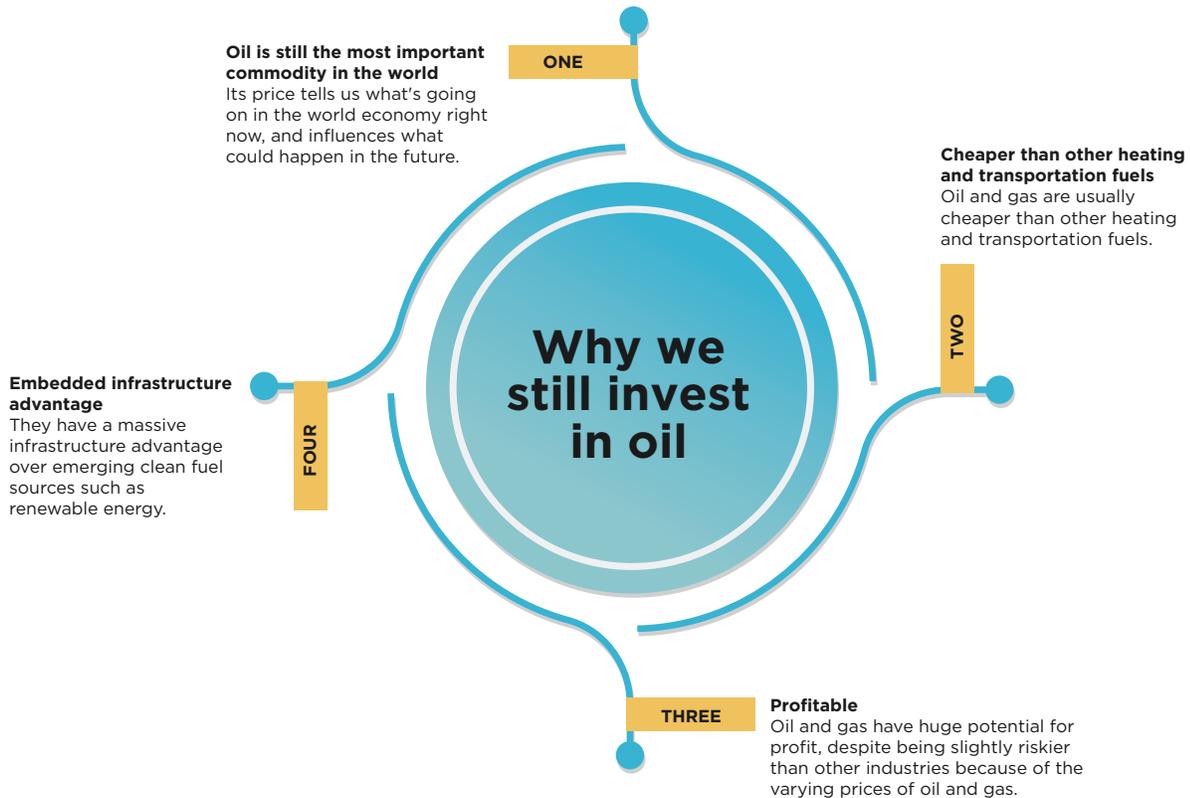
However, oil-rich countries need to diversify to become resilient to the changes in energy markets, with development of renewable energy resources as part of the approach.

Through the Paris accord, the world has committed to keeping the global temperature rise to 1.5°C above pre-industrial era levels.

At the same time, a growing number of countries have committed to achieving carbon neutrality, or "net

zero" emissions, within the next few decades, with most countries choosing net zero by 2050 as their goal. Reality, however, paints a different picture. Greenhouse gas emissions have continued to increase, with factors contributing to this including unsustainable energy use, land use and land-use

change, and lifestyles and patterns of consumption and production.¹ Geopolitical issues and conflicts are now firmly entrenched as an integral part of the global transition, with energy security requirements taking precedence over the energy transition to low carbon fuels. What this means is that the world is still investing in oil.



¹"Emissions of greenhouse gases have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020". IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland.

Why the world is still investing in oil - an explainer | CONTINUED



ONE REASON IS THAT OIL IS STILL THE MOST IMPORTANT COMMODITY IN THE WORLD, AS OIL REPRESENTS MORE THAN A COMMODITY PRICE WITH A SET ENERGY VALUE.

Additionally, oil is used in many industries such as transportation, manufacturing, and agriculture, and is also used to produce electricity and heat. The world is still investing in oil because it is still the most efficient and cost-effective way to power these industries. Additionally, for certain goods, there is, as yet, no competitive alternative to a product derived from oil or gas.

The price of oil also serves as a proxy for general economic conditions worldwide, with the oil price representing consensus opinion on geopolitical and economic reality. First, like other commodities, the price of oil is mainly driven by supply and demand issues. For many years, and even now - when most of the world is concerned about economic transition - the demand



IN BARBADOS, FUEL IMPORTS ALONE REPRESENT 17 PERCENT OF TOTAL IMPORT

for oil, and changes in that demand for oil, are a good proxy for global economic activity. That price tells us what is happening in the economy, and future oil contracts indicate prevailing sentiment about the future. To cite an example, airlines and industrial companies use oil contracts to manage energy cost or to insure themselves against large swings in fixed costs, given the relative unpredictability of future oil prices. For economies, a low oil price can aid economic recovery, or forestall economic decline, given the high

impact that oil purchases can have on the external account of small open economies.

For example, in Barbados, fuel imports alone represent 17 percent of total imports; for the members of the Eastern Caribbean Central Bank, petroleum products account for over 14.0% of ECCU's total imports and 92.0% of its electricity generation mix. For businesses that depend on fuel (airlines, etc.), a decline in the oil price can have the same effect as a global tax cut.

CHEAP OIL CAN HELP CONSUMING ECONOMIES BOUNCE BACK MORE QUICKLY FROM ECONOMIC SHOCKS AND HELP PREVENT A RECESSION FROM BECOMING A DEPRESSION.

IN ADDITION, ENVIRONMENTAL REALITIES MEAN THAT WHEN OIL IS CHEAP, THERE IS LESS ECONOMIC INCENTIVE TO LOOK FOR ALTERNATIVES.



While there has been investment in renewable energy over the last decade, it is not yet enough to replace existing capacity.

