CENTER for INTERNATIONAL ENVIRONMENTAL LAW

The High Cost of Offshore Oil and Gas

Climate, Ecosystems, and Economies in the Wider Caribbean

Drilling rig off the coast of Curaçao. © Denise - stock.adobe.com

Offshore oil and gas development has become a defining economic and environmental issue in the Wider Caribbean. While the region has historically hosted major hydrocarbon industries, particularly in Trinidad and Tobago, recent offshore discoveries in the Guyana-Suriname Basin have triggered a new wave of exploration and production. These developments raise significant concerns regarding the region's climate commitments,[1] marine ecosystems, and economic dependence on both fossil fuels and ocean resources. Ocean-based sectors, such as tourism and fisheries, are vital to the Wider Caribbean and provide decision-makers with an opportunity to align regional cooperation around more sustainable economies that ensure a transition away from fossil fuels.

Offshore Oil and Gas Build-Out

Trinidad and Tobago has been an oil and gas producer since 1908,[2] with an offshore sector dominated by natural gas.[3] The country also developed large liquified natural gas (LNG), methanol, and ammonia industries based on its offshore gas reserves.[4] In recent years, however, Guyana has emerged as the fastest-growing oil producer in the Wider

Caribbean.[5] Neighboring Suriname has also recorded major offshore discoveries, though production has not yet begun.[6] Beyond production, the Wider Caribbean is becoming a hotspot for LNG infrastructure buildout, specifically for LNG imports from the United States.[7] The region is also a major global maritime corridor for oil transport.[8]

Climate and Ecological Harms

Offshore oil and gas activities pose multiple environmental risks to marine ecosystems in the Wider Caribbean, including coral reefs,[9] mangroves,[10] and fisheries.[11] Offshore exploration, production, and transportation, including intense tanker traffic, contribute to increased risk of discharges, spills and marine pollution.[12] Models show that approximately 83 percent of the Caribbean Sea could be impacted by oil spills due to shipping routes.[13]

Currently, there is no regional oil spill monitoring system to track incidents in the Wider Caribbean[14] and make this important data publicly accessible. According to the latest and most regularly relied upon data found, there are an estimated 250 oil spills in the Gulf of Mexico and the Caribbean Sea annually.[15] Fossil fuels contaminate surface waters[16] and beaches.[17] In marine organisms, these pollutants can impair reproduction, reduce survival rates, and cause long-term ecological stress.[18] Peer-reviewed research has demonstrated the detrimental impact of fossil fuels on Caribbean coral reef ecosystems since the 1980s.[19] Experimental and field studies show that oil exposure causes sub-lethal effects on corals.[20] Long-term monitoring near refineries in Aruba demonstrated that chronic oil pollution reduced coral cover, altering species distribution and ecosystem structure.[21] Similarly, contamination in Panama's Bahía Las Minas also led to adverse impacts on coral physiology and would cascade to ecosystem degradation.[22] Mangroves[23] and seagrass beds[24] are also highly sensitive to oil contamination.

An oil tanker off the coast of Saint Martin. © Jaakko - stock.adobe.com

The Wider Caribbean is highly vulnerable to climate change impacts despite having contributed very little to global greenhouse gas (GHG) emissions.[25] Stronger hurricanes, sea-level rise, and ocean warming[26] amplify the exposure and potential ecological damage associated with offshore oil and gas infrastructure.[27] According to the Intergovernmental Panel on Climate Change (IPCC), based on projections of sea-level rise, "almost all port and harbour facilities in the Wider Caribbean will suffer inundation in the future."[28] Such inundation could spell disaster for tourism and cruise industries, as well as for the coastal oil and gas processing and storage facilities that rely on these harbors.[29] Thus, offshore oil and gas expansion not only drives climate change by releasing significant GHG emissions across its phases,[30] but, in doing so, it also elevates the frequency and intensity of extreme weather events that can damage infrastructure and release disastrous hydrocarbons and chemicals into the Caribbean Sea.

