The Luangwa Community Forests Project (LCFP) in Zambia

A review of the biggest REDD+ project in Africa financed by the Italian oil and gas company ENI

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Commissioned by:
Greenpeace Italy
May 2021

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1. INTRODUCTION

This is a report commissioned by Greenpeace Italy to review the Luangwa Community Forests Project (LCFP) in Zambia with a special interest in checking for any inconsistencies in terms of assumptions, projected carbon credits to be generated, and any unintended effects on the community. In the sections that will follow, we will provide a background of Zambia and the project area of the Luangwa. We will also review the carbon emissions reductions targets of the Italian oil and gas company ENI S.p.A. (major player that committed to buy carbon credits from the LCFP for 20 years and until 2038), with a special interest in their use of forest carbon offsets, before narrowing down on one of their partner projects - the LCFP to check for the project's environmental integrity.

1.1 ZAMBIA AND THE LUANGWA COMMUNITY

Zambia is a landlocked country found in the southern region of Africa. It has a land surface area of 752,614 square kilometer (km^2). The geography of Zambia is mostly high plateau with some mountains. Zambia is surrounded by eight neighboring countries: Democratic Republic of Congo to the north, Tanzania to the north-east, Malawi to the east, Mozambique to the southeast, Zimbabwe and Botswana to the south, Namibia to the southwest, and Angola to the west. Administratively, Zambia is divided into 10 Provinces namely Central Province, Copperbelt Province, Eastern Province, Luapula Province, Lusaka Province, Muchinga Province, Northern Province, North-Western Province, Western Province, and Southern Province. The population is concentrated mainly around the capital city, Lusaka, in the south and the Copperbelt Province to the northwest. The main economic activities are mining and agriculture.

Zambia lies in the tropics and its climate is modified by the altitude of the country. Generally, the climate is favorable to human settlement and comfort. Zambia experiences two main seasons; the rainy season (November-April) and the dry season, further divided as the cold dry season (May-August) and the hot dry season (September-October). The marked seasonal pattern of precipitation is caused by the north and south movement of the Intertropical Convergence Zone (ITCZ), which shifts with the Sun.

Zambia is endowed with vast amounts of natural resources such as minerals, wildlife, and forestry, freshwater and arable land. Forests occupy a large area of the country. Approximately 459,433 km^2 of Zambia is classified as forests (FAO, 2020) that is about 61% of the total land area. Forests and woodlands provide the majority of the Zambian population with various products, both timber and non-timber, for their livelihoods (Mulenga et al., 2014), and are therefore of significant importance to Zambia's social economic and cultural development. Open woodlands make up more than 94% of the forests, with Miombo woodlands making up about 42% of this (Chidumayo, 2013). Miombo is

the Swahili word for *Brachystegia*, one of many species found across this transboundary ecosystem. The miombo ecosystem describes the vastest dry forest biome in southern Africa, stretching over seven countries (Angola, Democratic Republic of Congo, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe), covering more than 2.7 million km^2. In Zambia, Miombo is the main land cover, with almost 42% of the country covered by this woodland type.

Figure 1. Map of Africa with Zambia highlighted in green.

1.2 INTRODUCTION TO THE REVIEW OF LUANGWA COMMUNITY FORESTS PROJECT (LCFP)

The LCFP is one of the many *Reducing Emissions from Deforestation and forest Degradation* (REDD+) projects in developing countries. The premise for REDD+ is straightforward: tropical forests store roughly 25% (250 billion tons) of the planet's terrestrial carbon[1] - which combines with other gases to produce greenhouse gasses (GHGs). However, since 1990, more than 420 million hectares[2] of forests have been deforested, releasing carbon dioxide into the atmosphere and reducing the storage and sink capacity of the forests.
REDD+ proposes a solution to halt/reduce deforestation that relies, among other things, on addressing the drivers of deforestation. The thinking behind is that economic growth in developing countries inevitably depends on exploiting forests. Therefore, tropical countries that reduce their emissions from forests relative to a calculated reference level receive financial compensation thus creating an incentive to keep forests intact. It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. The main potential sources of finance for a future global REDD+ mechanism are international funds, compliance-based finance and voluntary carbon markets. While the Clean Development Mechanism, which falls under the regulated or compliance markets and is one of three flexible mechanisms under the Kyoto Protocol, was targeted at countries and organizations with legally binding emission reductions and focuses only on afforestation and reforestation projects, the voluntary carbon markets (VCM) were developed independently of governments and allows corporations, non-governmental organizations, individuals, and others to voluntarily participate in the business of offsetting their GHGs emissions (Exergia, 2007). Practically, this means as part of compensating their emissions, corporations can help 'save' a tropical forest, and claim the resulting carbon credits[3] (the tons of carbon dioxide avoided as emissions). To help save or conserve existing forest stocks, it is necessary to identify and address the drivers of forest loss and forest degradation. These include direct drivers such as

[1] Source: https://www.nature.com/articles/s41559-019-1090-0
[2] Source: http://www.fao.org/state-of-forests/en
[3] 1 carbon credit = 1 tCO2e (ton of carbon dioxide equivalent).

logging, large-scale forest conversion for agricultural expansion, firewood and charcoal production, and subsistence agriculture by the rural poor and indirect drivers such as poor governance, weak institutions and inadequate land tenure regimes. The assumed reductions in emissions of carbon dioxide can then be sold on to different organizations or individuals in the case of VCM. One such example is the LCFP, being implemented by Biocarbon Partners (BCP). For corporations, motives for buying carbon credits include:

- willingness to manage the effect of their activities on climate change by 'offsetting' their emissions; and potentially claim carbon neutrality;
- an interest in philanthropy;
- showing compliance with their stated intention to become carbon neutral ('Net Zero');
- public relations or corporate social responsibility[4].

This review focuses on the LCFP for mainly two reasons. First, LCFP is touted as the biggest REDD+ project in Africa by area and the biggest in the world by the number of beneficiaries (175,000)[5]. Second, we conducted a thorough search of the carbon registries to check for carbon offset projects where ENI has been involved in any capacity. Between September 2020 and January 2021, we consulted the following registries:

- VERRA register (Verified Carbon Standard);
- CDP (the world's largest self-reported dataset for investors, companies, cities, states and regions to manage their environmental impacts);
- International Database on REDD+ projects and programs (IDRECCO);
- FAO-Reddplus-Info;
- Markit[6];
- Forest Trends;
- Gold Standard[7].

Despite public announcements in which ENI lists several countries where it is starting REDD projects[8], we found only the LCFP in Zambia as the project where ENI is currently involved as a buyer.

Further, ENI announced, through a press release in November 2019, that it "has become an active member of the governance of the Luangwa Community Forests Project (LCFP)"[9], suggesting they are not only interested in buying the carbon credits generated by the project but willing to take an active role in the governance of the project.

[4] Source: https://exergia.gr/wp-content/uploads/voluntary-carbon-market-diagnosis.pdf

[5] Source: http://blog.biocarbonpartners.com/africas-largest-redd-project-by-hectarage-verified-in-zambia/#:~:text=To%20the%20best%20of%20our,beneficiaries%20of%20approximately%20175%2C000%20beneficiaries

[6] Source: https://mer.markit.com/br-reg/public/index.jsp?entity=project&sort=project_name&dir=ASC&start=0&acronym=&limit=15&name=&standardId

[7] Source: https://registry.goldstandard.org/projects?q=&page=1

[8] Source: https://www.repubblica.it/dossier/ambiente/virtual-circular-tour/2020/09/22/news/la_transizione_energetica_passa_per_la_conservazione_delle_foreste-268210120/

[9] Source: https://www.eni.com/en-IT/media/press-release/2019/11/eni-has-become-an-active-member-of-the-governance-of-the-forest-conservation-redd-luangwa-community-forests-project-lcfp-in-zambia.html#:~:text=Sustainability-,Eni%20has%20become%20an%20active%20member%20of%20the%20governance%20of,Forests%20Project%20(LCFP)%20in%20Zambia&text=The%20Luangwa%20Community%20Forests%20Project%20started%20in%202014%20and%20it,Zambian%20Government%20and%20local%20communities

1.3 MECHANISMS OF THE LUANGWA COMMUNITY FORESTS PROJECT (LCFP)

The LCFP is a large scale grouped REDD+ project implemented in Eastern and Lusaka Provinces, Zambia, since 2014 with an initial project area of 943,646 hectares. The project is being implemented on communal land in 12 chiefdoms falling within Game Management Areas (GMA)[10] and two private "game ranches"[11] offering safaris. Both communities (including 69 village action groups in the chiefdoms) and the private ranches are said to have given Free Prior Informed Consent[12] through consultations that were held before the project started and engaged through what the project calls "community engagement" to ensure corrective action on some project activities[13]. Implementation is in partnership with the traditional authorities and the government of the Republic of Zambia. The project is expected to generate emission reductions through avoided deforestation, using the mitigation activities reported in the textbox below.

TEXTBOX 1: LCFP PLANNED ACTIVITIES

- Direct conservation support - Forest monitoring will be done using remote sensing, aerial and ground monitoring. Encroachment prevention will be accomplished by training, funding, and helping to manage community scouts.
- Engagement and capacity building with key Government and community stakeholders.
- Performance-based payments to community stakeholders delivered through local institutions.
- Promoting alternative livelihood activities including: conservation agriculture, non-timber forest product livelihoods, and sustainable enterprise development.

Figure 2. Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 11 - Verra Registry.

The baseline scenario (i.e. the without-project scenario, defined further in section 6) is unplanned deforestation driven primarily by the expansion of subsistence agriculture according to the project document. Other direct drivers of deforestation not mentioned in the project document include tobacco growing, urbanization, and infrastructure development and fire, while indirect drivers that have been omitted include institutional, policy, and environmental such as climate change. A great emphasis is placed on

[10] A Game Management Area (GMA) in Zambia is a buffer zone around a national park in which licensed safari and subsistence hunting is permitted. It is a communal area in which people live by semi-subsistence agriculture, coexisting with wildlife (Bandyopadhyay & Tembo, 2009).

[11] Game ranching comprises the maintenance of wild animals in defined areas delineated by fences. It is a form of husbandry similar to cattle ranching, the animals are managed on natural vegetation although the habitat may be manipulated to improve production efficiency. The animals on the ranch are the property of the ranch owner for as long as they remain on his ranch. Animals on ranches may be exploited for meat but most ranches aim for the added value of sport/trophy hunting, live animal sales and ecotourism. Source: http://www.fao.org/3/w7540e/w7540e0e.htm

[12] Free, Prior and Informed Consent (FPIC) is a specific right that pertains to indigenous peoples and is recognised in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). It allows them to give or withhold consent to a project that may affect them or their territories. Once they have given their consent, they can withdraw it at any stage. Furthermore, FPIC enables them to negotiate the conditions under which the project will be designed, implemented, monitored and evaluated. This is also embedded within the universal right to self-determination.
Source: http://www.fao.org/indigenous-peoples/our-pillars/fpic/en/

[13] Source: Project description document (PD) - file name: 20190715_LCFP_PD (4).pdf - pag. 42 - https://registry.verra.org/app/projectDetail/VCS/1775

agricultural expansion, population growth, and proximity to roads. A summary of the main drivers is presented in figure 3. Among the main drivers of deforestation related to subsistence agriculture is the cultivation of tobacco[14]. Eastern province produces[15] more tobacco than most provinces in Zambia. It is estimated that tobacco production accounts for more deforestation than any other factor as tons of woodfuel is required in the curing process (Gumbo et al., 2018).