On the other hand, for oil producers low oil prices are not always good news. Oil companies are some of the largest spenders in terms of operations; low oil prices can lead to a significant decline in energy sector activity and economic activity. The converse is true: high oil prices lead to greater activity and more growth, all things being equal. That is why oil companies and governments prefer relatively stable prices in the middle range, not below US \$40 per barrel, not above \$80 per barrel — not too cheap to threaten dividends, tax revenue and discourage greener alternatives, not too expensive to place a burden on the economy, or encourage a switch to alternatives.

ANOTHER REASON FOR STILL INVESTING IN OIL AND GAS IS THAT OIL AND NATURAL GAS ARE USUALLY CHEAPER OVERALL THAN OTHER HEATING AND TRANSPORTATION FUELS.

While new energy installations with renewables are cheaper than those with fossil fuels, the addition of storage reserves tends to negate that advantage.

While it is true that a long-term shift to renewables is desirable for Caribbean countries, these countries are nowhere close to achieving them. Despite the declines in the

cost of renewable energy in the past few years and its projected competitiveness with fossil fuels, the transition is moving quite slowly. Moreover, the issues around battery infrastructure in the Caribbean remain unresolved.

While there has been investment in renewable energy over the last decade, it is nowhere near the amount needed to replace existing capacity. Operationally, absent significant grid level investment in expensive energy storage, renewables are yet to solve the “spinning reserve” issue, or the need for reserve power capacity for on-tap availability.

OIL AND GAS HAVE AN INFRASTRUCTURAL ADVANTAGE OVER EMERGING CLEAN FUEL SOURCES SUCH AS RENEWABLE ENERGY.

Renewables (solar, wind) do not have the embedded infrastructure advantage (pipelines, refineries, retail petroleum dealer networks) but must build renewable energy generation infrastructure and then be integrated into the electricity grid.

With massive renewable infrastructure investments being carried out in much of the developed world – such as the Investment Plan for Europe, Energy for the EU, the Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) for the US – this advantage will gradually go away, but for now it persists in the short to medium term. However, the concern about climate change and the impact of burning fossil fuels on the environment has led to a shift towards renewable energy sources such as solar and wind power.

DESPITE THE REALITY THAT RENEWABLE FUELS ARE NOW MOSTLY PRICE COMPETITIVE WITH OIL, OIL IS STILL VERY PROFITABLE AND RETAINS THE ABILITY TO GENERATE SUBSTANTIAL PROFITS.

Oil and gas have a huge potential for profit, which is why they are a compelling choice for investment, despite being somewhat riskier than other investments. What attracts investors is the prospect of significant capital gains. As oil prices rise, oil companies generate cash, giving them more money to drill additional wells to increase their oil and gas production, repay debt, repurchase stock, and pay dividends. This creates significant shareholder value. Dividend payments in the sector tend to be higher than average because of the amount of cash that oil companies generate during good times. That



often makes the sector attractive to investors seeking high dividend yields, or investors wanting stable dividends – private pension funds, for example. BP and Shell between them contribute nearly a fifth of all dividend income generated by UK companies. Bad news on the profits front is a significant threat to secure retirement income for millions of people. The oil companies, via tax payments to governments, also pay taxes into public coffers.

THINKING AHEAD

While not here yet, the “end of oil” makes economic transformation imperative. There must be a clear pathway to mobilising the trillions needed to support countries and communities on the front line of the climate crisis and keep the critical 1.5°C goal in sight.

Oil-rich countries need to diversify to become resilient to the changes in energy markets. Countries and businesses reliant on oil and gas must execute the transition, including the development of renewable energy resources.

Oil-rich economies should commit to reforms that reduce obstacles to innovation and entrepreneurship, and reduce the potential for low productivity and wasted resources.

With stranded assets a new and very real risk, shifts in governance in oil-dependent economies are urgently needed. Governments, multinational development banks, and private finance must collaborate to scale up financial initiatives and technical assistance, improve investment conditions within countries, and build high-quality, bankable green projects. With transition, countries that were previously energy dependent may become self-sufficient in energy.

Countries with lots of sun and wind – as in the Caribbean – could not only be self-sufficient but could also export energy. Ultimately, there may be a peace dividend: if the world no longer needs so much oil, there would be less potential for conflicts. ■

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THE TRAGEDY OF THE COMMONS: TIPS FOR SUSTAINABLE CO-EXISTENCE

Estimated read time:  5 min



KEY TAKEAWAYS

The tragedy of the commons explains how individuals tend to act in their own self-interest when granted access to a public resource or "commons", leading to the depletion of the shared resource.

Overfishing and unsustainable exploitation of forests and wildlife habitats are notable examples.

By understanding the importance and power of collective action, individuals, communities, and governments can take steps to prevent the occurrence of such tragedies.



Queen conch — an overfished mollusk in the Caribbean

The tragedy of the commons is a concept in economics that highlights the conflict between individual self-interest and the collective well-being when it comes to shared resources. This theory explains how individuals tend to act in their own self-interest when granted access to a public resource or "commons", leading to the depletion of the shared resource.



THE CASE OF COD IN CANADA

The tragedy of the commons has repeatedly manifested in recent history. One notable case is the overfishing of the cod fish in Grand Banks off the coast of Newfoundland, Canada.

For nearly five centuries, the historic cod fisheries off the coast of Newfoundland and Labrador attracted both local and international fishing fleets, contributing significantly to the region's economy and way of life.

However, over the decades, the combination of overfishing and advancements in fishing technology led to a catastrophic reduction in cod stocks, pushing the fishery to the brink of commercial extinction, culminating in the Canadian government's decision to implement

a moratorium on the northern cod fishery in July 1992.

COULD THE COLLAPSE OF THE COD FISHING INDUSTRY HAVE BEEN PREVENTED?

To prevent the collapse of the cod fishery and promote sustainable co-existence, several measures could have been implemented. First and foremost, **stricter regulations on fishing quotas and catch limits** should have been established and enforced. By imposing sustainable catch limits, fish stocks could have been given the chance to replenish and recover over time. Additionally, the introduction of more selective fishing techniques, such as hook-and-line fishing, could have reduced bycatch and minimised damage to non-target species.