Recommendations to Address Climate and Ecological Harms Caused by Fossil Fuels

- Prioritize the phaseout of extraction from marine areas critical to ecological integrity, human rights, and climate stability.
- Standardize and require that Environmental Impact Assessments (EIAs) include scope 3 (downstream) emissions, cumulative human rights, and ecological impacts. EIAs should also be applied to the shipping of fossil fuels (e.g., LNG carriers).
- Require upfront financial guarantees for decommissioning, cleanup, and environmental restoration for ongoing production projects.

End Offshore Oil and Gas to Support Sustainable Ocean-Based Economies

In countries like Trinidad and Tobago, fossil fuels have historically dominated the economy, generating significant exports and government revenues.[31] However, such fossil fuel dependency leaves exporting countries vulnerable to changing markets and

price shocks amid the energy transition.[32] A dependence on fossil fuel imports also creates vulnerability to both energy price shocks[33] and foreign geopolitical conflicts.[34]

At the same time, the Caribbean economy depends heavily on healthy ocean ecosystems. Caribbean tourism, fisheries, and coastal industries rely on intact coral reefs, pristine beaches, and thriving marine biodiversity.[35] The Wider Caribbean is more dependent on tourism for income than any other region in the world, with the sector contributing more than 11.4 percent of the region's total gross domestic product (GDP) and 2.75 million jobs in 2023.[36] Small-scale fisheries and aquaculture, meanwhile, employ almost 540,000 people across the seventeen member States of the Caribbean Regional Fisheries Mechanism (CRFM).[37]

Offshore oil and gas activity puts ocean-dependent industries at risk. In Trinidad alone, at least 50,000 fishers could be affected by a large-scale oil spill.[38] Oil spills and chronic pollution can therefore undermine the very sectors that sustain livelihoods in small islands, especially as they build sustainable ocean-based economies. In fact, while oil extraction promises revenue, an economic valuation analysis in Belize demonstrated that these projected gains are lower than the long-term economic benefits of protecting the ocean for fisheries and ecotourism. Oil revenues both decline over time and threaten other ocean sectors that support essential local livelihoods and human rights.[39] Thus, one of the most important ways to strengthen ocean-based economies is to reduce the threat posed by offshore oil and gas.

Recommendations to Prioritize a Sustainable Ocean-Based Economy

- Break away from economic and energy dependency on fossil fuels.
- Deter future expansion or pollution by ensuring extraction companies provide reparations and compensation to impacted communities.

Legal and Governance Gaps

States have an obligation under international law to protect the global commons, including the ocean, from the drivers and impacts of climate change. The International Tribunal for the Law of the Sea (ITLOS) Advisory Opinion on climate change concludes that States have an obligation to take all measures necessary to prevent, reduce and control marine pollution, including GHG emissions.[40] The International Court of

Justice's (ICJ) Advisory Opinion also says that States have a legal obligation to use all means at their disposal to prevent climate harm and protect human rights from the impacts of climate change.[41] It emphasizes that the failure of a State to protect the climate system from GHG emissions due to fossil fuel production, consumption, licensing, and subsidies "may constitute an internationally wrongful act which is attributable to that state,"[42] triggering legal consequences. The Inter-American Court of Human Rights has also called on States to encourage policies that "facilitate the transition of polluting sectors."[43]

Despite an abundance of legal and regulatory frameworks specifically designed to prevent and mitigate the harms to oceans and the climate, gaps in regional protection remain. For example, while clear on the need to take all measures necessary to prevent, reduce, and control marine pollution, the Cartagena Convention — a regional sea convention — primarily addresses pollution control rather than preventing extraction.[44] Caribbean countries rely on national legislative frameworks to address marine pollution, including the imposition of fines and penalties.[45] Greater regional cooperation could help harmonize and strengthen prevention and protection measures that address risk to the ocean and climate at its source: offshore oil and gas.

