SOLUTIONS UNDER THE FOREST

The Tropical Forest Forever Facility's Potential for Keeping Fossil Fuel in the Ground

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Introduction

The Tropical Forest Forever Facility (TFFF) is a Brazil-led initiative that aims to provide predictable, results-based financing to countries that maintain their tropical forests, utilising investment returns from a global endowment. As part of LINGO's ongoing research, we aim to understand the extent of fossil carbon beneath forests that the TFFF may cover—quantifying the amount of coal, oil, and gas under tropical moist broadleaf forests and estimating the associated potential CO_2 emissions that would be avoided by keeping them underground. This analysis combines deposit layers, forest cover data, and BGR energy statistics, applying conversion metrics to translate fossil reserves into carbon equivalents. Our approach overlays national-level fossil deposit polygons with forest cover to determine, for each TFFF-participating country, how much fossil fuel—and thus how much CO_2—could effectively be "under protection" through the TFFF if it were to adopt a pledge of no fossil fuel extraction in its forests.

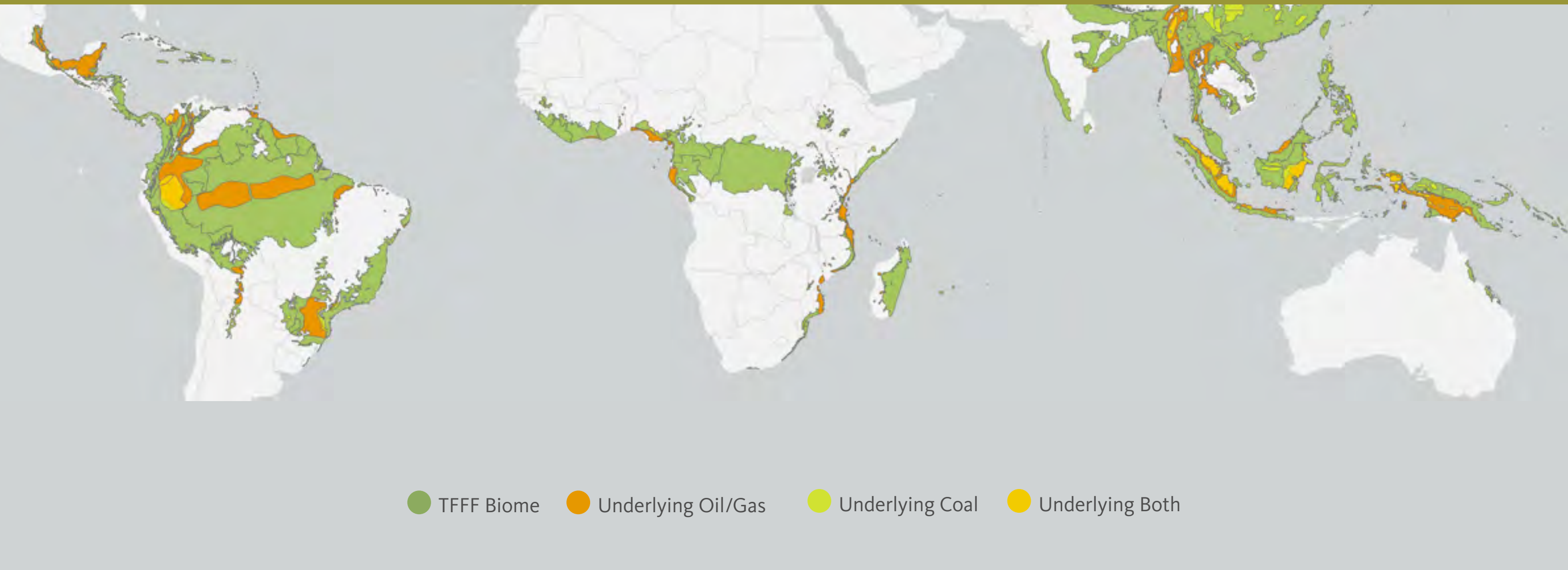
Methodology

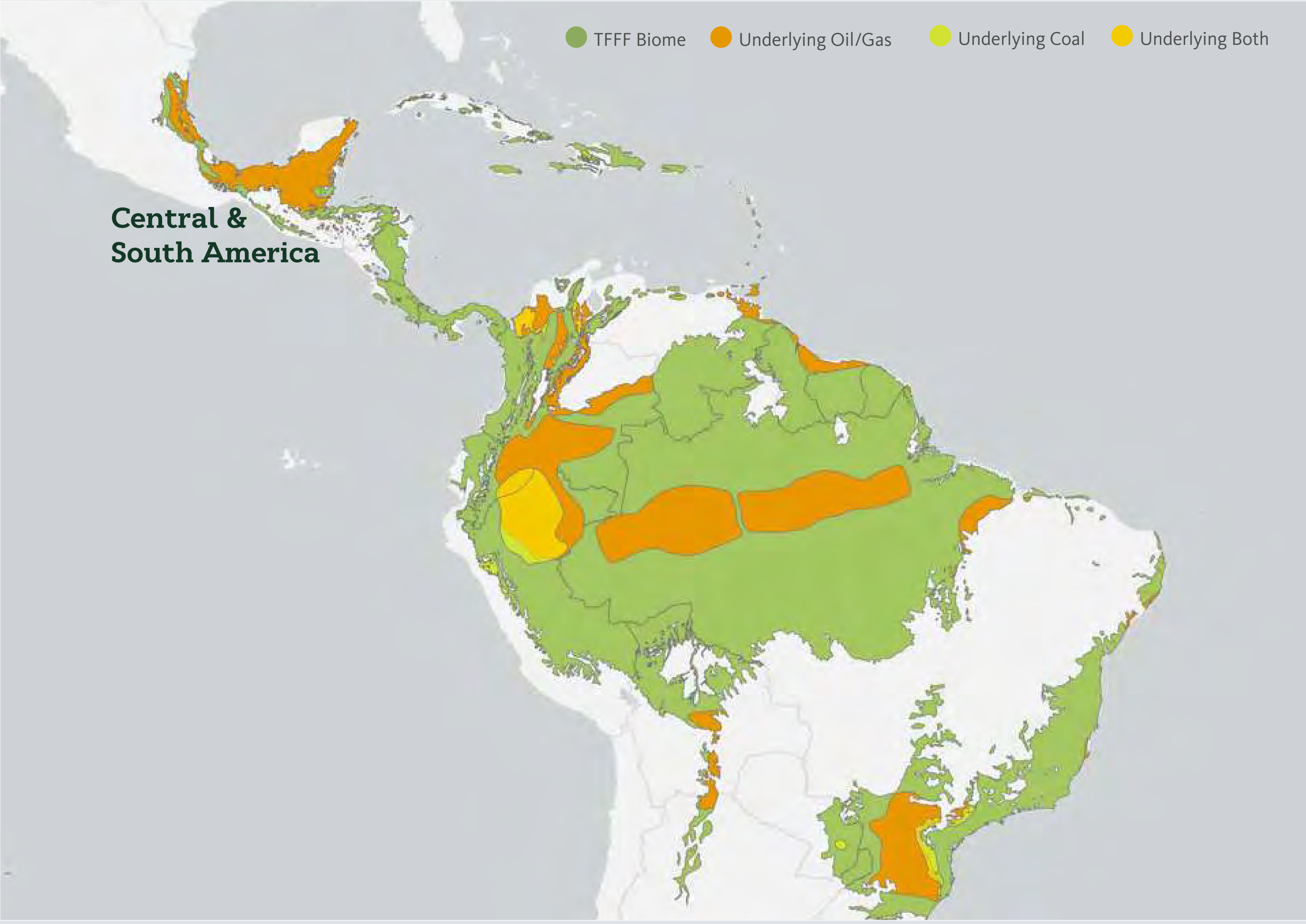
Our methodology combines spatial overlay and attribution to quantify fossil deposits beneath tropical forests. We split oil and gas, and coal deposit polygons, as well as tropical forest cover polygons, at national borders and exclusive economic zones, then tagged each piece with country attributes. We generated overlap polygons where tropical forest cover coincides with underlying fossil deposits. For every country, we calculated the total area of each deposit type and the subset under forest cover to derive the percentage of deposit area beneath forests. We then looked up national reserves and resources for coal, oil, and methane gas and scaled them by these percentages to estimate the quantities located under forest cover. Finally, we converted these deposit estimates into potential CO_2 emissions using LINGO's KING conversion metrics.