Furthermore, **implementing a comprehensive monitoring and surveillance system** could have helped ensure that fishing practices remained within sustainable limits. This includes real-time tracking of fishing vessels and the use of satellite technology to monitor fishing activities, enabling authorities to respond promptly to any signs of overfishing.

Education and awareness campaigns targeting both fishers and the public could have played a crucial role in fostering a culture of responsible resource management. By raising awareness about the importance of preserving fish stocks for future generations and highlighting the consequences of overexploitation, individuals and communities may have been more inclined to support sustainable fishing practices.



EXAMPLES OF THE TRAGEDY OF THE COMMONS IN THE CARIBBEAN

In the Caribbean, one notable example of the tragedy of the commons is the overfishing of queen conch, a large marine mollusk, found in Caribbean waters. The queen conch is a shared resource, with many individuals having access to it for fishing. However, due to the open-access nature of the conch fishery, individual fishers tend to maximise their own gains without considering the long-term sustainability of the resource. As a result, the conch population has been overexploited, leading to a decline in conch stocks and posing a threat to the ecosystem and the livelihoods of local communities that rely on conch fishing.

The unsustainable exploitation of forests and wildlife habitats provides another example in the Caribbean. In cases where there is open access and limited regulation, individuals often prioritise their immediate needs over the long-term well-being of shared ecosystems. The Caribbean's lush forests and diverse wildlife face significant challenges due to overexploitation, habitat degradation, and inadequate conservation measures. For instance, unregulated logging, driven by individual economic interests, can lead to deforestation and loss of critical habitats for endemic species.

HOW CAN THE TRAGEDY OF THE COMMONS BE AVOIDED?

Avoiding the tragedy of the commons in the context of fishing, hunting, logging, and other shared resource exploitation in the Caribbean requires effective governance, community involvement, and sustainable management practices.

TO PREVENT THE TRAGEDY OF THE COMMONS IN THE CARIBBEAN AND PROMOTE SUSTAINABLE RESOURCE MANAGEMENT, SEVERAL MEASURES CAN BE TAKEN:



Implementing Quotas and Regulations:

Establishing catch quotas and fishing regulations can help ensure that fishing activities are conducted within sustainable limits.



Community-Based Management:

Involving local communities in the management of shared resources can lead to more sustainable practices. Community-based management allows for the development of rules and norms that reflect the interests and needs of local fishers, leading to more responsible resource use.



Economic Incentives:

Introducing economic incentives, such as tradable fishing permits, can encourage fishers to adhere to sustainable fishing practices. Tradable permits allocate a limited number of fishing rights, allowing fishers to buy, sell, or lease these rights, thereby creating a market-driven mechanism to manage resource use.



Education and Awareness:

Raising awareness about the importance of sustainable fishing practices and the potential consequences of overexploitation can lead to a collective understanding of the need for responsible resource management.



Enforcement and Monitoring:

Strengthening enforcement efforts to prevent illegal and unsustainable fishing practices is essential. Monitoring fishing activities through technology such as satellite tracking can help authorities detect and deter overfishing.



Collaborative Governance:

Collaborative approaches that involve various stakeholders, including governments, fishers, researchers, and conservation organisations, can lead to more comprehensive and effective management strategies.

CONCLUSION

The tragedy of the commons remains a significant challenge for society, threatening shared resources and the environment. By understanding the importance and power of collective action, individuals, communities, and governments can take steps to prevent the occurrence of such tragedies.

Sustainable use of our resources is achievable through education, regulation, collaboration, incentive systems, and technological innovation. By working together, we can safeguard shared resources and create a more sustainable future. ■

ENERGY EFFICIENCY — THE FIRST FUEL OF THE ENERGY TRANSITION



Estimated read time:



KEY TAKEAWAYS

Energy efficiency is often called the 'first fuel' of the energy transition, because it represents a source of power that essentially adds no additional carbon into the atmosphere.

There are many simple ways that citizens can adjust their domestic consumption patterns to conserve power.



In August 2023, the Trinidad and Tobago Electricity Commission (T&TEC) announced that the country had recorded its highest-ever consumer electricity demand of 1,400 megawatts on August 24th.

Just days later, the state utility revealed the record was surpassed again, with demand climbing to 1,410 MW the following week.¹ Unseasonably high temperatures were blamed for the increase, as citizens ratcheted up their air conditioning and kept their units running for longer to combat the heat.

As the mercury continues to rise due to global warming, it is expected that demand for cooling will increase further. This will in turn drive overall electricity demand higher. In Trinidad and Tobago, where power generation

is fueled by natural gas, this presents a challenge. Given its maturing hydrocarbon reserves, the country must now source its gas from deeper water at higher costs. With a hungry hydrocarbon-based industrial sector to feed, the country can ill afford to direct more molecules into power generation.

So, how can power demand be met without consuming more gas? The introduction of renewable energy (RE) into the grid is one option, but RE projects have extended gestation periods. In the interim, an immediately available and low-to-no cost solution is energy efficiency.

BEING ENERGY SMART

Energy efficiency is often called the 'first fuel' of the energy transition, because it represents a source

of power that essentially adds no additional carbon into the atmosphere. It is simply a mechanism by which existing energy supplies are used more optimally, through thoughtful consumption and reduction of waste. By using more efficient products and practices, consumers expend less energy - and money - to achieve the same tasks. This is not only valuable from an emissions and economic standpoint, but it helps bolster energy security, as unused energy can be redirected to meet demand in other areas.

At the domestic level, consumers may be familiar with the approach of switching appliances and fixtures to models that have been certified as energy efficient, such as Energy Star appliances and LED bulbs. However, there are other useful - and in some cases innovative - ways to use energy more efficiently at home.

¹<https://newsday.co.tt/2023/08/30/update-ttec-records-highest-electricity-demand-again/>

Save energy



Adjust the temperature on your air conditioner

While estimates vary on the precise savings, it is generally accepted that raising the temperature on your unit can result in reduced energy bills. The logic is simple – the higher you set the temperature, the less the unit needs to work to achieve it. For many people, increasing the temperature by one or two degrees does not make a perceptible difference, yet it can yield appreciable savings over the long run.

On your days out, set a timer for your air conditioner

If your model allows, or you have smart home devices, set your air conditioner to turn on just a few minutes before you expect to be home. If you enter a warm room, you may be tempted to turn the unit on high to cool the room quickly, and run the risk of leaving it at that level for longer than you need to make the space comfortable.