Recommendations to Address Legal and Governance Gaps

- Halt offshore licensing by first banning new offshore oil and gas exploration and production.
- Utilize the collaborative space of the Cartagena Convention to develop a model offshore oil and gas regulation that enforces the phaseout of fossil fuels.

Conclusion

Offshore oil and gas activities reinforce the Wider Caribbean's fossil fuel dependence and intensify vulnerabilities to climate change, marine ecosystem contamination, and economic shocks. These risks jeopardize other ocean-based sectors, such as tourism and fisheries, on which the Wider Caribbean relies heavily, further underscoring the need for decisive action to protect economies, ecosystems, and communities from offshore oil and gas. Given existing legal and governance gaps, regional cooperation is crucial to accelerationg a just transition away from fossil fuels that will safeguard both marine ecosystems and sustainable development.

Endnotes

[1] "How are Caribbean Countries Advancing Their Climate Goals?" United Nations Development Program, accessed April 27, 2026, https://climatepromise.undp.org/news-and-stories/how-are-caribbean-countries-advancing-their-climate-goals.

[2] Philip R. Woodside, *The Petroleum Geology of Trinidad and Tobago*, (US Geological Survey, 1981), https://pubs.usgs.gov/of/1981/0660/report.pdf; "Historical Facts on the Petroleum Industry of Trinidad and Tobago," Ministry of Energy and Energy Industries," accessed March 17, 2026, https://www.energy.gov.tt/historical-facts-petroleum/.

[3] "Oil and Gas Industry," Ministry of Energy and Energy Industries, accessed on April 23, 2026, https://www.energy.gov.tt/our-business/oil-and-gas-industry/.

[4] Anthony T. Bryan and Kimberly Green, *The Southern Caribbean Energy Matrix and the Consequences of the Regional Push for Renewable Energy* (Latin American and Caribbean Center, 2021), https://lacc.fiu.edu/publications/lacc-caribbean-working-paper-series/bryan_southern-caribbean-energy-matrix_wps2-2021.pdf.

[5] Data from *Guyana Becomes Key Contributor to Global Crude Oil Supply Growth*, US Energy Information Administration (EIA), May 21, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62103.

[6] Matthew Smith, "Suriname's Oil Boom Faces Economic Headwinds Despite Major Discovery," OilPrice.com, February 16, 2026, https://oilprice.com/Energy/Energy-General/Surinames-Oil-Boom-Faces-Economic-Headwinds-Despite-Major-Discovery.html.

[7] Data from *US Exports of LNG to The Caribbean Near Record Highs in 2025, US* Energy Information Administration (EIA)," March 19, 2026, https://www.eia.gov/todayinenergy/detail.php?id=67366.

[8] Asha Singh, et. al. "Potential Oil Spill Risk from Shipping and the Implications for Management in the Caribbean Sea," *Marine Pollution Bulletin* 93, no. 1-2 (2015): 217-227, 218, https://www.researchgate.net/profile/Hamish-Asmath/publication/273381350_Potential_oil_spill_risk_from_shipping_and_the_implications_for_management_in_the_Caribbean_Sea/links/6894c399d3c4ac316e2ecfff/Potential-oil-spill-risk-from-shipping-and-the-implications-for-management-in-the-Caribbean-Sea.pdf.

[9] R.P.M.Bak, "Effects of Chronic Oil Pollution on a Caribbean Coral Reef," *Marine Pollution Bulletin* 18, no.10 (1987): 534-39, https://doi.org/10.1016/0025-326x(87)90537-6; Hector Guzman and Ernesto Weil, "Assessing the Long-Term Effects of a Catastrophic Oil Spill on Subtidal Coral Reef Communities Off the Caribbean Coast of Panama (1985-2017)," *Marine Biodiversity* 50, no. 3 (2020): 28, https://www.researchgate.net/publication/340051663_Assessing_the_long-term_effects_of_a_catastrophic_oil_spill_on_subtidal_coral_reef_communities_off_the_Caribbean_coast_of_Panama_1985-2017.