Results

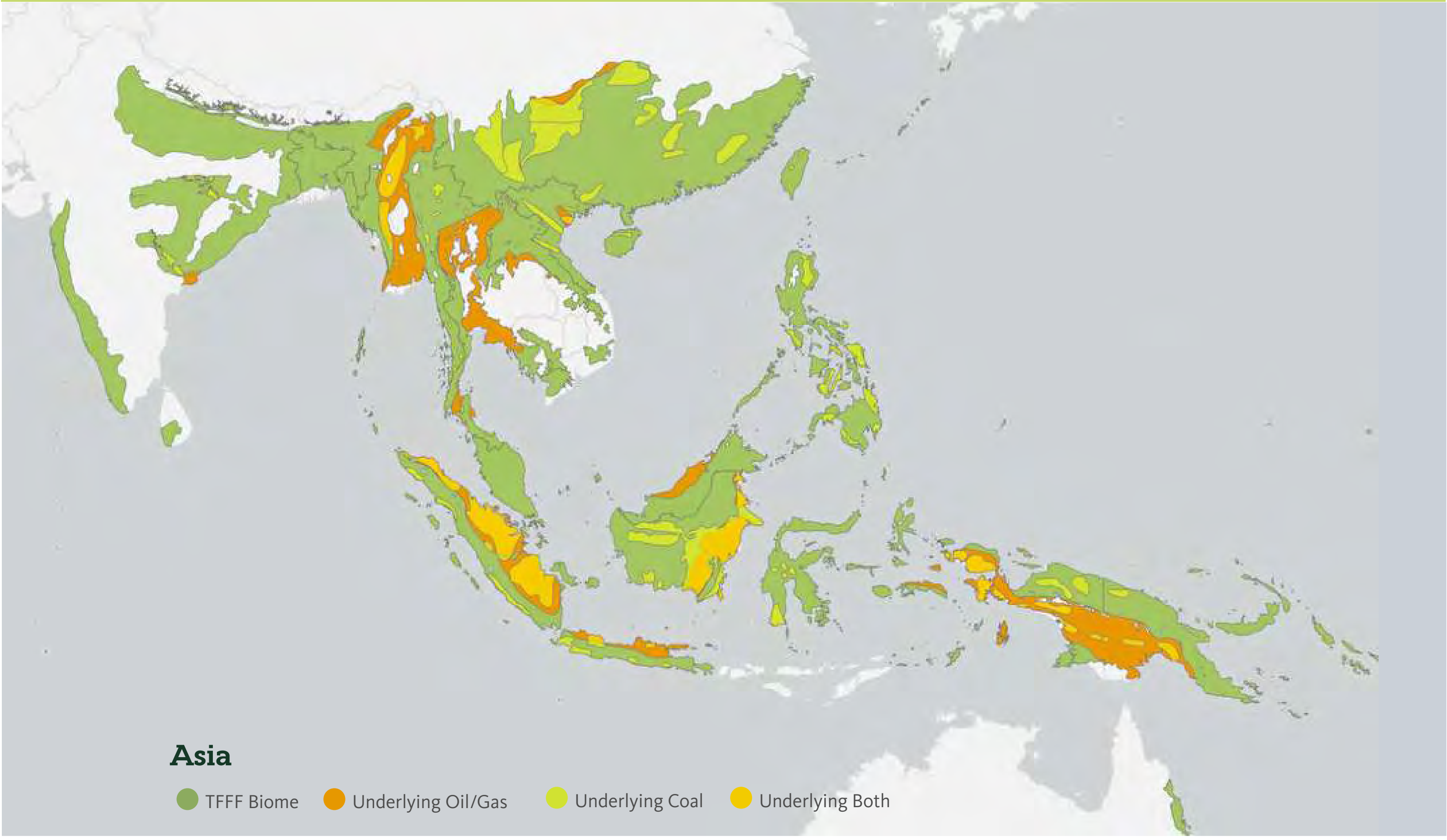
Potential CO2 from the burning of fossil fuels under TFFF: 317 - 4,665 billion tonnes