Service your air conditioner regularly²

Replacing and cleaning filters in your unit can ensure they work at peak efficiency and can reduce energy consumption by up to 15%.

Cook intelligently

Whenever possible, plan your meals to make best use of your appliances. If you intend to turn on your oven, try to plan a menu that allows you to bake as many of your dishes as possible. Pre-heating the oven to cook one item uses the same energy as it would take to cook multiple items.



Keep a thermos handy

If you are a frequent coffee or tea drinker, consider boiling water in the morning then keeping it in an insulated vacuum bottle or thermos. That way, you do not need to turn the kettle on for every brew.



Wash with cold water

If your clothes are not excessively dirty, choosing a cold wash will allow you to save some power. Also, some laundry detergents are now engineered to work just as well in cold water as hot.



Use décor to your advantage

In some homes, lights go on as soon as the sun dips. However, you can eke extra sunshine out of the day by installing mirrors in strategic locations to reflect the sunlight at its evening angles. This would allow you to leave the lights off for longer.



Dry your clothes in the sun

Clothes dryers guzzle electricity. Take advantage of warmer temperatures and hang your laundry out to dry in the sun. Clothes dry quicker and can sometimes smell fresher for longer when air-dried. Be sure to check weather forecasts regularly so you can schedule your laundry days to coincide with sunny days.

Take cold, short showers

When it is hot outside, it makes sense to take cold showers, not just to cool you down, but also save on energy costs. Water heaters account for a significant share of domestic energy bills, so using less hot water is an easy way to cut expenditure. Where possible, don't leave your showers for the coolest times of day, so you avoid the temptation of turning on the hot water.



If you are given to taking long showers, try using one of your favourite songs to help you mark the time. Limit your shower time to just one encore if possible.

Reduce standby power or phantom loads

Even when not in use, appliances and devices that are plugged into outlets still draw electricity. This 'phantom load' is wasted energy. To eliminate this loss of power, unplug anything that is not being used, including chargers. An even more practical option would be to install smart power strips which are capable of detecting when an appliance is not being used, and can simply stop the flow of electricity to that device.



Spend leisure time outside

To reduce runtime on your air conditioner and other appliances on days off, try scheduling an activity that takes you outside. A beach getaway, a hike or even a day at the mall are all options for a cool outing that will take some burden off your energy bill.



Share the load

Family gatherings can help strengthen bonds and at the same time, reduce energy bills. Consider planning weekend potluck lunches that bring separate households – be it family or friends – together in one location. This would mean cooling one home or running one entertainment system instead of multiple on a given day. Alternating the hosts from one weekend to the next means the energy expense is shared.



This list is by no means exhaustive, but is a good point of departure for consumers wishing to cut down their energy use. What is most important is that every individual audit his or her consumption patterns and make a conscious effort to use less and use wisely. ■

² <https://www.washingtonpost.com/climate-solutions/2023/06/25/air-conditioner-energy-savings/>

SUSTAINABLE LIVING: HOW TO SHOP, DRESS, PLAY AND CONSUME MORE SUSTAINABLY



REC
MATE



REDUCED
WATER
CONSUMPTIO

Estimated read time:  6 min





KEY TAKEAWAYS

The role of individuals, interest groups, and civil society in the sustainability movement should not be underestimated.

With some immediate and simple changes to how we shop, dress, play and consume, we can all contribute towards creating a more sustainable future.

Sustainability is often written and spoken about as a lofty concept being driven by governments and corporations, that will impact economies in the distant future.

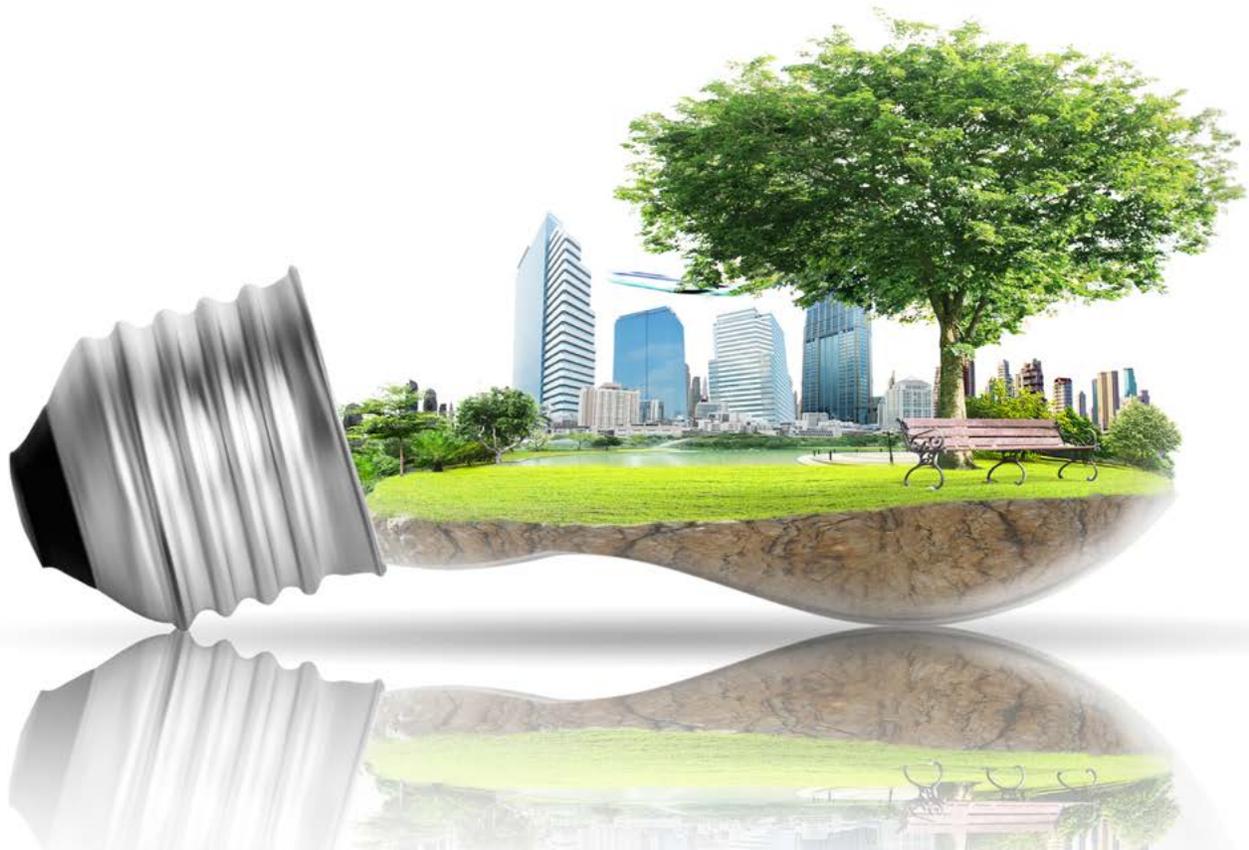
Governments and corporations undoubtedly have an important role to play in championing