[10] Berrin Tansel, "Characterization of Oil Exposure Parameters Affecting Impact, Recovery, and Reestablishment of Mangrove Forests: Lessons Learned," *Journal of Environmental Management* 370 (2024): 122981, https://doi.org/10.1016/j.jenvman.2024.122981.

[11] Sean Pascoe and James Pembroke Innes, "Economic Impacts of the Development of an Offshore Oil and Gas Industry on Fishing Industries: A Review of Experiences and Assessment Methods," *Reviews in Fisheries Science & Aquaculture* 26, no. 3 (2018): 350-370, https://www.researchgate.net/profile/Sean-Pascoe/publication/323502677_Economic_Impacts_of_the_Development_of_an_Offshore_Oil_and_Gas_Industry_on_Fishing_Industries_A_Review_of_Experiences_and_Assessment_Methods/links/68d4f4f0ffdca73694b2d5d9/Economic-Impacts-of-the-Development-of-an-Offshore-Oil-and-Gas-Industry-on-Fishing-Industries-A-Review-of-Experiences-and-Assessment-Methods.pdf.

[12] Upasana Khatri et al, *Offshore, Off-Limits: Making Oceans Off-Limits to Offshore Oil and Gas* (Center for International Environmental Law, March 2025), https://www.ciel.org/wp-content/uploads/2025/03/Offshore-Off-Limits.pdf.

[13] Asha Singh et al., "Potential Oil Spill Risk From Shipping and the Implications for Management in the Caribbean Sea," *Marine Pollution Bulletin* 93 (2015): 217–27, https://doi.org/10.1016/j.marpolbul.2015.01.013.

[14] United Nations Educational, Scientific and Cultural Organization (UNESCO), "Oil Spill," UNESCO Subcommission for the Caribbean and Adjacent Regions, accessed April 28, 2026, https://iocaribe.ioc-unesco.org/en/OilSpill.

[15] GESAMP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, *Estimates of Oil Entering the Marine Environment from Sea-Based Activities* (GESAMP, 2007), 33, https://www.gesamp.org/site/assets/files/1257/estimates-of-oil-entering-the-marine-environment-from-sea-based-activities-en.pdf.

[16] Lucy Allen et al., "Fossil Fuels and Water Quality," in *The World's Water: The Biennial Report on Freshwater Resources* (Island Press/Center for Resource Economics, 2012), p. 73-96, https://observatoriopantanal.org/wp-content/uploads/crm_perks_uploads/5cb0f734750a11456042675850236/2019/08/2012_Fossil_Fuels_and_Water_Quality.pdf.

[17] Markus Huettel, "Oil Pollution of Beaches," *Current Opinion in Chemical Engineering* 36 (2022): 100803, https://doi.org/10.1016/j.coche.2022.100803.

[18] Rajesh Kumar et al., "Oil Pollutants: A Review on Pathways in Marine Environments, Bioavailability in Various Organisms and Physiological Disruptions in Fish," *Marine Pollution Bulletin* 222 (2025): 118867, https://doi.org/10.1016/j.marpolbul.2025.118867.

[19] Y. Loya and B. Rinkevich, "Effects of Oil Pollution on Coral Reef Communities," *Marine Ecology Progress Series* 3 (1980): 167-180, https://www.int-res.com/articles/meps/3/m003p167.pdf.

[20] Ann Marie Hulver et al., "Interaction Effects of Crude Oil and Nutrient Exposure on Settlement of Coral Reef Benthos," *Marine Pollution Bulletin* 185 (2022), 114352, https://doi.org/10.1016/j.marpolbul.2022.114352.

[21] C.M. Eakin et al., Oil Refinery Impacts on Coral Reef Communities in Aruba, NA. Proceedings of the Colloquium on Global Aspects of Coral Reefs, Miami, 1993, 139-145, https://www.researchgate.net/publication/282371376_Oil_refinery_impacts_on_coral_reef_communities_in_Aruba_NA.