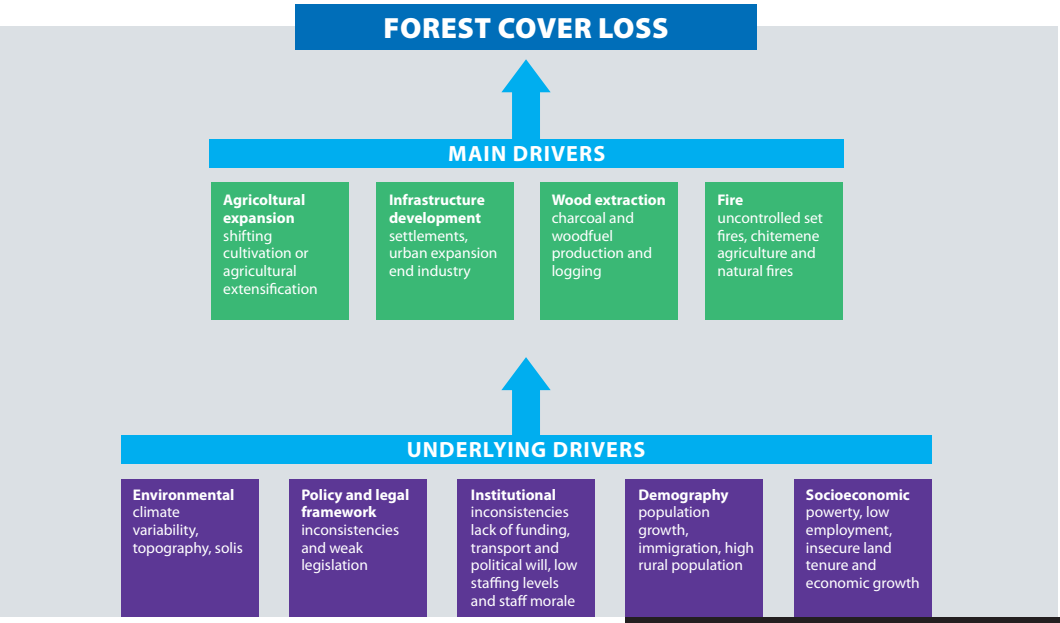

Figure 3. Direct (main) and indirect drivers of deforestation in Zambia. Source: Day et al., 2014.

The baseline scenario further assumes that communities remain poor because of their dependence on subsistence agriculture (even though the reverse case can be argued for, that poor households engage in subsistence agriculture and not the other way), and that biodiversity declines due to habitat loss and increased poaching as community members access the forest. Therefore, by implication, the with-project scenario would reduce poverty and the decline in biodiversity.

The project's community objective is poverty alleviation for at least 10,000 households, specifically targeting vulnerable households and the poorest of the poor. The project also aims to promote infrastructure development and water provision. The planned activities are summarized in Textbox 1 (figure 2). The biodiversity objective is maintaining a massive wildlife corridor between five national parks in the catchment of Zambia's 4th largest river system (the Luangwa river) and conserving and maintaining vulnerable and endangered species through habitat protection and reduction in poaching. Figure 4 shows the location of the project.

[14] Publicly-stated government policy continues to promote the narrative that tobacco growing is essential to the livelihoods of smallholder farmers and a necessary element in poverty reduction but most tobacco farmers who have signed contracts with leaf-buying companies to cultivate tobacco leaf are operating at a net loss. (Source: "The Economics of Tobacco Farming in Zambia: Tobacco Farmers Survey Report 2019" University of Zambia and the American Cancer Society, 2019).

[15] Source: https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-018-0328-y

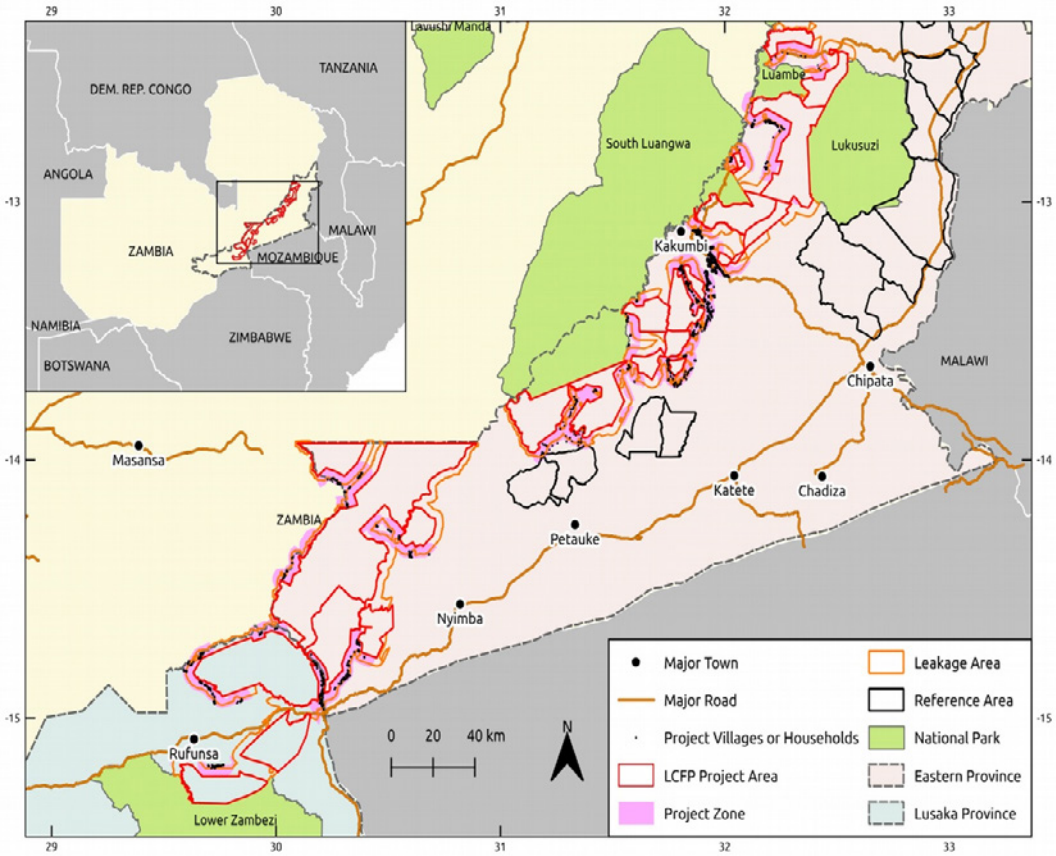

Figure 4. Project areas of the LCFP in the Eastern province of Zambia. Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 20 - Verra Registry.

The climate objectives are to avoid deforestation in the project area and assist communities and biodiversity with climate change adaptation benefits through income diversification, improved farming techniques, crop diversification, and maintenance of habitat corridors. The project received a "Triple Gold" certification from the Climate, Community & Biodiversity Alliance (CCBA)[16], a gold status for each impact on the community, climate (through emission reductions), and impact on biodiversity - hence the triple gold. It is also accredited to the VCS standard. The main challenge with the standards is that firms that audit the projects to determine their eligibility into the standard are hired and paid by the project developer. There is thus pressure on auditors to approve projects in order to preserve their business relationships with the developers. This compromises the auditors' independence and neutrality. The auditor will need to be impartial, yet may want to generously overlook issues and overestimate emission reductions in order to keep the customer.

The estimated emission reductions for the 30 year project span is 83.6 millions tons of carbon dioxide equivalent tCO2e[17] (tCO2e) at an average of 2.8 millions tons of carbon dioxide equivalent per year (tCO2e/yr)[18] (when you divide the project total emission re-

[16] Source: https://biocarbonpartners.com/impacts/luangwa-community-forests-project/

[17] Detailed figure: 83,598,204 tCO2e - Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 6 - https://registry.verra.org/app/projectDetail/VCS/1775

[18] Detailed figure: 2,786,606 tons of carbon dioxide equivalent per year (tCO2e/yr).

ductions by the number of years) even though the project states an average of 3 millions tCO2e/year[19]. Because this is a voluntary carbon project, it ideally does not contribute to Zambia or any Country's[20] intended nationally determined contributions (NDCs), except by helping to sustainably manage the forests through community forests which is part of Zambia's sustainable forest management goal[21]. The LCFP project document states that "the host country [Zambia] is not participating in any compliance mechanism and credits will be sold on the voluntary market, there is thus no risk of double counting". However, in practice, it is possible that double counting could exist along the project life span if Zambia starts to actively participate in any carbon market as Zambia's Intended Nationally Determined Contributions document does not explicitly state that credits generated from the VCMs will be excluded from the NDCs calculation.

In the following sections, we will review some of the project assumptions, choice of the reference area, and projections for carbon credits. Specifically, we also answer questions related to the Italian oil company, ENI's promise to offset its carbon emissions using the LCFP. In section 2, we provide an overview of the different actors in the LCFP, section 3 briefly describes the methodology, while general issues with VCMs are given in section 4, ENI's promise of carbon offsets in section 5 and specific issues with the LCFP are in section 6. A conclusion is given in section 7.

[19] Detailed figure: 2,985,650 tCO2e/year - Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 11 - https://registry.verra.org/app/projectDetail/VCS/1775

[20] Source: https://www.carbon-mechanisms.de/fileadmin/media/dokumente/Publikationen/Bericht/2020_11_19_cc_44_2020_carbon_markets_paris_era.pdf

[21] Source: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Zambia%20First/FINAL+ZAMBIA%27S+INDC_1.pdf

2. PARTNERS AND PLAYERS IN THE LCFPs

Voluntary carbon markets have a different implementation approach compared to REDD+ activities that fall under the auspices of the UN and have to be undertaken at the national or sub-national level. VCMs have several private players serving different roles. Here, we list the key actors and their roles in the implementation of the LCFP.

- **Biocarbon Partners (BCP)** - this is the project proponent for the LCFP. A project proponent is: "The individual or organization that has overall control and responsibility for the project, or an individual or organization that together with others, each of which is also a project proponent, has overall control or responsibility for the project" (CCB Standards Rules Version 3, 2016)[22]. BCP was founded in 2012 and started to work in Zambia, first with the Lower Zambezi REDD+ project before adding the LCFP as their second project. Their mission is "to address deforestation in wildlife-rich areas of Zambia" [23].
- **Community Resources Boards (CRBs) and Village Action Groups (VAGs)** - the project description document also lists the 12 community resources boards as proponent/implementing partners. These are groups that have legal backing from the Forest Act of 2015 in Zambia. They are made up of community members and with legally recognized rights and responsibilities to manage community resources effectively.
- **Forestry Department** - under the Ministry of Lands and Natural Resources, and **Department of National Parks Wildlife** under the Ministry of Tourism and Arts are the two key government departments listed under other entities/stakeholders that have a legally recognized authority/mandates to manage resources within the forest (Forestry Department) and Game Management Areas (DNPW) as the LCFP encompasses some GMAs.
- **United States Agency for International Development (USAID)** - is also listed as a stakeholder as BCP received a grant in 2014 for the implementation of activities.
- **Verra** - is the standards organization that runs both the VCS standard and the Climate, Community, and Biodiversity (CCB) Triple Gold standard. The organization also approves the validation and verification reports carried out by third party auditors, though this approval is automatic once the auditors have validated or verified the emission reductions. Validation is to determine that the project design conforms to the Standards, in this case, both the Verified Carbon Standards (VCS) and the CCB standards that the project is validated for[24]. Verification is to determine that the project has been

[22] Source: https://verra.org/wp-content/uploads/2016/05/Rules_for_the_Use_of_the_CCB_Standards_December_2013_0.pdf
[23] Source: https://biocarbonpartners.com/about/our-story-and-values/
[24] Source: http://blog.biocarbonpartners.com/africas-largest-redd-project-by-hectarage-verified-in-zambia/

successfully implemented and whether it has generated or is on track for generating net positive climate, social, and biodiversity benefits in accordance with its validated design. Verification also happens at the end of each monitoring round to verify the carbon credits generated are truthful (Milne & Mahanty, 2019). "VCS is a private, not-for-profit, non-governmental organization founded to provide quality assurance in the certification of projects' voluntary carbon emissions reductions[25]. The VCS is a greenhouse gas accounting program used by projects around the world to verify and issue carbon credits in voluntary and pre-compliance markets."