sustainability, as they are responsible for establishing policies, laws, regulations and industry standards that direct how resources are used.

However, the role of individuals, interest groups, and civil society in the sustainability movement should not be underestimated. With some immediate and simple lifestyle changes, we can all contribute

towards creating a more sustainable future.

Furthermore, sustainable living has numerous benefits, including savings, improved health and wellbeing, and reduction of carbon dioxide emissions. Here are a few simple steps that we can take to shop, dress, play and consume more sustainably.





How to Shop Sustainably

Sustainable shopping requires that we rethink what we buy and how we buy it. Consumers have the power to force change in the way items are sourced, packaged, and sold. The following are some simple, impactful actions we can take:



Reduce Plastic

Purchase items with plastic-free packaging and walk with a reusable shopping bag to the grocery store, the market and even to the mall.

SAY NO TO PLASTIC STRAW



Not only is local food fresher and more nutritious, but it also has a lower carbon footprint and supports local businesses.

BRING YOUR OWN BAG



NO PLASTIC BAGS



BRING YOUR OWN CUP



Repair and refurbish instead of buying new



Before you replace your broken television, blender or couch set, consider having these items repaired and/or refurbished. Repairs usually cost much less than purchasing new and help small service providers in the community.



QUALITY

GO GREEN



NOT QUANTITY

WASTE SORTING



Buy what you need

If you are buying in bulk, consider splitting the purchase with a friend or family member. This will reduce your individual cost and result in less wastage.



Support businesses that employ sustainable practices

Take the time to research the stores that you plan to shop at. Find out whether they are actively trying to reduce plastic use; sourcing produce from regenerative farms; buying from local farmers, etc.

To shop less is to shop better. Invest in purchasing better quality products that will last longer.





How to Dress Sustainably

SUSTAINABILITY IS ALWAYS IN FASHION.

It is therefore quite alarming that the fashion industry produces 10 percent of the world's carbon emissions and is the second largest consumer of water on the planet (Fall-Johnson, 2020).

The fast fashion culture drives the demand for cheap, trendy clothing that in turn, results in 85 percent of clothing ending up in landfills every year. Fast fashion also perpetuates unsavoury employment practices where workers in the developing world are forced to work under unsafe conditions with low pay.

The deleterious effects of these practices came into sharp view in 2014 as 1,138 workers perished when the Rana Plaza factory collapsed in Bangladesh.

Below are some conscious decisions we can make to support a more reasonable, sustainable culture as it pertains to what we wear.



Donate used items.

Used dinner dresses and suits can be donated to schools and charitable organisations to be worn by students who need clothes for graduation or to outfit young professionals.

'Shop' in your own closet.

Be creative about mixing and matching your items of clothing and don't be afraid to rework or revamp an old outfit.



Buy better quality clothing and wear them longer.

As fashion goes, if you keep your clothes long enough, they will be back in style before you know it.



Repurpose old clothing.

For example, old towels can be repurposed as washcloths. Even some international fashion brands, such as Rave Review of Sweden and Conner Ives in the UK, produce the majority of their designs from existing materials.



Buy clothing made from natural fibres,

such as linen and cotton, as opposed to synthetic fibres, such as polyester. Production and washing of synthetic fibres releases over 500,000 tonnes of microfibres into the oceans annually (Fall-Johnson, 2020).



Rent a dress or suit.

A growing trend in developed countries is the rental of garments for special occasions, including weddings, gala events, and graduation balls. This is a sensible way to look fashionable at a lower cost while eliminating waste.

Sustainable Leisure

We all need to relax and have a little fun from time to time. For many of us, leisure involves travelling to other countries, attending sporting events, enjoying the movies, or simply hanging out with friends. Leisure, similar to other facets of life, can be enjoyed in more sustainable ways.



Try a 'staycation'

Vacationing in-country helps to reduce your overall carbon footprint and supports local establishments. Moreover, taking the time to explore the country improves your appreciation of the flora, fauna, history and culture of your homeland.

Family activities

Engage in environmental activities as a family.

Activities such as beach clean-ups and tree planting exercises can be enjoyable to do as a family. This also helps to instil positive values among the young generation.



Sustainable vacation spaces

Chose sustainable vacation accommodation. There are a growing number of environmentally friendly vacation spaces that utilise sustainable practices such as renewable energy, LED lighting, natural lighting, farm-to-table restaurants, etc. If you have a choice, why not choose a sustainable option.



Carpool to events.

Carpooling is a simple way to reduce your carbon consumption in a measurable way.



Incorporate sustainability into your events.

When planning your events – weddings, birthday parties, baby showers, corporate events, etc. – include reusable crockery and cutlery and sustainable décor elements.



Outdoor activities

Enjoy physical activity outdoors. Activities such as hiking, biking and jogging outdoors help improve both your health and appreciation of nature. Gardening and landscaping can also be rewarding hobbies that directly benefit the environment.





Sustainable Consumption

United Nations Sustainable Development Goal #12 - Sustainable Consumption & Production highlights the imperative that global consumption must be reduced in order to minimise impacts on the environment, economies and people.

We must begin to do more and better with less if the goal of limiting global warming to 1.5 degrees by 2030 is to be achieved. Sustainable consumption will require a cultural shift, in which everyone can play a part.



Eat more fruits and vegetables.

Farming of livestock, particularly cows, produces about one third of human-caused methane emissions globally. Methane is a more potent greenhouse gas than carbon dioxide. Reducing beef consumption is an immediate change that can reduce methane emissions.