[22] Kathryn Burns and Anthony Knap,. "The Bahia las Minas Oil Spill Hydrocarbon Uptake by Reef Building Corals," *Marine Pollution Bulletin* 20, no. 8 (1989), 391-398, https://www.researchgate.net/profile/Kathryn-Burns-4/publication/223883981_The_bahia_las_minas_oil_spill_Hydrocarbon_uptake_by_reef_building_corals/links/5a1c8c1145851537318912222/The-bahia-las-minas-oil-spill-Hydrocarbon-uptake-by-reef-building-corals.pdf.

[23] Tansel, "Characterization of Oil Exposure Parameters"; Gonasageran Naidoo, "Oil Pollution in Mangroves: A Review," *Forests* 17, no. 1, (Naidoo,): 43. https://doi.org/10.3390/f17010043; Norman C. Duke, "Oil Spill Impacts on Mangroves: Recommendations for Operational Planning and Action Based on a Global Review," *Marine Pollution Bulletin* 109, no. 2 (2016): 700–715, https://doi.org/10.1016/j.marpolbul.2016.06.082.

[24] Maria Cecilia Santana Lima et al. "Oil Spill Effects on Seagrass Ecosystems: A Systematic Review." *Hydrobiologia* 852 (2025): 3171–90, https://doi.org/10.1007/s10750-024-05748-3.

[25] Clint Lewis, "Climate Change and the Caribbean: Challenges and Vulnerabilities in Building Resilience to Tropical Cyclones," *Climate* 10, no. 11 (2022): 1; OECD/IDB, *Caribbean Development Dynamics* 2025 (OECD, 2024), 19, https://doi.org/10.1787/a8e79405-en.

[26] World Meteorological Organization (WMO), *State of the Climate in Latin America and the Caribbean* (WMO, 2024), https://library.wmo.int/viewer/69456/download?file=WMO-1367-2025_en.pdf&type=pdf&navigator=1.

[27] Jinxin Dong et al., "Climate Change Impacts on Coastal and Offshore Petroleum Infrastructure and the Associated Oil Spill Risk: A Review," *Journal of Marine Science and Engineering* 10 (2022): 849, https://doi.org/10.3390/jmse10070849.

[28] M. Myoo et al., "Small Islands," *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. H.-O. Pörtner et al. (Cambridge University Press, 2022), 2064.

[29] Upasana Khatri, *Offshore, Off-Limits*.

[30] Ove Hoegh-Guldberg and Eliza Northrop, *The Ocean as a Solution to Climate Change: Updated Opportunities for Action* (World Resources Institute, 2023), https://doi.org/10.69902/98e3de92. According to a recent analysis, halting the expansion of offshore oil and gas extraction and

phasing down current production and consumption could avert 5.30 Gt of CO_2e per year in GHG emissions, which is equivalent to the annual emissions of 1.18 billion gasoline-powered cars.

[31] Petra Dünhaupt et al., "Trinidad and Tobago at a Political Crossroad: Perspectives for a Just Transition for People and Nature," GLU Working Paper, No. 68, (Global Labour University - Freunde und Förderer e.V., 2025), https://www.econstor.eu/bitstream/10419/330337/1/1939756774.pdf.

[32] Lars Jensen, *Global Decarbonization in Fossil Fuel Export-Dependent Economies* (UNDP, 2023), https://www.undp.org/publications/dfs-global-decarbonization-fossil-fuel-export-dependent-economies.

[33] Rafik Nashi and Hicham Ouakil, "Energy Price Shocks and Current Account Balances: What Role for Economic Structure, Energy Dependency and Renewable Energy Development?" *Sustainable Futures* 9 (2024): 100402, https://doi.org/10.1016/j.sftr.2024.100402.

[34] Andreas Sieber, "Fossil Fuels Have Become a Macroeconomic Risk" Green Central Banking, April 15, 2026, https://greencentralbanking.com/2026/04/15/fossil-fuels-have-become-a-macroeconomic-risk/; IPBES, "Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services," (IPBES 2019), 62, 132, https://doi.org/10.5281/zenodo.3831673.