- **Carbon credits buyers** - these are not listed as part of the stakeholders, but they are ultimately vital for the project to remain sustainable. The carbon credits or GHGs removals need to be bought at the prevailing market price to allow the proponent to implement activities that require funding. For the LCFP, various individuals and corporations have bought the carbon credits generated since 2015. One major player that bought the verified carbon units in 2020 is ENI[26]. ENI further announced, through a press release in November 2019, that it "has become an active member of the governance of the Luangwa Community Forests Project (LCFP)"[27] and committed to buying the carbon credits (not clear how many) from the LCFP for 20 years until 2038, 7 years before the project end date for the LCFP. It is not clear what ENI joining the governance of the project means, as usually buyers are not involved in the governance of the projects.

[25] Source: https://www.intracen.org/WorkArea/DownloadAsset.aspx?id=58666

[26] Source: https://www.eni.com/en-IT/media/press-release/2020/11/cs-eni-compensazione-emissioni.html/

[27] Source: https://www.eni.com/en-IT/media/press-release/2019/11/eni-has-become-an-active-member-of-the-governance-of-the-forest-conservation-redd-luangwa-community-forests-project-lcfp-in-zambia.html#:~:text=Sustainability-,Eni%20has%20become%20an%20active%20member%20of%20the%20governance%20of,Forests%20Project%20(LCFP)%20in%20Zambia&text=The%20Luangwa%20Community%20Forests%20Project%20started%20in%202014%20and%20it,Zambian%20Government%20and%20local%20communities

3. METHODOLOGY

The approach used here is a systematic review of the project documents for the LCFP, most of which can be found on the Verra registry at https://registry.verra.org/app/projectDetail/VCS/1775. We reviewed all documents, from the project description document to the monitoring reports, to understand the design, theory of change, and carbon credits generated in each monitoring round. In instances where two versions of the document existed with the same information, we relied on the more recent version. For example, two round 1 monitoring reports exist, MR1 and MR1.2. In this case, for information available in both reports, we rely on the MR1.2, which is the updated version of monitoring report 1. Further documents on guidance and standards for the carbon projects were accessed from Verra, such as VM0009 Methodology for Avoided Ecosystem Conversion version 3, and VM0015 Methodology for Avoided Unplanned Deforestation. The LCFP project description document was compared against the laid-out standards in these two documents.

We also rely on personal communication, mostly in the form of emails between different stakeholders and Greenpeace Italy. Among the organizations that were consulted are the United Nations Development Programme, Verra, CDP, and BCP. Expert opinion was also sought from experts in the carbon markets field and from academia. Further, scientific literature that relates to the different aspects considered in this paper, such as carbon dioxide removed per hectare, average deforestation rates, was reviewed to compare and put what the LCFP used into context. Because project documents are many, we cite them using their short titles while scientific literature is cited in the standard way.

4. GENERAL ISSUE: VOLUNTARY CARBON MARKETS (VCMs)

There are two types of carbon markets in climate literature: the compliance markets and the voluntary carbon markets (VCMs). The compliance market - which includes the now-expired Clean Development Mechanism (CDM), the EU's Emissions Trading System, and the yet-to-formalized Sustainable Development Mechanism under the Paris Agreement - is used by companies and governments that by law have to account for their GHG emissions. It is regulated by mandatory national or regional carbon reduction regimes. The CDM was until December 2020 the main regulatory market in developing countries. On the voluntary market the trade of carbon credits is on a voluntary basis. The CDM[28] does not include land use, land-use change, and forestry activities, except for afforestation and reforestation activities. Therefore, a separate program under the U.N. addressed emissions coming from deforestation in developing countries, after massive lobbying from different interests — *Reducing Emission from Deforestation and forest Degradation* (REDD) or REDD+ (to include the role of conservation, sustainable management of forests and enhancement of forest carbon stocks')[29].

Voluntary carbon markets involve private firms and individuals who desire to offset some or all of their emissions by buying carbon credits. Verified emission reductions are transacted in the voluntary carbon market. Voluntary carbon markets, which emerged in the mid-1990s, are self-regulated and exist separately from carbon markets set up by governments in response to the 1997 Kyoto Protocol. Carbon credits are transacted over the counter (trading that does not occur on a financial exchange which includes trades in which participants are known to each other and trades that are mediated by a third party, and in which counterparties remain anonymous), and often directly between the project developer and buyer, verified and registered by third parties such as Verra. The VCM is more disintegrated with different organizations setting voluntary standards that differ. The voluntary market is largely unregulated by the State and was regarded initially as the 'wild west' of carbon markets (Dhanda & Murphy, 2011). As Seyller et al. (2016) states: "Contrary to the CDM, there is no legal authority which controls and certifies carbon credits sold on the voluntary carbon market." Broadly, they are still operating on the fringes of government except for legal and institutional consultations. Major voluntary standards, such as the Verified Carbon Standard (VCS), follow a rigorous asset creation process resembling the one developed for the CDM. The VCM market is more fragmented, confusing and has been accused of cheating in terms of overestimating

[28] Note that the CDM ended in December 2020, even though requests for registering projects, renewing crediting periods, and issuing credits are going on, but any approvals are provisional.

[29] Source: https://www.unredd.net/about/what-is-redd-plus.html

the carbon credits generated (Economist, 2020[30]; Randalls, 2017). Frequently, there are also problems in the communities in which these programs are implemented (Bayrak & Marafa, 2016), including what has been termed 'green grabbing'—the grabbing of land and other resources from local communities for environmental concerns such as conservation (Fairhead et al., 2012), even though standards such as the CCB have put in safeguards to reduce the negative impacts on the communities.

In an article, the Economist magazine calls voluntary carbon credits "cheap cheats" because they allow big companies to buy carbon credits[31], some of which are hard to verify, at extremely low prices. For example, the average price in 2018 was $3 per ton of CO2 equivalent (tCO2e) compared to the E.U.'s cap-and-trade scheme https://www.economist.com/special-report/2020/09/17/cheap-cheats[32] (a scheme that caps the emissions from heavy-energy installations and allows them to trade emissions allowances) CO2 prices, which were eight times higher ($24)[33]. These prices tend to be much lower for carbon credits from forests in developing countries compared to carbon credits from other schemes mostly in developed countries. In a study, Conte and Kotchen (2010), found that prices for forest carbon credits are lower than, for example, renewable energy by about 40% and that they are much lower in developing countries (lower by about 70%). In cases where the REDD+ project area is in a protected area, smallholders are by law not allowed to deforest or degrade the forest and the project comes in to help enforce the law, which may include compensating the farmers as an incentive not to deforest. In cases where households are financially compensated, it has been argued this compensation is not sufficient (compensation is lower than the opportunity cost - Ickowitz et al., 2017)[34]. For example, EasyJet spent a paltry 6% of its pre-tax profits to offset all its carbon emissions, by buying carbon credits from developing countries[35].

The second criticism is that the system is subject to abuse and cheating. Projects that use avoided deforestation, such as the LCFP, are hard to prove that the deforestation that has been avoided is certainly due to the project and that it would not have happened without the project—additionality. Leakage, which is the other main issue in these projects, has also not been conclusively addressed. How do they ensure that people are not engaging in other activities that harm the environment, such as the use of chemical fertilizers or simply increasing deforestation in other parts of the country to meet, for example, the national demand for charcoal which has been increasing in recent times due to droughts and electricity blackouts in urban areas?[36] A study published by the European Commission in 2016 looking into one big carbon offset program found that 85% of the offsets had no net environmental benefits[37]. Other flaws of offset schemes are in relation to:

a) Non-permanence: potential for carbon saving projects to revert to more emission-intensive activity or to be destroyed by fire, weather events, or human disturbance. Allocating some carbon credits to the "buffer" account is one solution that is being implemented to reduce this risk, but as we will show, the risk is underestimated.

b) Procedural weaknesses in project verification and validation.

[30] Source: https://www.economist.com/special-report/2020/09/17/cheap-cheats
[31] Source: https://www.economist.com/special-report/2020/09/17/cheap-cheats
[32] Source: https://ec.europa.eu/clima/policies/ets_en
[33] Source: https://www.economist.com/special-report/2020/09/17/cheap-cheats
[34] Source: https://www.sciencedirect.com/science/article/pii/S0305750X1531161X
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[36] Source: https://forestsnews.cifor.org/64586/drought-fuels-charcoal-boom-in-zambia?fnl=
[37] Source: https://ec.europa.eu/clima/sites/clima/files/ets/docs/clean_dev_mechanism_en.pdf

For regulated markets, United Nations oversight is stretched, and verification is dominated by a few large companies in a highly competitive environment. However, for the VCMs, there are multiple players that tend to have vested interests. For example, U.N. spot checks and reviews have found many verification reports to be unsatisfactory in terms of project additionality, monitoring and estimation of carbon saved, and local consultation, as reported in a PricewaterhouseCoopers commissioned report[38]. Even though verifiers are independent from project proponents, Seyller et al. (2016, p. 234) argue that "project developers and verifying bodies have converging interests to design a convenient baseline scenario of future deforestation in order to increase their own income by generating and selling as many carbon credits as possible, knowing that the actual impact of their project on the drivers of deforestation is likely to be limited due to factors beyond their control".

[38] Source: https://eprints.qut.edu.au/56096/1/Carbon_Fraud_Risk_PWC_Accepted.pdf

5. ENI'S PROMISE OF CARBON OFFSETS IN THE LCFP

In its long-term strategy[39] ENI has two goals, incrementally. First, they target to offset 6 million tCO2e (tons of CO2 equivalent) per year by 2024, and secondly to offset 40 million tCO2e by 2050, using carbon forest offsets for both targets.
Further, in their plan for carbon neutrality[40] in the long term, they state that they intend to reduce GHGs both in absolute terms and intensity of emissions. The ambitions are summarized in Textbox 2.

TEXTBOX 2: ENI LONG TERM CARBON NEUTRALITY TARGETS

- Absolute – reduce net lifecycle emissions (Scope 1, 2 and 3): -30% in 2035; -80% in 2050 (vs 2018).
- Relative – reduce net carbon intensity of energy production (Scope 1, 2 and 3): -15% in 2035; -55% in 2050 (vs 2018).

Figure 5. Source: ENI, 2020 (plan for carbon neutrality[41]).

These numbers are summarized below in figure 6. In absolute terms, a net reduction of 30% from the 2018 emissions means that ENI plans to be emitting about 376 million tons of CO2 by 2035, with an intensity of 61 grams of CO2 (gCO2) per megajoule (MJ) of energy produced (1 barrel of oil equivalent = 6,120 MJ of energy). By 2050, the absolute net emissions are targeted to reduce to 107 million and an intensity of 32 gCO2/MJ of energy produced. According to the respected industry analyzer, Carbon Tracker, this means that ENI is not aiming for net zero, unlike other oil companies such as BP and Repsol. They argue that for these numbers to result in net-zero requires absolute emissions to fall at a rate faster than emissions per megajoule falls (relative goal), or relatively production to fall[42]. However, ENI's production grew by 1% from 2018 to 2019 and its plan earlier in 2020 outlined a 3.5% annual growth from 2019 to 2025[43], which means that intensity is only reducing through the addition of renewable energy sources such as wind and solar, or other sources formally treated as zero emissions, such as biofuels. This would mean the absolute emissions are never likely to be net zero.