Please
STOP
the
FOOD
WASTE

Eat smaller portions.

Consuming smaller portions will directly reduce carbon emissions, reduce wastage and benefit your health as well.



Don't waste water.

Use just enough water to shower, brush your teeth and wash dishes. Also, utilise a bucket to wash your car, as this would greatly reduce water consumption.



Don't waste electricity.

Turn off the lights and air conditioning when you leave a room. Hang your clothes on the line to dry instead of using the dryer and use energy efficient appliances as much as possible.



Eat seasonal fruits and vegetables.

Consumption of fruits and vegetables in season reduces emissions resulting from bringing produce to market. Seasonal produce is also fresher and more nutritious.

Sustainable living is achievable. However, it requires awareness, planning and consistency to make it a lifestyle. The rewards of sustainable living are endless, as it saves money and promotes health and well-being while strengthening the economy and preserving the environment. Making and implementing a plan for sustainable living can also be an enjoyable family activity.

Apps such as NGC's Energy SmartTT can provide useful information to help measure the energy consumption of your household. The entire family can get involved in setting reduction targets and monitoring consumption during the year. Then you can come together to celebrate your 'wins' as your electricity and water bills as well as your waistlines are all reduced! ■

CYBERSECURITY AND SUSTAINABILITY



Estimated read time:  3 min



KEY TAKEAWAYS

Cyber-risk is one of the top threats facing organisations and their stakeholders today.

Companies managing energy systems, such as gas utilities and power producers, have a greater responsibility to plan for and mitigate cybersecurity risks.

Companies should prepare for the day when cybersecurity risk and resilience form part of ESG regulatory requirements.



In 2020, the COVID-19 pandemic coincided with an increase in cyber-incidents, including ransomware.¹

In December of the same year, the Solarwinds Supply Chain attack was discovered. The attack had started since March 2020, when Solarwinds (the company) was infiltrated by hackers who injected trojan malware into the Solarwinds software update, that subsequently went out to at least 200 major customers

worldwide.² Some of Solarwinds' customers include the US military, the National Security Agency and Fortune 500 companies.

In 2021, the Colonial Pipeline cyber-attack in the US demonstrated the vulnerability of critical infrastructure and the negative impact on physical environment and social stability. In 2022, the Russian invasion of Ukraine saw an increase in cyber-warfare against Ukraine.³

Every one of those major cyber-incidents impacted the social stability of people, businesses and countries. Were any of those impacted entities practising good governance to ensure resilience in the event of cyber-attacks? Would investments depreciate in light of entities being victims of cyber-attacks? The short answer is that it depends on whether those businesses reported their cybersecurity efforts. This is one reason why businesses should include cybersecurity risk measures in their sustainability reporting.

¹"Cyber Threats Have Increases 81% Since Global Pandemic," [Online]. Available: <https://www.businesswire.com/news/home/20211108005775/en/Cyber-Threats-Have-Increased-81-Since-Global-Pandemic>.

²"The SolarWinds hack timeline: Who knew what, and when?," CSO Online, [Online]. Available: <https://www.csoonline.com/article/3613571/the-solarwinds-hack-timeline-who-knew-what-and-when.html>.

³"Ukraine says it is fighting first 'hybrid war'," BBC, [Online]. Available: <https://www.bbc.com/news/technology-60622977>.

Sustainability and ESG are two terms that are often used in the context of business. Sustainability is a broad concept that refers to meeting the needs of the present without compromising the future. Sustainability encompasses environmental, social, and economic aspects of human activities.

On the other hand, ESG is a specific framework that evaluates the environmental, social, and governance aspects of a business or an investment.

ESG and sustainability are not just concerned with health, safety and the environment. Cybersecurity is a major consideration, as cyber-risk is one of the top threats facing organisations and their stakeholders today. In its 2022 *Global Cybersecurity Outlook* report, the World Economic Forum refers to the prevalence of cybersecurity risks as “the new normal”.⁴ Therefore, it stands to reason that it should become a mainstream part of ESG reporting.

Linking cybersecurity and sustainability: a natural gas case study

Often-repeated examples of past cyber-intrusions are worth re-examination, as these cases demonstrate how damaging attacks on large and strategically significant systems, such as utilities, banks, and hospitals can be mapped onto the environment, society, and business aspect of sustainability, and why they should be reported.

The attack on the US Colonial Pipeline in 2021 demonstrated how a cyber-attack can interrupt the



flow of gas in a critical network. This attack confirmed that Industrial Control Systems (ICS) managed via Supervisory Control and Data Acquisition (SCADA) systems are very much at risk, with far-reaching implications. Consider the impact to society when industrial plants or businesses that rely on gas for production must stop operations, or lay people off. Consider the loss of revenue to governments and the cascading effect that has on communities. Consider the impact to the country if stoppage of gas-generated electricity is extended for long periods. Consider the severe reputational damage on gas companies and their executives.

Governance also comes into play when investors, customers, and even the upstream gas players, want to know that the gas aggregators are diligent in addressing their

cybersecurity resilience. Reporting on cyber-risk metrics can offer a window into overall corporate behaviour as it relates to securing the key assets of the company.

Proving cyber-resilience in the ICS operations through transparent reporting has the potential to attract more investors and even increase international ratings.⁵

Companies managing energy systems, such as gas utilities and power producers, have a greater responsibility to prepare for and mitigate cybersecurity risks. A greater emphasis on holistic ESG reporting inclusive of cyber-risk is therefore essential. In fact, according to auditing firm KPMG, companies should prepare for the day when cybersecurity risk and resilience form part of ESG regulatory requirements.⁶ ■

⁴“Global Cybersecurity Outlook 2022,” World Economic Forum, [Online]. Available: <https://www.weforum.org/reports/global-cybersecurity-outlook-2022/>.

⁵“What Is Environmental, Social, and Governance (ESG) Investing?,” Investopedia, 2023. [Online]. Available: <https://www.investopedia.com/terms/e/environmental-social-and-governance-esg-criteria.asp>.

⁶KPMG.com, “Cyber Security: Don’t report on ESG without it,” KPMG, 2021.