[35] P.W Schuhmann and R. Mahon, "The Valuation of Marine Ecosystem Goods and Services in the Caribbean: A Literature Review and Framework for Future Valuation Efforts," *Ecosystem Services* 11 (2014): 56-66, https://doi.org/10.1016/j.ecoser.2014.07.013.

[36] World Bank Group, *Rethinking Caribbean Tourism: Strategies for a More Sustainable Future* (World Bank Group, 2025), ii, https://openknowledge.worldbank.org/entities/publication/b54c9855-5046-4953-bbee-89d80f22761e.

[37] Caribbean Regional Fisheries Mechanism (CRFM), "Fisheries and Aquaculture Contribute Over US$ 200 Million to Caribbean Exports and More than Half-a-Million Jobs," CRFM, December 7, 2025, https://www.crfm.int/index.php?option=com_k2&view=item&id=891:fisheries-and-aquaculture-contribute-over-us-200-million-to-caribbean-exports-and-more-than-half-a-million-jobs&Itemid=508.

[38] "Fears of an Oil-Spill Off the Coast of Trinidad and Tobago," *BBC*, October 21, 2020, https://www.bbc.co.uk/newsround/54615253. Furthermore, according to Exxon's own environmental impact assessment (EIA) for a planned oil project in the Stabroek Block, there is a 60-70 percent likelihood that an oil spill would reach Trinidad and Tobago's coastlines; "Oil Spill from Exxon's 8th Project Could Spread to 12 Other Caribbean Islands," *The Daily Herland*, April 1, 2026, https://www.thedailyherald.sx/regional/oil-spill-from-exxon-s-8th-project-could-spreads-to-12-other-caribbean-islands.

[39] Andrés M. Cisneros-Montemayor et al., "Economic Use Value of the Belize Marine Ecosystem: Potential Risks and Benefits From Offshore Oil Exploration," *Natural Resources Forum* 37, no.4 (2013): 221–30, https://doi.org/10.1111/1477-8947.12023.

[40] International Tribunal for the Law of the Sea (ITLOS), *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law*, Case No. 31, Advisory Opinion, May 21, 2024, https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf.

[41] International Court of Justice (ICJ), *Obligations of States in Respect of Climate Change*, Advisory Opinion, July 23, 2025, https://www.icj-cij.org/sites/default/files/case-related/187/187-20250723-adv-01-00-en.pdf.

[42] ICJ, *Obligations of States in Respect of Climate Change*, para. 427.

[43] Inter-American Court of Human Rights (IACtHR), *Climate Emergency and Human Rights*, Advisory Opinion AO-32/25, May 29, 2025, para. 342, https://jurisprudencia.corteidh.or.cr/en/vid/1084981967.

[44] Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, adopted March 24, 1983, 1506 UNTS 161, https://treaties.un.org/doc/Publication/UNTS/Volume%201506/volume-1506-I-25974-English.pdf.

[45] C. Andrea Clayton et al, "Policy Responses to Reduce Single-Use Plastic Marine Pollution in the Caribbean," *Marine Pollution Bulletin* 162 (2020): 111833, https://doi.org/10.1016/j.marpolbul.2020.111833.

About CIEL

Founded in 1989, the Center for International Environmental Law (CIEL) uses the power of law to protect the environment, promote human rights, and ensure a just and sustainable society. CIEL is dedicated to advocacy in the global public interest through legal counsel, policy research, analysis, education, training, and capacity building.

Acknowledgments

The *High Cost of Offshore Oil and Gas* was authored by Bruna Campos. It was edited by Nathalie Eddy, Nikki Reisch, Rachel Radvany, Lucienne Noel and Upasana Khatri.

Please send comments or questions to info@ciel.org to be sure of a reply.

CIEL

CENTER for INTERNATIONAL ENVIRONMENTAL LAW