[39] ENI Long-Term Strategic Plan to 2050 and Action Plan 2021-2024, Source: https://www.eni.com/assets/documents/press-release/migrated/2021-it/02/CS-strategy-2021-2024.pdf
[40] Source: https://www.eni.com/assets/documents/eng/just-transition/2019/Eni-for-2019-Carbon-neutrality-in-the-long-term.pdf
[41] Ibidem.
[42] Source: https://carbontracker.org/eni-the-first-oil-company-to-lay-out-a-strategy-of-managed-decline/
[43] Source: https://www.eni.com/assets/documents/investor/2020/eng/2019-full-year-results-strategy.pdf

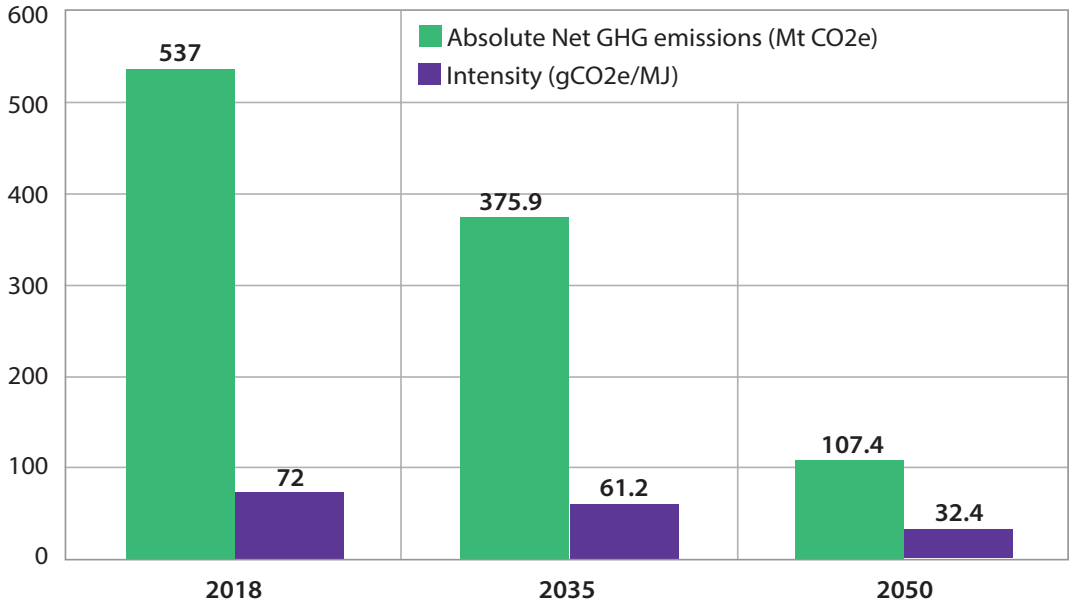

Figure 6. ENI long term carbon neutrality targets. Source for the calculation is ENI's plan for carbon neutrality[44].

Of the planned reductions in emissions, in its long-term strategic plan to 2050 (and action plan 2021-2024)[45] ENI promises to use carbon offset projects to offset about 40 million tons of CO2 per year by 2050. They target carbon offset projects in developing countries. Their biggest partner project is the LCFP project. Not only have they promised to buy the resulting carbon credits from this project, but also joined its governance. While buying carbon credits to offset emissions has become common, ENI's promise is a bold one for the reasons that will be stated below. Oil companies' core business, by default, results in huge emissions of GHGs.

To offset 40 million tons of CO2 per year, ENI would need more than 12,5 million hectares[46] of forest assuming that the forest type and emission reduction per hectare is similar to the LCFP (i.e. 221 tCO2e for every hectare of avoided deforestation in a year). This would require more than 13 projects similar to the LCFP, which is the largest forest project in Africa (assuming the carbon credits produced in the LCFP are correct). Equivalently, this would mean ENI helping to save a forest area bigger than Italy's whole forest area (about 11 million hectares[47]). This is a vast amount of forest to "save" from deforestation for any organization. But to demonstrate how predatory these schemes can be and why they are "cheap cheats" for big corporations, ENI would manage to meet this target using just 0.8% of its gross profit (using the 2019 profit of $22.587 billion[48] and average price of carbon credits in the LCFP of $4.5 per tCO2e).

This cost is far below the social cost of the emissions, which is the overall damage carbon emissions cause to society. In detail, carbon emissions cause devastating impacts: extreme weather events like flooding and deadly storms; the spread of disease; sea level rise; increased food insecurity; and other disasters. These impacts can cost businesses,

[44] Reference year 2018. Figures refer to CO2eq. Source: https://www.eni.com/assets/documents/eng/just-transition/2019/Eni-for-2019-Carbon-neutrality-in-the-long-term.pdf; https://www.eni.com/assets/documents/investor/2020/eng/Strategy-20-23-Sessione-Modello-GHG.pdf. During the Shareholders' Meeting, 12th May 2021, ENI corrected the "Net GHG Lifecycle Emissions" for 2018 explaining why in the 2020 Annual Report (page 17) the "Net GHG Lifecycle Emissions" are 505 Mt instead of 537 Mt. Source "Answers to questions submitted during Shareholders' Meeting 2021 (only italian version)": https://www.eni.com/assets/documents/eng/governance/shareholders-meetings/2021/Answers-to-questions-submitted-during-Shareholders-Meeting-2021.pdf

[45] ENI Long-Term Strategic Plan to 2050 and Action Plan 2021-2024, Source: https://www.eni.com/assets/documents/press-release/migrated/2021-it/02/CS-strategy-2021-2024.pdf

[46] Exact figure: 12,586,667 hectares of forests.

[47] Exact figure: 10,900,000 hectares of forests.

[48] Source: https://www.macrotrends.net/stocks/charts/E/eni-spa/gross-profit

families, governments and taxpayers hundreds of billions of dollars through rising health care costs, destruction of property, increased food prices, and more[49].
The social cost of carbon is a measure of the economic harm from those impacts, expressed as the dollar value of the total damages from emitting one ton of carbon dioxide into the atmosphere. Consensus amongst scientists is that the social cost of 1 tCO2e is around $50[50] in today's dollars (Howard & Sylvan, 2015[51]), compared to the current carbon market price of about $4-$6/ tCO2e.
At first, it was erroneously reported by the Financial Times[52] (though there was an error on the part of ENI on communication) that ENI would be planting 8.1 million hectares of forests in Africa. However, this was clarified as referring to saving already existing forests in Africa[53]. If this number still stands, it is overly ambitious to achieve considering that globally, about 10 million ha of forests per year are lost due to deforestation and forest degradation, according to the Food and Agriculture Organisation's 2020 Forest Resources Assessment report (FAO, 2020). If this number was indeed erroneously mentioned, a target of 40 million tCO2e by 2050 is still too high to be feasible. For example, this would require about thirteen projects of the LCFP size[54]. However, given the competition for carbon credits that has risen in recent years (grew by 6% in 2019, and did extremely well even amid the COVID-19 pandemic in 2020)[55], and that supply of carbon credits is still not stable to meet all demand (according to Gabriel Labbate, from the United Nations Environment Program "there is not enough supply to meet that demand"[56]), and that most of the resulting credits are questionable (Seyller et al., 2016; West et al., 2020), ENI will need to start new avoided deforestation projects, which take time to have reasonable 'Emission Reductions' (E.Rs, equivalent to carbon credits) and independently evaluate their environmental integrity. The LFCP in its first 3 years (2015-2018) was projected to have about 3.8 million tons of E.R., which was likely an overestimate as the first monitoring period reported just 528,534 tons of CO2e for 2018 (the third year). Since ENI is planning new projects, for example, in the Western province of Zambia and other African countries (ENI, 2020 Shareholders Question and Answer)[57], achieving 40 million tons of CO2e per year is highly ambitious and would require investing in vast REDD+ projects that are few and with multiple buyers. Such huge investments in carbon offset projects risks leading to land grabbing[58] in the host country[59]. Assuming ENI's goal is to become carbon neutral and not carbon-free[60] (which is ano-

[49] Source: https://www.edf.org/true-cost-carbon-pollution#:~:text=The%20social%20cost%20of%20carbon%20is%20a%20measure%20of%20the,per%20ton%20in%20today's%20dollars
[50] Source: https://www.nature.com/articles/d41586-021-00441-0?s=09
[51] Source: https://www.edf.org/sites/default/files/expertconsensusreport.pdf
[52] Source: https://www.ft.com/content/7c4d944e-470d-11e9-b168-96a37d002cd3
[53] Source: https://www.bloomberg.com/news/articles/2019-05-03/eni-to-focus-on-saving-african-forests-to-offset-co2-emissions#:~:text=The%20project%20is%20part%20of,from%20the%20atmosphere%20by%202030.&text=Eni%20will%20develop%20forestry%20projects,reduce%20emissions%20stemming%20from%20deforestation
[54] This calculation is made assuming that ENI would join the project in the 4th year - 2019 - when emissions reductions (carbon credits) would have gone up compared to the initial 3 years of the project.
[55] Source: https://www.ecosystemmarketplace.com/articles/demand-for-voluntary-carbon-offsets-holds-strong-as-corporates-stick-with-climate-commitments/
[56] Source: https://www.pri.org/stories/2021-01-29/global-demand-carbon-offsets-combat-emissions-growing-supply-unreliable
[57] Source: https://www.eni.com/assets/documents/governance/2020/eng/minutes--shareholders-meeting-13-may-2020/Answers-to-questions-submitted-during-Shareholders-Meeting-2020.pdf
[58] For example, as conceptualized here, green grabbing is defined as the appropriation of land and resources for environmental ends https://www.tandfonline.com/doi/full/10.1080/03066150.2012.671770
[59] Practical example include in Uganda where smallholders were displaced (https://www.framtiden.no/english/other/co2lonialism-in-uganda.html) or in Tanzania where studies have found REDD+ projects led to displacement, and resettlement with little impact (https://www.tandfonline.com/doi/abs/10.1080/17531055.2017.1356622 - https://doi.org/10.1016/j.worlddev.2016.08.005).
[60] Carbon free means no carbon dioxide emissions. For ENI, this would mean no more fuels that have emissions. Carbon neutral means that an organization or State is compensating as much carbon dioxide from the atmosphere as it's putting in. The net amount of carbon emissions is zero. This can in theory be achieved through carbon offsets like hypothetical carbon sequestration or planting trees or avoid deforestation.

ther ethical challenge), it would need to be able to buy enough carbon credits to offset its annual emissions that stand at 537 million tons per year[61] (ENI Methodology for the Assessment of GHGs). This task would be more daunting. This would require about 191 (equal to about 180 million hectares[62]) projects the size of the LCFP (the largest project by area in Africa and largest in the world by the number of beneficiaries) or 4.4% of the entire forest area in the world, or nine times the area of Italy or more than half the area of the Amazon rainforest. However, if they invested in other more dense primary and secondary forests such as those in the DRC and Ghana, this number would reduce but not substantially.

Again, if all this was offset using forests in developing countries, it would cost ENI just 10.7% of their 2019 gross profit[63].

Focusing on the countries that ENI has planned for carbon offset projects, and using the carbon stock from literature, we show in Table 1 the project sizes that would be required to meet ENI's target. For Zambia, we still use carbon stock levels found in literature than what is in the project document because the project figures are higher than what is in li-

Table 1: Hypothetical sizes of forests and REDD+ projects size that would be required for ENI to offset 40 million tons of CO2 per year

Country ENI plans to invest in[64]	Major forest type	Forest area (ha) in the Country#	Above ground carbon stock (in tCO2e) per hectare	Area to be saved from deforestation per year (ha) to offset 40 million tCO2e (column X)	Size of REDD+ project forest needed (in ha) to avoid (column X) ha of annual deforestation given a deforestation rate of…	
					0.6%*	1.5%**
Zambia	Miombo and mopane woodlands	44,814,030	114	350,877	58,479,532	23,391,813
Mozambique	Miombo and mopane woodlands	36,743,760	110	363,636	60,606,061	24,242,424
Vietnam	Tropical seasonal forest	14,643,090	324	123,457	20,576,132	8,230,453
Ghana	Savannah	7,985,710	188	212,766	35,460,993	14,184,397
Mexico	Temperate (coniferous, broad-leafed and cloud forests)	65,692,080	121	330,579	55,096,419	22,038,567
Angola	Miombo (open tropical)	65,800,190	122	327,869	54,644,809	21,857,923

Source for all forest sizes is the FAO's global forest resources assessment reports for 2020[65]
*0.6 is the average deforestation rate for most countries in Africa.
**1.5% is used as an upper bound, borrowing from studies that show that if crop revenues increase to $100/ha, then deforestation would increase to about 1.5% (Busch & Engelmann, 2017). All figures on above ground carbon stocks per hectare at the country level are calculated from Saatchi et al., (2011)[66] who provide average carbon stock rates per country by combining several studies including IPCC (2006).