NGC GROUP QUARTERLY HIGHLIGHT REEL



COMMERCIAL HIGHLIGHTS



In July, NGC and the Water and Sewerage Authority of Trinidad and Tobago (WASA) signed a Memorandum of Understanding (MOU) to collaborate and share learnings around critical functional

activities common across both organisations, including asset integrity management; pipeline maintenance and monitoring; procurement; reporting and operational sustainability.

NGC deepened its presence and participation along the local natural gas value chain, completing the acquisition of Heritage Petroleum Company Limited's (Heritage's) participating interest in the Offshore

Blocks NCMA 4 (20%), Block 22 (10%) and Block 9 (100%), which are in Trinidad's North Coast Marine Area (NCMA). It also acquired Heritage's 19.5% shareholding in Point Fortin LNG Exports Limited (PFLE).

As the Government-appointed agency responsible for leading the export promotion of energy services on behalf of Trinidad and Tobago, National Energy played a significant role in the recent Memorandum of Understanding (MoU) signing between the Republic of Trinidad and Tobago and the Republic of Suriname. The execution of this MoU can result in several potential benefits for Trinidad and Tobago's energy service companies, such as:

- The removal of trade barriers resulting in the increased export of energy services
- Opportunities for Trinidad and Tobago's technical training institutes, universities, and industrial sector to knowledge-share with Surinamese nationals on energy-related matters
- Opportunities to create public-private partnerships with companies in Suriname for further development of Suriname's energy sector



On August 3rd, 2023 PPGPL signed a Technical Services Agreement with The Gas Gathering Limited (TGGL) of Ghana – a private consortium – to provide technical and commercial advisory services, drawing on its expertise in the fields of process and mechanical engineering, project management, process operations, and commercial.



Phoenix Park Energy Marketing LLC (PPEM) a wholly owned subsidiary of Phoenix Park Gas Processors Limited (PPGPL) has strengthened its relationship with its largest customer, Intersim SA (SIMSA GROUP, Mexico) by signing a non-binding Letter of Intent on 9th August, 2023 in Mexico.

This Letter of Intent documents the intention of both parties to collaborate towards increasing the number of rail cars of propane delivered by PPEM to SIMSA from the current volume of 300 cars per month to 650 cars per month and beyond.

LEADERSHIP COMMUNICATIONS AND STAKEHOLDER **ENGAGEMENT**

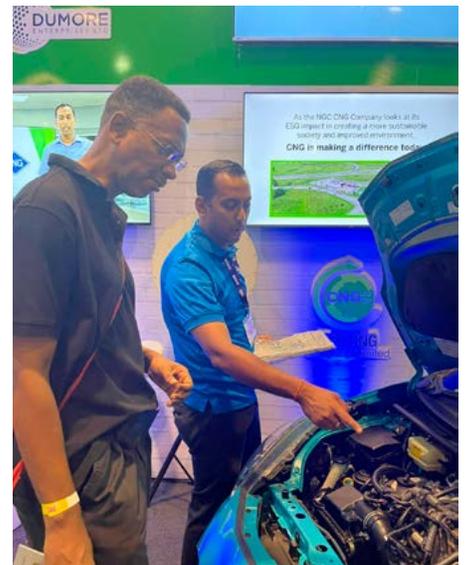


In the last quarter, The NGC Group participated in the following events and conferences:

- Caribbean Corporate Governance Institute Conference
- Society of Petroleum Engineers of Trinidad and Tobago (SPETT) and Latin American and Caribbean Petroleum Engineers Conference
- Institute of Chartered Accountants of the Caribbean's 40th annual Caribbean Conference of Accountants
- Trinidad and Tobago Chamber of Industry and Commerce (TTCIC) and Arthur Lok Jack Graduate School of Business - 'The Power of ESG' Conference
- Association of International Energy Negotiators Conference
- Caribbean Risk Management Academy Conference



NGC celebrated its 48th anniversary on August 22nd. The event was commemorated with an inter-faith service.



NGC CNG participated in the annual three-day Trade and Investment Convention at the Centre of Excellence in partnership with the two licensed converters, Burmac CNG & Dumore Enterprises.



In August, NGC hosted His Royal Majesty, Otumfuo Osei Tutu II, The Asantehene, Ghana, and his delegation, who were invited to visit Trinidad and Tobago by Dr. the Honourable Keith Rowley. The delegation received a tour of the Point Lisas Industrial Estate and presentations on the Trinidad and

Tobago energy sector. NGC also shared updates on its landmark project being delivered in Ghana, which involves the design, procurement, construction, and installation of a pressure regulator skid for the existing Takoradi Distribution Station (TDS).

PROJECTS



NGC commissioned a new 4-inch natural gas pipeline to George Aboud and Sons Limited (GASL), further expanding its supply network and customer base.

NGC completed construction of a 1.6-km, 20-inch buried natural gas pipeline and associated pig launcher and pig receiver stations to tie the Cascadura wells — located in the onshore Ortoire block — into the domestic network. This infrastructure enabled the successful delivery of first gas from the Cascadura field in September.

SUSTAINABILITY AND GREEN AGENDA

On July 4th 2023, LABIDCO and The University of Trinidad and Tobago (UTT) signed a project agreement launching a study to establish a renewable energy centre at the Port of Brighton. The project follows the recommendations of the recently completed GHG Inventory conducted at the Port of Brighton and is expected to provide valuable insights that can inform the development of sustainable energy policies for the shipping industry in the region.

In July, the British High Commission's UK Department of Business and Trade conducted a workshop titled "Developing an Offshore Wind Sector: Insights and Practicalities," at National Energy's Point Lisas Meeting Room. The workshop is aligned to National Energy's efforts to develop



offshore wind technologies as stated in the "Roadmap to a Green Hydrogen Economy in Trinidad and Tobago" where offshore wind

is identified as the best renewable energy source available for this country's production of green hydrogen.

SUSTAINABILITY AND GREEN AGENDA

National Energy successfully executed sub-lease agreements with Brechin Castle Solar Limited (BCSL). BCSL is the project company owned by the BP, Shell, Lightsource bp Consortium, and is responsible for the development of the Brechin Castle Solar Farm in Point Lisas. Having achieved this project milestone, BCSL can commence construction of the Brechin Castle Solar Farm.