Country	Oil & Gas Overlap %	Coal Overlap %	Total Potential CO_2 from Reserves MT (Million Tons)	Total Potential CO_2 from Resources MT
India	7.9	55.3	117,592.8	201,378.6
China	1.0	36.1	98,099.6	3,843,033.7
Indonesia	32.5	95.6	47,303.4	141,195.7
Venezuela	11.7	29.2	17,891.0	21,189.6
Colombia	54.0	94.2	9,122.2	24,543.0
Nigeria	22.7	29.2	6,697.8	6,423.2
Vietnam	2.0	82.7	5,222.7	5,925.3
Brazil	35.7	53.8	3,619.9	36,763.3
Malaysia	32.5	95.6	2,538.1	3,914.7
Ecuador	59.0	95.8	1,917.3	209.7




TFFF Biome
Underlying Oil/Gas
Underlying Coal
Underlying Both
Central & South America


Africa



Discussion

This area-based research should be considered a starting point for a fuller study of the TFFF's emissions avoidance potential. While 68 countries were identified with TFFF-elegible forests above gas, oil, and coal deposits, we had source data to derive potential CO_2 estimates for only 51 of them. Revisions are likely to uncover additional potential benefits.

If only considering proven fossil fuel reserves, India, China, and Indonesia contain the largest recoverable deposits under tropical broadleaf forests. Declaring these reserves off-limits to extraction would avoid nearly 263 billion tonnes of potential CO_2 emissions from the burning of oil, gas, and coal. If just these three countries made such a commitment, it would represent 83% of all potential CO_2 from reserves under TFFF forest cover. Broadening one's scope to all fossil fuel deposit resources (regardless of commercial viability), the amount of potential CO_2 under consideration grows almost 14x. China, India and Indonesia again top the list of countries, with virtually all of the world's potential CO_2 emissions from tropical broadleaf-covered resource deposits (96%), highlighting these three countries' leadership opportunity in combining the TFFF approach with efforts to keep oil, coal, and gas deposits in the ground.

Including non-extraction commitments with the TFFF program has the potential to avoid sizable amounts of climate-disrupting emissions, while channelling funds to Global South countries. Such a measure must be considered in the context of other funding and “Leave it in the Ground Incentive Deals” (LIDs)[1] as an additional fiscal lever to help willing tropical countries transition away from their reliance on fossil fuels. While some TFFF-eligible nations are reluctant to transition entirely away from fossil fuel extraction, other tropical countries have taken the lead in this effort. Colombia’s fossil fuel phase-out conference in early 2026 and Brazil’s hosting of the COP30 conference provide opportunities to further their leadership in connecting climate with protection of the natural world.

Data

Data is available at https://www.leave-it-in-the-ground.org/tfffdata →

Sources

Flanders Marine Institute (2024). Union of the ESRI Country shapefile and the Exclusive Economic Zones (version 4). Available online at https://www.marineregions.org/.

LINGO (2023). Protected Carbon: Coal Deposits. Available online at https://protected-carbon.org/

LINGO (2023). Protected Carbon: Oil and Gas Deposits. Available online at https://protected-carbon.org/

Global Forest Watch, World Resources Institute (2024). Tropical Tree Cover. Available online at https://data.globalforestwatch.org/datasets/gfw::tropical-tree-cover/

1 LINGO (2024). Toolbox of Financial Incentives to Leave Fossil Fuels in the Ground. Available online at https://www.leave-it-in-the-ground.org/resources/lingo-incentives/