[61] See note 44.
[62] Exact figure: 180,236,386 ha.
[63] Using 2019 profit of $22.587 billion (source: https://www.macrotrends.net/stocks/charts/E/eni-spa/gross-profit) and average price of carbon credits in the LCFP of $4.5 per tCO2e, then the total cost would be $4.5*537 million = 2.4165 billion, which is 10.7% of the profit.
[64] Source for the list of countries ENI plans to invest in: https://www.eni.com/assets/documents/governance/2020/eng/Notice-of-Ordinary-Shareholders-Meeting-2020.pdf
[65] Source: http://www.fao.org/forest-resources-assessment/fra-2020/country-reports/en/
[66] Source: https://www.pnas.org/content/108/24/9899 - Only above ground figures are used to make the calculation comparable with the LCFP that uses only above-ground carbon stocks to calculate the ERs.

terature and questionable. I also assume lower deforestation rates, guided by literature, than what is used in the LCFP project document.
As the table above (Table 1) shows, to offset 40 million tons of CO2 from carbon projects in developing countries, ENI would require enormous forest areas covered by REDD+ projects to be saved considering forests' current carbon stocks per hectare and the average deforestation rates. For example, if the project encompasses 1 million ha, and given that the annual deforestation rate in Zambia is 0.6% (a lower figure than that used in the LCFP, but closer to what is reported in most studies as the average for Africa), it means the project will save 6000 ha per year (assuming 100% efficacy). Assuming 114 tCO2/ha, it will avoid emissions of 684,000 tCO2 each year.

CALCULATIONS BOX FOR TABLE 2

Area to saved is given as 40,000,000 tCO2e / carbon dioxide stock (after converting the carbon stocks per hectare to carbon dioxide) per hectare, for example, for Zambia it is given as 40,000,000/114 = 350,877.

Size of REDD+ project given a deforestation rate is calculated as,
REDD+ project size= area to be saved/ deforestation rate.

For example, for Zambia under 0.6% deforestation rate, the size of the REDD+ project would need to be 350,877 ha/ 0.006= 58,479,532 ha. In short, if a REDD+ project encompassing about 58,479,532 ha in an area where the deforestation rate is 0.6% per year needed to generate 40 million tCO2e, it would would save about 350,877 ha be stopping this deforestation per year.

To reach the 40 M tCO2 target, ENI will need more than 58 projects of the size of the LCFP (projects covering 58 million ha, more than the total forested land in Zambia).
However, using more dense forests with higher carbon stocks and in countries with higher deforestation rates, the size of the forests required to attain 40M tCO2 would reduce, though would remain high. Even with a higher hypothetical deforestation rate of 1.5%, and using Vietnamese and Angolan forests which have higher carbon stocks per hectare and assuming all carbon stored is lost once forests are converted to other land use, the size of the REDD+ project forests coverage required to offset 40 million tCO2e is still large (8 million ha in Vietnam, which is about 56% of all the countries' forest cover). For example, Saatchi et al (2011) estimate that the carbon stocks for all African forests is about 61 billion tons, or about 223 billion tons of carbon dioxide. At an annual deforestation rate of 0.6% for Africa, ENI target alone represents about 3% of the available potential emission reductions for Africa.

A report done by Greenpeace United Kingdom (2021)[67] shows that meeting targets set by the Airlines and oil companies combined, through afforestation and/or reforestation projects may be a huge challenge. This points to a lower likelihood that these targets companies put forward can be genuinely met through forests.

[67] Source: https://www.greenpeace.org.uk/wp-content/uploads/2021/01/Net-Expectations-Greenpeace-CDR-briefing.pdf

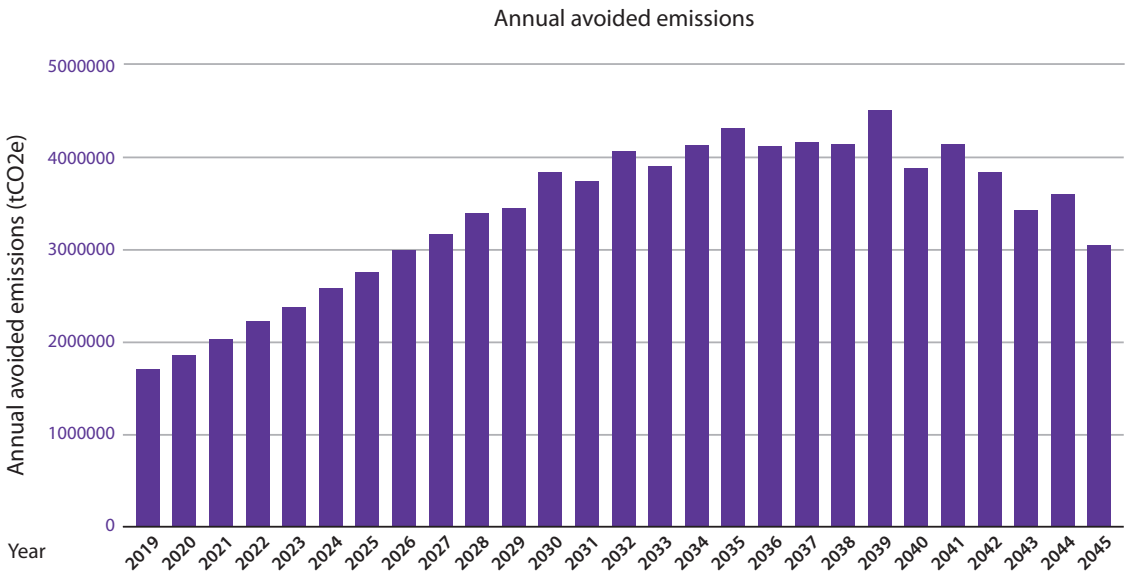

Figure 7. Annual avoided emissions from the LCFP project.

Estimated emission reductions per year from the LCFP (figure 7), are 2,786,607 tCO2e (83,598,204 tCO2e / 30 years) per year, but the projects end in 2045 and it's not clear what will happen with the forest then. So, on average, if ENI becomes the sole buyer of all the LCFP carbon credits, it can use the biggest project in Africa to offset just about 7% of its annual target by 2050 showing that using forests to offset 40 million tCO2e is a real challenge. To meet the 40 million tCO2e per year target, it would need about 13 of such (LCFP) projects.

For example, in 2020, ENI managed to only purchase about 1.5 million tCO2e from the LCFP, some of which were produced in much earlier years. According to a press release in November 2020, ENI said that "thanks to forest conservation in Africa, Eni has offset GHG emissions equivalent to 1.5 million tons of CO2" [68]. Below, we show that indeed ENI has bought the said number, even though these carbon credits were generated in various years. For the sake of transparency, we would like to state that when we first checked in September 2020, ENI was not listed as a buyer until December 2020 when we checked the Verra registry once again.

Table 2: Carbon credits retired on behalf of ENI

Year Produced	Quantity(tCO2e)	Date bought by/retired for ENI
2015	252,765	0
2016	520,636	0
2017	644,420	0
2018	72,179	0
Total	**1,490,000**	

Source: Verra registry (VCUs issued records)[69].

[68] Source: https://www.eni.com/en-IT/media/press-release/2020/11/cs-eni-compensazione-emissioni.html
[69] Source: https://registry.verra.org/app/projectDetail/VCS/1775

6. ISSUES WITH THE LCFP

In the previous section, we have taken the figures given by the LCFP as given. However, the LCFP may not have perfect environmental integrity. In the following subsection, we review the LCFP, ENI's partner project.

6.1 CHOICE OF THE REFERENCE AREA

In carbon literature, the baseline scenario plays an important role as it determines the number of carbon credits generated as a result of the project or intervention. Baseline or reference level is defined as a business-as-usual (BAU) from degradation and deforestation (D.D.) projected into the future. It asks how emissions from D.D. would evolve without the REDD+ project (Angelsen, 2008; Seyller et al., 2016). The actual emissions are then compared to this baseline to determine the emissions reductions (E.R.s). Baselines are often derived from BAU scenarios in the sense that they are often based on historical trends, extrapolated and applied to the future and corrected by a set of quantitative and qualitative parameters at the local level (deforestation drivers, economic and geographic conditions, etc.). However, some project areas do not have historical data. To overcome this challenge, projects often choose what is known as a *reference area*. A reference area corresponds to "a land unit used to reflect the baseline land use without the planned activity. It is applied to determine the likely future land use for the project area in a standardized way" (Dutschke et al., 2006, p. 96). The VCS methodology document (VM009 v3) defines a reference area as "an area in the same region as the project area that is similar to the project accounting area in regards to acting agents of conversion, acting drivers of conversion, socio-economic conditions, cultural conditions, and landscape configuration. This area is used to estimate the conversion parameters [parameters used to project D.D. trends]".

- **REFERENCE AREA:** A land unit used to reflect the baseline land use without the planned activity, assumed to reflect how the project area will also evolve over time in terms of deforestation.
- **PROJECT AREA:** The area under control of the project proponent which contains at least one project accounting area.
- **PROJECT ACCOUNTING AREA:** The area to which the baseline emissions models are applied. A forest or native grassland area within the project area that is subject to conversion in the baseline scenario.
- **PROXY AREA:** The area where residual carbon stocks (after conversion, the end state) are estimated for each baseline type.
- **LEAKAGE AREA:** The area where leakage (the unexpected loss of anticipated carbon benefits due to the displacement of activities in the project area to areas outside the project, resulting in carbon emissions) would likely occur resulting from a change in the supply of wood products due to the project activity(ies).

Figure 8. Sources: VM0015, UN-REDD Glossary[70], Angelsen et al. (2018).

[70] Source: https://www.unredd.net/knowledge/glossary.html

According to the project description document[71], the LCFP follows the F-U3 methodology for the VM0009, which falls under "Avoided Unplanned Deforestation and Degradation" for forests with low conversion (less than 25%) along a perimeter. VCS gives further guidelines on the reference area in the "VM0015- Methodology for Avoided Unplanned Deforestation" guide document. According to this guide, the reference area should meet at least three of the following criteria[72]:

- **FOREST/VEGETATION CLASSES:** At least 90% of the project area must have forest classes or vegetation types that exist in at least 90% to the rest of the reference region.
- **ELEVATION:** At least 90% of the project area must be within the elevation range of at least 90% to the rest of the reference region.
- **SLOPE:** The average slope of at least 90% of the project area shall be within ±10% of the average slope of at least 90% of the rest of the reference region.
- **RAINFALL:** The average annual rainfall in at least 90% of the project area shall be within ±10% of the average annual rainfall of at least 90% of the rest of the reference region.

Figure 9. Source: VM0015, page 19[73].

However, a closer analysis at the project accounting and reference areas shows that the reference area (i.e. a larger area with similar conditions, agents and drivers used for comparison with the project accounting over time) is not "similar" to the project accounting area as the project claims.

Table 3: Differences between project accounting and reference areas

Attribute[b]	Project accounting area	Reference area	Difference (Reference- project)
Elevation (meters above sea level)	611	986	375
Population density (2010)	2.75	29.6	26.85**
Population density (as used in the project document i.e. different years)	19.3 (2045, projected)	29.6	10.3*
Rainfall (mm/year)[74]	765	862	97**
Area planted per household (ha)[75]	1.4	1.6	0.2**
Main forest type	Mostly mopane woodlands with some Miombo woodlands	Miombo woodlands on plateau, valley	
Area (hectares)	485,495	556,309	

** p<0.05, * p<0.1 Statistically significant difference between project accounting area and reference area at 90%, and 95% confidence level. All data is from the project documents, unless stated.

[71] Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 125 - https://registry.verra.org/app/projectDetail/VCS/1775

[72] Source: https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf

[73] Source: https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf

[74] Data obtained from the Climate Research Unit version 4, of the University of East Anglia, at a resolution of 1km^2.