NGC CNG sponsored the inaugural Net Zero Camp hosted by Re-New Caribe (RNC) Energy. The 2-week camp was held from August 7th - 18th and housed at the Lisas Gardens Community Centre in Couva. The camp was open to the public and saw 33 participants sign up for 10 days of interactive learning and activities around renewable energy and energy efficiency.

NGC CNG sponsored the Green Entrepreneur of the Year award at the annual NEDCO awards. The award was won by EcoMe Car Wash Company.

NGC partnered with Shell Trinidad and Tobago Limited (Shell) in 2021 to implement a three-year energy education initiative for secondary schools called Re-Energize TnT. The programme includes taught curriculum on renewable energy and energy efficiency, as well as practical energy audits and a community green initiative. In September 2023, the Mayaro Secondary School was awarded a solar photovoltaic (PV) system based on the results of the "Energy Star Competition" - an inter-school energy audit competition where students from Mayaro Secondary School and Woodbrook Secondary School assessed the energy usage of various parts of their school.



CORPORATE SOCIAL RESPONSIBILITY



The annual NGC/NAAATT Championship Games were held in July, providing a platform for junior, juvenile and senior track and field athletes to compete at the national level.

The 7th edition of the Commonwealth Youth Games was held in Trinidad and Tobago from August 4th to 11th. NGC was platinum sponsor of the major international event, which included athletics, cycling, swimming, netball, rugby, triathlon and volleyball. Over 70 countries, 1,000 athletes and 500 officials took part in these games.



NGC reinforced its commitment to sport and youth development by becoming a silver sponsor of the Secondary Schools Football League (SSFL). NGC pledged its support to SSFL at its launch on Thursday 17th August 2023.

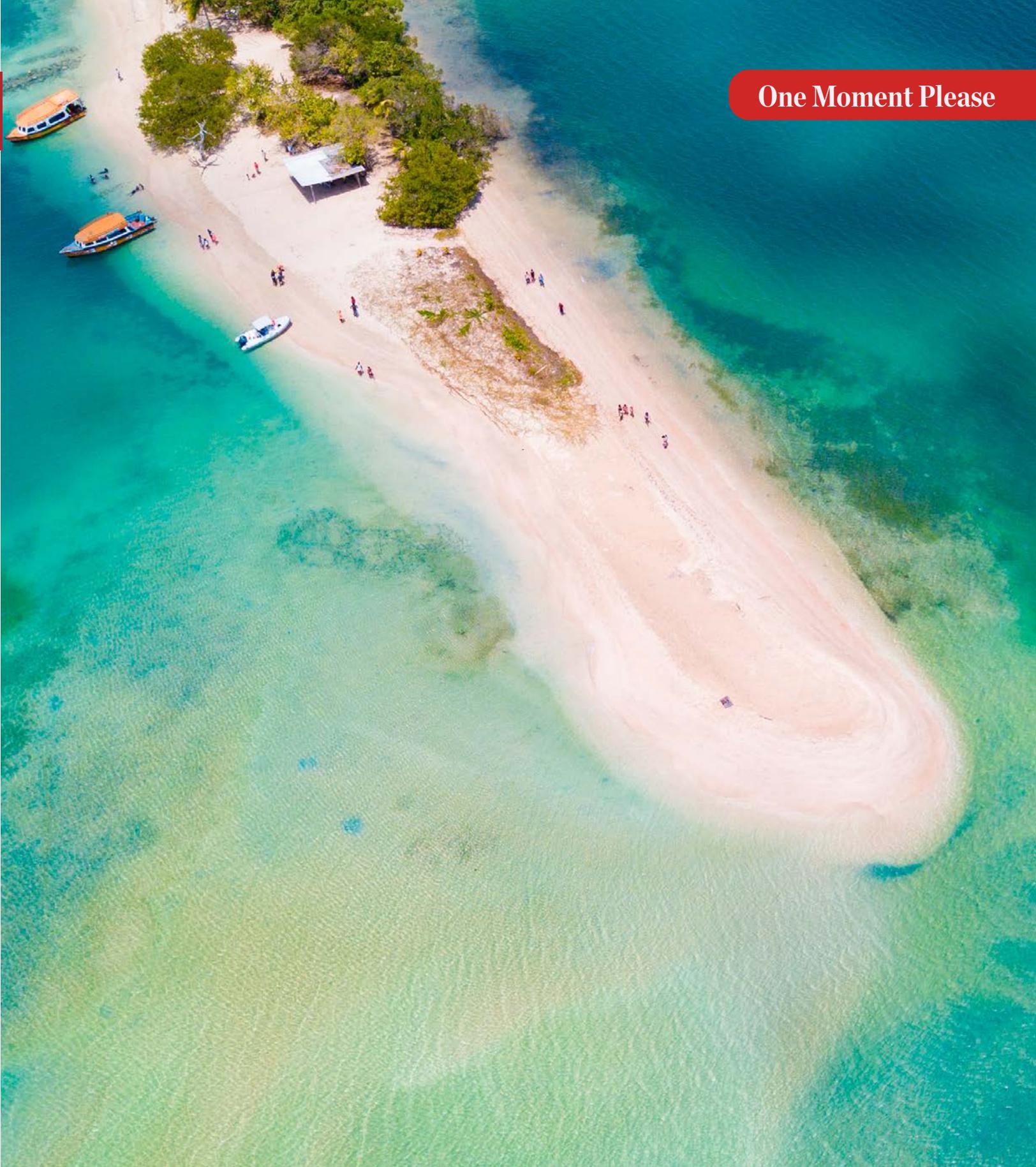
The 2023 trinidad+tobago film festival was launched under the theme 'Look We'. NGC has been a sponsor of the event for 15 years.



As part of NGC's Inspire 2 Achieve (I2A) programme, an Open House was held in September at the La Brea Police Youth Club.

The Open House was an opportunity for the I2A participants to showcase to their peers, parents, community, and key stakeholders the range of future-focused knowledge and skills they acquired since starting the programme in March of 2023 in the learning tracks of STREAM (Science, Technology, Research, Engineering, Art, and Math), Sustainability, and Entrepreneurship.

One Moment Please



TO REFLECT ON THE BEAUTY THAT SURROUNDS US HERE IN TRINIDAD AND TOBAGO
No Man's Land, Tobago



THE NGC GROUP OF COMPANIES