[75] Data from the Rural Agricultural Livelihoods Survey (RALS) 2012, and 2015. This data is representative at district level. For the project accounting area, Chipata, Lundazi and Petauke were included. Lundazi was included under reference because more than ¾ of the population in the district that is part of the project area is in the reference area. Chongwe, Mambwe, and Nyimba are included in the project accounting area.

The differences in Table 3 raise serious doubts about the similarity between the two areas. Following the guide stated above from VM0015, there are significant differences between the two areas in terms of rainfall, elevations, and population density.
The difference in population density, which is big, is of concern since population density is the main driver of deforestation according to the BCP's own analysis of the drivers of deforestation (see "Introduction to the Review and Luangwa Community Forests Project - LCFP"). The more people per area means they are competing for small land, hence they have to cut trees to acquire new agriculture fields. First, the project uses the projected 2045 population density for the project area and compared this to the 2010 population density for the reference area. The justification is that the population density that matters is the one at the end of the project. But, we argue that the population density in the project area that matters should not be taken to the end of the project as most of the activities will happen in the 2020s and 2030s. Therefore, a 'middle-point' for the length of the project would show that the population density in the project accounting area is much less than 19 habitants/square kilometers. The project document states that "the main driver variables explaining the quantity and location of deforestation are population density and accessibility to forests, i.e., distance to roads, distance to settlements, and slope"[76]. Given these large differences in population density, any extrapolation of the deforestation trend that is precipitated by population density from the reference area to the project accounting area in the baseline is highly suspicious and probably misleading. Potentially, this goes against the VCS standards that recommend that the "the reference area must be similar to the project accounting area in regards to various conditions" (i.e. various conditions that affect deforestation) (VM009, pg. 15)[77]. Even by the end of the project in 2045, the project accounting area's population density will not be as high as that of the reference area in 2010. Further, general economic (incomes, technology, population growth), political, and institutional factors may change over time such that the drivers of change in the reference area in the past may be different from drivers of change in the project area in future. Therefore, expecting the project area to evolve (from 2015-2045) the same way as the reference area evolved from 1985-2015 is not plausible.
Further comparison shows that the area cultivated per household is larger in the reference area than the project accounting area, which could explain the observed deforestation rates in the reference area. The forest types in the two areas are also different. Though both forest types can generally be called Miombo-mopane woodlands (Mittermeier et al., 2003); the two areas have different proportions of the Miombo and Mopane species. The reference area is predominantly a miombo woodland on a plateau while the project accounting area is composed of mostly mopane woodlands. This has implications for the parameters, for the carbon stock density, and even deforestation, that have been used to project deforestation in the project accounting area as households may prefer cutting certain tree species for charcoal for example.

6.2 PROJECTED DEFORESTATION

The second main issue with the LCFP that compromises its environmental integrity has to do with the deforestation rate used, the choice of the baseline approach, and the actual reported deforestation in each of the monitoring reports.

[76] Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 3 - https://registry.verra.org/app/projectDetail/VCS/1775
[77] Source: https://verra.org/wp-content/uploads/2018/03/VM0009-Methodology-for-Avoided-Ecosystem-Conversion-v3.0.pdf

6.2.1 REPORTED BASELINE DEFORESTATION RATE

First, we begin by showing that the reported deforestation in the reference area is higher than most figures reported in Africa and Zambia inclusive, and therefore the deforestation avoided through the LCFP is most likely overestimated, resulting in an overestimated number of carbon credits produced. In the monitoring report 1 (MR1), they state that the deforestation rate for the reference area (as the project accounting area has no observed deforestation) "for the fixed reference period [1985-2015, ndr.] "was 1% with a notable increase to 4.6% between 2013 and 2017" (MR1, p. 45)[78]. Further, in the project description document[79], they state that the "estimated number of hectares of reduced forest loss in the project are measured against the without-project scenario" is 361,060 ha, out of the total project accounting area of 485,495 ha. This translates into a deforestation rate of [80] 2.5% per year—a figure quite high. If we take into account the fact that each year there will be less forest area remaining (assuming the project does not add more land to the project area), the average deforestation rate estimated is around 5% for the lifespan of the project using the annual emission reductions and average carbon stocks per hectare to calculate the area avoided from deforestation (figure 10). While it is expected that areas that are on the frontiers of say main roads of villages will have higher deforestation rates, the size of the LCFP means that the inner areas away from the frontiers of deforestation makes a huge proportion of the project area.

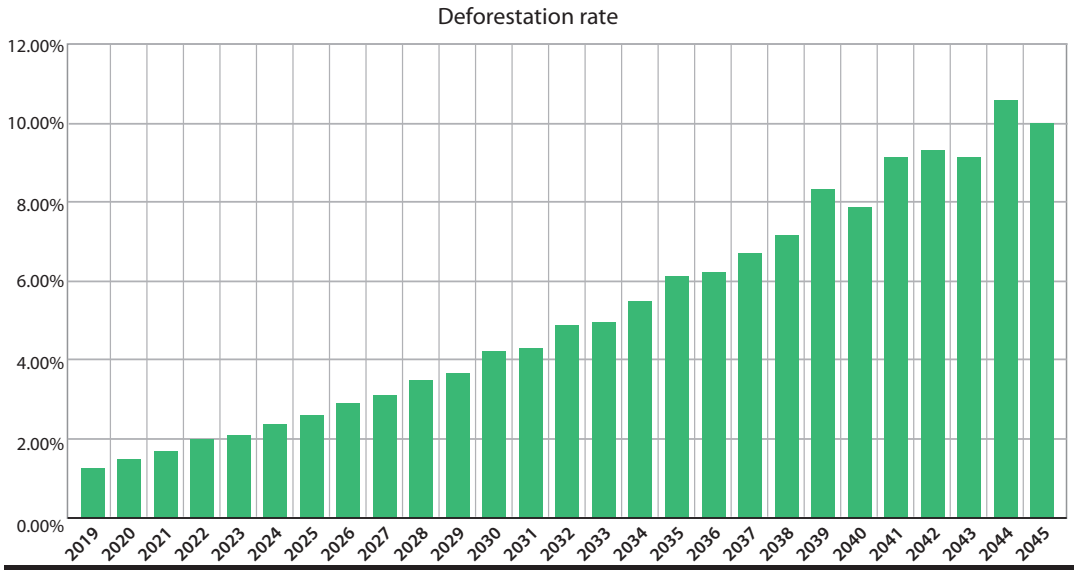

Figure 10. Project implied annual deforestation rate over the lifespan of the project. The deforestation rate is calculated by dividing the annual emission reductions by the amount of carbon stocks per hectare (221 tCO2e/ha) used in the project, adjusting the denominator to take into account the remaining area after each year of deforestation from the total project area of 485,495 ha. Source: Project description document[81]. Deforestation rate is calculated using the E.Rs (tCO2) divided by 221 tCO2 (which is the carbon density used in the project) to get the hectares of avoided deforestation, divided by the project accounting area assumed remaining (after subtracting what has been deforested).

[78] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20180630_LCFP_MR1.pdf

[79] Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 7 - https://registry.verra.org/app/projectDetail/VCS/1775

[80] To calculate the deforestation rate, we divide the total area "saved" from deforestation by the number of years, 361,060 ha/30 years = 12,035 ha/year. Deforestation rate = 12,035/485,495 = 0.0247 = 2.5% per year.

[81] Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 151 - https://registry.verra.org/app/projectDetail/VCS/1775

It appears that the deforestation rate of more than 4%, is higher than what is available in literature and results in over estimation of the carbon credits generated.
In fact, in Zambia, the national average for deforestation rate is estimated at between 0.4% and 0.7% per year (Mukosha & Siampale, 2009; Chidumayo, 2012; GRZ, 2016; FAO, 2020). All studies and reports on deforestation in Zambia show lower rates than the rate used in the project. The most recent (2020) Forest Resources Assessment (FRA) report by FAO, using data from the second integrated land use assessment (ILUA II), shows that about 188,000 ha of forests were lost in Zambia per year between 2015 and 2020, out of a total of about 44 million ha of the forest—resulting in a deforestation rate of 0.42%. ILUA first assessment gave a range of 250,000-300,000 ha of forest loss per year (0.58-0.68% deforestation rate). Old FAO estimates have ranged from 166,000 ha to 445,000 ha (about 1% deforestation rate) of forest loss per year (FAO 2005, 2010). These figures for Zambia are commensurate with most countries in Africa. For example, the deforestation rate for Ghana is estimated at 0.4-0.7% between 1990 and 2015 (Acheampong et al., 2019), Mozambique at 0.58% nationally (Marzoli, 2007) with case studies on Miombo showing higher rates of about 0.8% (Ryan et al., 2014). With the highest deforestation rate in Africa because of high poverty and dependence on agriculture, Malawi ranged from 1-3% in the period between 1970-2010 (Mauambeta & Mumba, 2010)[82].
While national averages in Zambia may be lower because they include areas that are remote and far away from the frontiers of deforestation or human activity, provincial level estimates provided by Chidumayo (2012) in Table 4 still show lower rates of deforestation. The table shows that Eastern and Lusaka provinces, where the LCFP is based, have deforestation rates way lower than the figure reported in the project documents.
Though the monitoring report and the project document do not mention the actual figure used, the figure we calculate of 2.5% seems too high and significantly inflates the avoided deforestation in the project area, leading to a higher number of carbon credits being produced.

Table 4: Annual deforestation rates for at provincial level for Zambia

Province	Annual deforestation rate (%) 1965-2005
Central & Lusaka	-0.65
Copperbelt	-0.84
Eastern	-0.85
Luapula	-2.47
Northern	-0.47
Northwestern	-0.77
Southern	-0.2
Western	-0.2

Source: Chidumayo, 2012.

6.2.2 CHOICE OF THE BASELINE APPROACH

The VM0015[83] guide on avoided unplanned deforestation, which both MR1[84]and the project document refers to, gives guidelines on the choice of the baseline approach for projecting future deforestation rates. The guidance is shown below:

Selection of the baseline approach

To project future deforestation three baseline approaches are available:

a) Historical average approach: Under this approach, the rate of baseline deforestation is assumed to be a continuation of the average annual rate measured during the

[82] For Malawi, this includes urbanization, infrastructure and other drivers than mentioned in the LCFP. Note must also be taken that Malawi is poorer than Zambia and has no natural resources.
[83] Source: https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf
[84] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20180630_LCFP_MR1.pdf

historical reference period within the reference region or, where appropriate, within different strata of the reference region.

b) Time function approach: With this approach, the rate of baseline deforestation is estimated by extrapolating the historical trend observed within the reference region (or its strata) as a function of time using either linear regression, logistic regression or any other statistically sound regression technique (see step 4.1.3). This approach requires multiple deforestation measurements during the past 10-15 years.

c) Modeling approach: With this approach, the rate of baseline deforestation will be estimated using a model that expresses deforestation as a function of driver variables selected by the project proponents. Such driver variables may be spatial and consistency with the analysis of step 3 must exist.

The LCFP uses the historical approach, as stated in MR1 (p.45)[85]. Under the historical approach, the baseline deforestation is assumed to be the continuation of the historical deforestation rate. As the VM0015[86] further clarifies, approach a) (i.e. the historical average approach) should be used if there is no driver of deforestation that can be used to project deforestation; otherwise, option c) should be used. This does not seem to be the case in the LCFP, where population density is stated as one of the main drivers, and it is predicted that population density will increase in the project area. Given the VM0015 guideline, why did project proponents not use another approach, such as the modeling approach that seems more appropriate? Using the historical approach from the reference area, with deforestation rates that also seems higher than what has been reported by others (for example in Table 4), could also inflate the carbon credits generated and sold.

6.2.3 FIRE RISK

The non-permanence risk document that attaches a probability to the various risks that might affect the project and hence the permanence of the carbon credits generated puts the fire risk in the project at 0.5% (i.e. 0.5% chance of having a fire in the project area). Because of this low risk, the buffer account is set at 11% of the E.R.s generated. The buffer account includes other risks to the project such as financial viability risk, political risk that can affect continuity, and project management risk, in addition to the fire risk. Though this is stated in the project document and reflected in both MR1 and MR2, the table (page 150) in the Project description document[87] shows that the buffer account is only about 1% of the E.Rs. The VM009 guide states that this number could be between 10-40% depending on the risk. The LCFP sets it barely above the minimum. The document justifies this low risk on the grounds that the project puts mitigation measures, specifically early burning, against fire outbreaks and that the effect of fires on savannah is negligible, citing Chidumayo (1988). However, this ignores recent literature and other literature that shows the impact of fires on miombo forests, that is potentially induced by climate change (Cochrane et al., 2009; Saito et al., 2014) as increasing drought can enable fires to spread quickly to other forests. For example, Sinha et al. (2004) estimate that fires in southern Africa contributed as much as 12.6% of the average annual emissions from all types of savanna fires worldwide in 2000. Chidumayo (2013) estimates that fires caused between 25-77% of total biomass loss in Zambia's miombo forests, after 22 years of observations on permanent sample plots. For Zambia, estimates show

[85] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20180630_LCFP_MR1.pdf

[86] Source: https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf

[87] Source: LCFP Project description document (PD), file name: 20190715_LCFP_PD (4).pdf - page 150 - https://registry.verra.org/app/projectDetail/VCS/1775

that over 50% of the land area in Zambia is affected by fire, with approximately 25% of the total land cover burnt annually (Archibald et al., 2010). These fires result in emissions in the short term. As of 2000, Sinha et al. (2004) estimated that fires resulted in about 2000 Gg of biomass being burnt in Zambia between May and October. Fires also have long-term effects as they affect the growth of the forests. They can result in the transition of woodland to grassland (Bond and Keeley 2005). Smaller trees, particularly those below 5 cm DBH (diameter at breast height) have high mortality (up to 12%) in intense fires in miombo woodland. Fire can also inhibit the regeneration and survival of young plants and, therefore, woodland recovery from clearance or degradation. Compared to two other projects in Miombo forests, one in Tanzania and another in Zimbabwe, the LCFP has the lowest fire risk, in virtually similar settings.

Further, the LCFP puts the frequency of fires at 1 in every 10-25 years. However, Chidumayo (1995) showed that forests in Zambia are burnt at least once in 1.6 years. This was confirmed by a study done in Eastern province where they report that "the analysis revealed that of the area in Eastern Province that has burned in the last 14 years (2000 – 2013), 28% burned with a frequency of every 1.6 years, 37% burned every 3.5 years, 14% burned every 7 years, and 21% of the area burned every 14 years" (Hollingsworth et al., 2015, p. 18). Therefore, a likelihood of once in 10-25 years seems too optimistic, resulting in lower probability of fire, reduced buffer carbon allocation, and increased carbon credits generated for 'sale'.

6.2.4 FORESTS BIOMASS

The project puts the carbon emitted from degradation and deforestation at about 224 $tCO2e\ ha^{-1}$, which seems higher than most in literature. These net emissions from degradation and deforestation are the difference between what they measure as the sum of above ground carbon (AGC) and below ground carbon (BGC) stored in the Luangwa community forests of 239.5 $tCO2e\ ha^{-1}$ and that which remains after the forest has been converted to farmland, which is 15.6 $tCO2e\ ha^{-1}$. While we acknowledge that there are differences in the literature on the carbon storage capacity of the Miombo woodlands, and indeed any other forests, the project's own calculation is at the higher end of most studies. Below (Table 5), we provide figures from the literature that focus on the same type of forest.

Table 5: Above ground CO2e stocks of forests similar to the LCFP

Carbon storage miombo woodlands (t $CO2e\ ha^{-1}$)	Country/Region coverage	Study
114	Zambia	Saatchi et al., 2011
109*	Miombo Woodlands, Mozambique	Ribeiro et al., 2013
84	Miombo Woodlands, Tanzania	Shirima et al., 2011
125**	Miombo woodlands, Africa	Gumbo et al., 2018
122	Miombo, Mozambique	Ryan et al., 2011

* This study also calculated soil carbon, but we subtract that to compare with the LCFP's MR1.2 and MR2[88].
** Report the average of 54 studies reviewed.
Note: One study not listed in table 5 is Kutsch et al (2011) that calculated the carbon stock of an intact forest and one degraded as a result of charcoal burning. They found that on average, emissions from degradation are about 217 tCO2e/ha[89].

[88] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20190910_LCFP_MR1.2.pdf; 20200529_LCFP_MR2.pdf

[89] The paper gives an average biomass of 150 tons in undisturbed forest and 24 tons in a disturbed forest. To get the loss from forest degradation/disturbance, we do 150-24 = 126. Since this is biomass, to get CO2 we do the following calculation:126x0.47x3.667 = 217tCO2/ha.

If we take an average of the studies that focus on Miombo woodlands, similar to the project area for the LCFP, and make an assumption that all carbon is lost upon conversion of the forest to agriculture and other uses, then on average, there is 108 tCO2e per hectare. This would mean that, roughly, the LCFP overstates the carbon credits by double.

6.3 OTHER ISSUES WITH THE LCFP

The project activities that include infrastructure development, social services, conservation farming training, apiculture, crop diversification are in the domain of rural development. More direct activities include sensitizing the communities about forest fires and direct forest patrols. The planned activities are oriented towards rural development with limited direct incentives for farmers to conserve forests. This is typically an Integrated Conservation-Development Project (ICDP), or what has been labeled "conservation by distraction," including patrols to watch the forests. Patrols are conducted by trained scouts who monitor for encroachment into the project area, report any animal traps in the GMAs, and any poaching to protect biodiversity. Scouts are not armed, and are supposed to report any of these issues to the community resources boards and chiefs for resolution. These kinds of indirect incentives for conservation have been analyzed and deemed insufficient to yield conservation benefits. Problems include conceptual flaws that are embedded in the theory of change, for example, expecting other sources of income to reduce the use of forests. Studies show that people are more likely to incorporate new sources of income as complements to existing sources and not as substitutes (Ferraro et al., 2002). For example, beekeeping has been suggested in the project. In the case of LCFP, the project proponents have faced challenges in the implementation of some activities such as beekeeping with low yields. This may discourage households from these alternative activities that the project is promoting, likely making it hard for the households to completely stop depending on the forest. Such challenges are part of the bigger problem with REDD+ projects that try to move smallholders away from their traditional ways of life to new activities that they have very little or no experience in and are probably not very interested.

For conservation initiatives that encourage extractive activities (e.g., non-timber forest products-NTFPS- value addition that has been suggested), sustainability is a key concern (Kiss, 2016). The LCFP attempts to commercialize non-timber forest products by value addition, something that may increase the likelihood of unsustainable harvest/collection from the forest (Morsello et al., 2014). Direct payments instead of indirect payments have been found to offer better incentives for households to conserve the forests (Ferraro, 2001)[90]. Vero et al (2015) find similar evidence in the context of REDD+ in Kenya, showing that hybrid ICDP and some form of direct payment work better when households are forest users but not landowners.

6.4 POTENTIAL COMMUNITY PROBLEMS OF THE LCFP

The LCFP mentions that they were instrumental in operationalizing the Forest Act of 2015 in Zambia and a statutory instrument (S.I) of 2018 for Community Forest Management. In the non-permanence report, it is stated that "BCP has been instrumental in the operationalisation of the Forest Act 2015 by developing guidelines that secure statutory rights like the Forest Carbon Stock Management guidelines and also the Community

[90] Conservation organisations and/or projects and their funders need to reckon with a colonial 'fortress conservation' which restricts access to customary and ancestral lands, and leads to harassment, abuse, evictions and killings of Indigenous People and other members of local communities. These atrocities are not incidents, they are the outcome of a failed conservation model predicated on colonialism that treats marginalised and forest dependent communities as a threat to wildlife. This outdated conservation approach must be discarded entirely.

Forest Management Statutory Instrument" (page 7). One interesting aspect of the S.I., which probably was advocated by Biocarbon Partners to ensure that the communities stick to the agreed-upon rules, is that they granted rights to the community where the forest is to exclude other villages from access. This somehow transformed the forest from open-access to restricted access. They granted the rights to communities that live within the forests while excluding those that live away from the forests, even though they could travel and access the forest. This means the communities that live within the forests now have more than usufruct use rights, but also have the right to exclude those that live outside the forests. However, even the communities that live within, because of the nature of REDD+ projects, have been stopped from using the forests except for some non-timber forest products such as honey (note that not all NTFPs collection/harvest is allowed). While this simplifies the implementation of the project, it has potential negative consequences for the communities. This has the potential to create conflicts among communities in the long-run and impoverish the communities without access to forests in the event of shocks that reduce their agricultural output. Conflicts between 'owner' communities and other communities is possible once one community has the property rights that include exclusion and alienation rights. Despite the consultations and the stated FPIC (free, prior informed consent), projects like the LCFP and their reliance on formal governance arrangements lead to common forests' enclosure. "This inevitably causes conflicts between and within villages over ownership and access to forest resources, especially given the importance of customary relations in tropical rural contexts" (Scheba & Rakotonarivo, 2016). We argue that despite the extensive community engagement strategy of the LCFP project, advocating for a statutory instrument that gives rights to one community will ultimately result in land conflicts. However, this gives an advantage to LCFP as they do not have to extend their programs to other communities to avoid deforestation.

Households collect food and earn income from forests. In a study in Zambia by Mulenga and others (2014), they found that rural households get 35% of their income from the extraction of non-timber forest products, and charcoal/wood fuel (for selling and home use) contributes 23 percentage points to this 35%. Table 6 reports on the percentage of households earning income from NTFPs per province.

Table 6: Households earning income from forests and types of NTFPs collected

			% of NTFPs households earning income from each NTFP			
Province/ national	**Weighted population**	**NTFP HHs**	**Wood fuel**	**Ants/ ceterpillars**	**Mushrooms**	**Wild honey**
Central	196,485	13,754	99	3	4	1
Copperbelt	101,692	9,152	91	4	7	1
Eastern	300,917	6,018	86	0	5	9
Luapula	180,091	14,407	67	28	19	1
Lusaka	48,512	1,455	100	0	0	0
Northern	316,613	6,332	73	21	4	5
Northwestern	133,154	18,642	5	73	25	18
Southern	207,419	14,519	84	0	15	6
Western	184,978	11,099	97	0	8	0
Zambia	**1,669,861**	**95,379**	**70**	**21**	**13**	**6**

Source: Mulenga et al. (2014)

So, by stopping households from using the forest to access NTFPs including wood fuel, the project is taking away about 35% or 23% (if we focus on charcoal/fuelwood only) of the household's income. This figure is not considering the direct contribution of forests to food and nutrition. Forests contribute as much as 14.8% of the recommended amounts of fruits and vegetables, and 106% of the reference quantity of meat and fish (Rowland et al., 2017). This contribution becomes even more important in the event of weather shocks such as droughts, which are already a major problem (Mulenga et al., 2017) or any household shock that affects agricultural production (McSweeney, 2004).

The second general issue is the lack of consideration for how covariate weather shocks affect households' use of forests. Because the marginal value of labor in agriculture goes down when there is a drought or a flood, households use forests as some form of natural insurance or safety net (FISHER, 2004; Delacote, 2009; Paumgarten & Shackleton, 2011). And since poor households depend more on forests, they are more likely to be affected by approaches drawing them away from forests. Cynthia Ratsimbazafy et al. (2011) showed that in Madagascar, implementing a REDD+ project reduced income and negatively affected the poorest households who depend more on forests. Projects such as the LCFP do not provide varying payments, varying in terms of the opportunity cost that different households have to incur and varying in years when households would use the forest more, such as years with covariate shocks that affect agricultural production.

Lastly, we want to highlight some discrepancies in the project documents that indicate conflicting pieces of information. We used our discretion to choose what to reference in some instances.

- Unclear deforested area in the first monitoring period: MR1.2 pg. 85[91] states that deforested areas in the project between 2015-2018 added up to "201.17" ha. However, the same document in Table 11 shows a figure of 2100.21 ha.
- Conflicting data on carbon stocks/storage capacity of the forests. This is more serious given that they actually carried out the study: MR1[92] gives the above ground and below ground total carbon stocks at 166 tCO2e/ha (Table 21), while the project description document and MR2 (pg. 59)[93] gives a figure of 236.2 tCO2e/ha.
- It is not clear which methodology the project is following between VM0009 (Methodology for Avoided Ecosystem Conversion)[94] and VM0015 (Methodology for Avoided Unplanned Deforestation)[95]. The documents, and email communication, refer both to VM0009 and VM0015. Project description document refers to VM0009, while MR1 refers to VM0015 (page 14), and the project document refers to "Avoided Unplanned Deforestation" which seems to be VM0015.
- There are major differences between MR1[96] and MR1.2[97]. This would need clarity.

[91] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20190910_LCFP_MR1.2.pdf
[92] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20180630_LCFP_MR1.pdf
[93] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20200529_LCFP_MR2.pdf
[94] Source: https://verra.org/wp-content/uploads/2018/03/VM0009-Methodology-for-Avoided-Ecosystem-Conversion-v3.0.pdf
[95] Source: https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf
[96] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20180630_LCFP_MR1.pdf
[97] Source: https://registry.verra.org/app/projectDetail/VCS/1775, file name: 20190910_LCFP_MR1.2.pdf

7. CONCLUSION

This analysis began by analyzing ENI's promise to use forest carbon projects in developing countries to offset their GHGs emissions by 40 million tons of CO2e by 2050 per year. With the analysis carried out here, we have shown that this bold claim may be impossible to achieve as it would require enormous tracts of forests to be saved from deforestation to meet this target. Using the case of the LCFP, they would require about ten such projects (assuming the carbon credits generated by the LCFP are correct) to reach such a target. Worse-off, if ENI was to offset all their emissions, which stand at about 537 million tons of CO2 per year, using carbon projects in developing countries' forests, this is nearly impossible. These targets will not be achieved without harm to the forest-dependent communities.

The second part of the analysis focused on checking for the environmental integrity of the LCFP. This was done by looking at the project documents, critically examining them and comparing any assumptions and estimations against scientific literature. The analysis considered five aspects: choice of reference area, deforestation rate, choice of baseline approach, fire risk, and carbon storage capacity of the forests. We found the reference area to be statistically significantly different from the project accounting area in ways that would inflate the carbon credits generated. We also found the deforestation rate used to project future avoided deforestation to be higher than what is reported by other studies, and the choice of the baseline approach not matching with what is recommended in the guidelines by VCS. Further, the risk of wildfires to the forests seems to be underestimated, and the carbon storage capacity of the miombo forests to be overstated, way above any figure we could find in literature. All these mismatches and errors are in the direction that would lead to overstated emission reductions. This project is not the only one, among many similar projects that have been reviewed scientifically, overstating the emission reductions. For example, Seyller et al. (2016) reviewed REDD projects in Congo DR and Madagascar and found "dubious" choices for reference region and questionable baselines. These same findings are reported for about 17 REDD+ projects in the Amazon that were reviewed by West et al. (2020), who conclude that the emission reductions are "overstated." Another study reviewed REDD+ projects in Central Africa found a gap between promises of reduced remissions and reality (Demaze et al., 2020). We conclude that the LCFP is no exception and most likely overstates their Emission Reductions (E.R.s) approximately by double[98], through the questionable choice of the reference area, baseline approach, fire risk probability, and deforestation rate used.

[98] See paragraph: 6.2.4. Forests biomass.

8. APPENDIX I: LUSAKA AND EASTERN PROVINCES OF ZAMBIA

The Luangwa forests in the Luangwa Valley add to the vast forest area in Zambia. The Luangwa Community Forest Project is being implemented in Lusaka and Eastern Provinces of Zambia, around the Luangwa valley. Rufunsa district is located on the eastern side of Lusaka Province. Rufunsa district (formerly part of Chongwe) is home to the Soli speaking people who grow maize as their main crop. The locals are also known to rear livestock such as local chickens, goats and cattle. Other economic activities include charcoal production. This is necessitated by the district's proximity to the capital city, Lusaka, which is the biggest market for charcoal.
In the Eastern Province, the districts of interest are Nyimba, Lundazi and Mambwe. Lundazi District is one of the biggest districts in Eastern province. The main ethnic groups are Tumbuka and Chewa speaking people, with Tumbuka being the most commonly used language. However, Ngoni, Senga and Bisa speaking people are found in Lundazi. Adjacent to Lundazi District is Mambwe District which is composed mainly of Kunda speaking people and the main language spoken is chiKunda. Additionally, chiBisa and chiChewa are also spoken in Mambwe District. The main economic activities are smallholder farming, trading, and providing tourism hospitality services. The main food crops grown are maize, sorghum, rice, groundnuts, sweet potatoes, cowpeas, cassava common beans and pumpkins. Cotton is grown as a cash crop under contract farming. However, crop production is constrained by crop raiding wild animals and by climate variability in the Luangwa (Mulungu et al., 2021). Nyimba District, also in the Eastern Province is characterized mainly by the Nsenga and the Chewa ethnic groups. The residents of the district mainly grow maize, sunflower and cotton. Cutting down of trees for timber and charcoal is also common in Nyimba district. Other economic activities in the Luangwa Valley are timber harvesting, charcoal production, photographic tourism, and safari hunting businesses. The main ethnic group is the Kunda and the main language spoken in the area is chiKunda, but ChiBisa and ChiChewa are also spoken (Umar and Kapembwa 2020).

Eastern province has over the 20 years seen a reduction in forest cover owing to deforestation as a total of 156,000 hectares was lost between 2000 and 2014[99]. The increase in deforestation suggests an increase in unsustainable forest use. A preliminary report in readiness for REDD+ showed that deforestation mainly occurs along the railway from the south of the country to the Copperbelt, but new hotspots are starting to appear

[99] Source: http://ziflp.org.zm/wp-content/uploads/2018/09/Deforestation_Drivers_UNIQUE-1.pdf

also away from the railway (Vinya et al., 2012). The study identified the key drivers of deforestation as agricultural expansion (specifically smallholder subsistence shifting cultivation, and general extensification), infrastructure development, wood extraction and fires (Vinya et al., 2012). One of the consequences of deforestation is the loss of biodiversity and genetic resources of many tree species, which threatens their continued existence or their possible future use (Forestry-Department 2016). The National Strategy to Reduce Deforestation and Forest Degradation (REDD+) which was developed in 2014 focuses on tackling different drivers of deforestation in both the forestry and other identified key sectors in particular, agriculture, energy, mining and infrastructure. The vision of the strategy is to contribute to a prosperous, climate change resilient economy by 2030, anchored upon sustainable management and utilisation of the nation's natural resources towards improved livelihoods (GRZ, 2014).

9. APPENDIX II: QUESTIONS POSED TO ENI S.P.A. PURSUANT TO ARTICLE 127-TER OF LEGISLATIVE DECREE NO. 58/1998

Greenpeace Italy, prior to ENI S.p.A. shareholder's meeting held on 12 May 2021, posed some questions to the company about its REDD+ projects. ENI's full answers to Greenpeace Italy, reported below, have been extracted from the document: "Assemblea Ordinaria di Eni SpA 12 maggio 2021 Risposte a domande pervenute prima dell'Assemblea ai sensi dell'art. 127-ter del d.lgs. n. 58/1998" published on ENI's website[100].

DOMANDE SU REDD+

A febbraio 2021 Eni S.p.A. ha presentato il Piano strategico 2021-2024 dove si segnala che l'azienda compenserà, tramite "iniziative REDD+", "oltre 40 milioni di tonnellate/anno di CO2 al 2050". Sempre nel Piano strategico 2021-2024, ENI ha pubblicato la lista dei Paesi in cui sta avviando progetti di conservazione forestale: Angola, Repubblica Democratica del Congo, Ghana, Malawi, Mozambico, Zambia, Colombia, Messico, Vietnam e Malesia. Tuttavia, nei database ufficiali consultati da ottobre 2020 a febbraio 2021 (tra cui VERRA register, ID-RECCO, FAO-REDD plus-Info, Markit, Forest trends, Gold Standard, CDP) non è stato possibile trovare alcuna informazione relativa ai progetti REDD+ in cui ENI è coinvolta in qualunque forma (o da cui sta acquistando crediti di carbonio), facendo esclusione per il LCFP in Zambia.

Stanti queste premesse, si chiede a ENI:

3.1 Una conferma che tutti i crediti di carbonio acquistati provengano dal progetto LCFP in Zambia;

Risposta

Oltre al progetto LCFP in Zambia, Eni ha acquistato a fine 2020 crediti dal progetto Kulera in Malawi. Analogamente a LCFP, si tratta di un progetto REDD+ validato e certificato Climate, Community and Biodiversity (CCB) Standard, livello "Triple gold", per il suo eccezionale impatto sulle comunità, sul clima e sulla biodiversità. Sul registro VERRA si possono vedere unicamente la generazione ed il ritiro. I crediti di Kulera non sono ancora stati ritirati.

3.2 Una conferma che l'azienda non sia partner o buyer di altri progetti REDD+.

Risposta

Si veda risposta 3.1.

[100] ENI S.p.A. - Assemblea Ordinaria di Eni SpA 12 maggio 2021 - Domande e risposte prima dell'Assemblea 2021 - page 68 - Source: ENI.

3.3 La motivazione per la quale ENI non pubblichi, attraverso i suoi canali, le informazioni sui progetti, limitandosi a elencare i Paesi in cui sta avviando progetti di conservazione forestale, senza dare alcuna specifica dei progetti e dei crediti di carbonio riferibili a ciascun progetto;
ENI ha dichiarato di "essere diventata un membro attivo della governance del Luangwa Community Forests Project (LCFP)", impegnandosi "altresì per 20 anni, fino al 2038, ad acquistare crediti di carbonio certificati. Normalmente, gli acquirenti di crediti di carbonio non sono coinvolti nella governance dei progetti REDD.

Risposta

Al momento Eni sta vagliando una serie di iniziative nei paesi menzionati. Solo dopo aver valutato e definito la partecipazione nel progetto si potrà predisporre un maggior dettaglio di comunicazioni.

3.4 Cosa significa l'ingresso di ENI nella governance del progetto in termini di task e responsabilità del processo?

Risposta

Entrando nella governance del progetto Eni ha la possibilità di poter sovrintendere ogni fase del loro sviluppo, dall'analisi delle cause di deforestazione alla protezione e gestione delle foreste, fino alla verifica, da parte di ente terzo, della riduzione delle emissioni e delle effettive ricadute positive per le comunità locali coinvolte nel progetto. Partecipando attivamente alla governance dei progetti REDD+ identificati Eni ha la possibilità di portare la propria esperienza e capacità di pianificazione in progetti complessi contribuendo al successo dell'iniziativa e alla stabilità anche finanziaria di lungo periodo.

3.5 Quale tipologia di controlli porta a termine ENI per verificare in maniera indipendente l'integrità ambientale dei progetti REDD+ da cui acquista crediti di carbonio o con cui collabora in alcun modo?

Risposta

Eni ha deciso di investire principalmente in progetti sviluppati secondo gli standard ambientali e sociali più elevati quali Verified Carbon Standard (VCS) e Climate Community and Biodiversity (CCB) di Verra riconosciuti a livello internazionale. I Crediti di Carbonio ottenuti sono certificati da un ente terzo indipendente accreditato da Verra che verifica che gli stessi siano reali, addizionali, misurabili e verificabili, permanenti ed unici. Peraltro, partecipando alla governance Eni ha la possibilità di verificare direttamente tutte le fasi del processo.

3.5.1 Nel dettaglio, quali di questi controlli ha adottato prima di entrare nella governance e acquistare crediti di carbonio al LCFP in Zambia?

Risposta

Oltre a quanto evidenziato del punto precedente, prima di entrare nel progetto Eni ha svolto le verifiche e due diligence applicabili secondo le proprie procedure (tra le quali ad es. Anticorruzione e Rispetto diritti umani).

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