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**Evaluation of the Climate Impact Assessment**

**ESIA for the Simandou Blocks 1 & 2 Mining Project**

By

**Mark L. Chernaik, Ph.D**

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I evaluated the climate impact assessment presented in the ESIA for the Simandou Blocks 1 & 2 Mining Project. I conclude that such assessment is defective for the following reasons:

* The value of 8.066 million tCO2e of emissions from mining *is likely a large underestimate*; and
* CO2e emissions from mining could be *substantially reduced* if Winning Consortium Simandou (WCS) were to take the reasonably available alternative of using renewable energy rather than heavy fuel oil for a proposed 40MW captive power plant that would be part of the mining project.

**Qualifications**

I have a Ph.D. from Johns Hopkins University School of Public Health and a law degree from the University of Oregon School of Law (with an emphasis on environmental law). Since 1992, I have served as Staff Scientist for the Environmental Law Alliance Worldwide (ELAW) advising public interest environmental lawyers on a variety of scientific matters, including more than 100 cases involving issues of sustainable development. In June 2005,[[1]](#footnote-1) and again in February 2011,[[2]](#footnote-2) the European Court of Human Rights relied on my opinions to reach landmark decisions regarding the right to environmental justice. Testimony I provided about how the impacts of proposed development projects were presented in Environmental Impact Assessments (EIAs) contributed to landmark judgments of the High Court of Kenya and the National Environment Tribunal.[[3]](#footnote-3) I have evaluated numerous EIAs for proposed mining projects, and I am the author of a popular guidebook for evaluating EIS for mining projects that has been translated into three other languages.[[4]](#footnote-4)

**The ESIA Substantially Underestimates CO2e Emissions From Mining**

The ESIA for the Simandou blocks 1 & 2 mining project contains the following conclusion about the amount of greenhouse gas emissions that would be associated with both the mining project and the related railway project. Page 2 of the Executive Summary states:

“Des considérations relatives au changement climatique sont accordées à l'effet du Projet Simandou sur le climat au sens large, mais aussi à l'effet du changement climatique sur le Projet. Sur la durée de vie de la mine de 22 ans,les émissions de gaz à effet de serre de Scope 1 (émissions directes de gaz à effet de serre) sont estimées à 19,066,716 tonnes d'équivalent carbone (tCO2e), dont 1l millions de tCO2e provenant du transport ferroviaire des exportations de minerai vers le port. ll ne doit pas y avoir d'émissions de scope 2 car la production d'électricité aura lieu sur le site, elle est donc couverte par le scope 1. Bien qu'il s'agisse d'une quantité considérable d'émissions de carbone, si le fer est considéré comme un produit essentiel pour la société, alors les émissions par unité de fer sont acceptables. WCS a intégré plusieurs méthodes pour améliorer l'efficacité et s'est engagé à entreprendre une évaluation de faisabilité pour déployée des énergies renouvelables en vue de réduire les émissions davantage.”

TRANSLATION:

“Climate change considerations are given to the effect of the Simandou Project on the wider climate, but also to the effect of climate change on the Project. Over the mine life of 22 years, Scope 1 greenhouse gas emissions (direct greenhouse gas emissions) are estimated at 19,066,716 tonnes of carbon equivalent (tCO2e), of which 11 million tCO2e from rail transport of ore exports to the port. There should be no scope 2 emissions as the electricity generation will take place on site so is covered by scope 1. Although this is a considerable amount of carbon emissions, if iron is considered an essential product for society, then the emissions per unit of iron are acceptable. WCS has integrated several methods to improve efficiency and is committed to undertaking a feasibility assessment for deploying renewable energy to further reduce emissions.”

Subtracting emissions of 11 million tCO2e from rail transport of ore exports to the port from 19.066 million tCO2e from the combined CO2e of the mines and the railway implies that CO2e emissions from mining would be 8.066 million tCO2e. However, as I discuss below, the value of 8.066 million tCO2e of emissions from mining *is likely a gross underestimate* because WCS’s estimated CO2e emissions fail to include emissions from land use changes

The value of 8.066 million tCO2e of emissions from mining is derived from the following table [Tableau 5.2.3 : Résumé des émissions primaires totales de GES pendant la durée de vie de la mine] beginning on page 5-24 of the ESIA, which shows emissions of 7.97 million tCO2e, 59% of which is from the combustion of heavy fuel oil at the proposed captive power plant and a further 37% of which is from the on-site combustion of diesel, primarily in heavy vehicles and equipment.

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Note, importantly, that CO2e emissions from “Perte de vegetation” (loss of vegetation) are designated as to be determined, resulting in the *complete exclusion* of CO2e emissions from land use changes in the CO2e of emissions from mining that is presented in the ESIA.

However, the ESIA does make some attempt at estimating emissions from land use changes in section 5.2.5.1 (Phase de construction) beginning on page 5-16. This section of the ESIA presents the following table (Tableau 5.2.2: Estimation des pertes de séquestration résultant du déboisement: Table 5.2.2: Estimated sequestration losses resulting from deforestation).

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Page 5-16 of the ESIA further states:

“On estime que 271300 tCO2e seraient émises si la zone boisée est défrichée et que le bois n'est pas conservé intact (c.-à-d. s'il est brûlé ou abandonné au pourrissement). En partant de l'hypothèse que le bois est préservé, ces émissions n'ont pour l'heure pas été incluses dans le modèle d'émission, cependant, il faudrait le faire si le bois est abandonné au pourrissement.”

TRANSLATION:

“It is estimated that 271,300 tCO2e would be emitted if the wooded area is cleared and the wood is not kept intact (ie burned or left to rot). Assuming that the wood is preserved, these emissions have not yet been included in the emission model, however, they should be included if the wood is left to rot.”

Considering how remote the mining blocks are from facilities that could theoretically process wood from mined areas into marketable materials, *it is unrealistic to assume* that any of the wood generated from vegetation clearing at the mining sites would be kept intact. Therefore, the estimated emissions of 271,300 tCO2e should have been included in the overall CO2e emissions of the mining project.[[5]](#footnote-5)

However, there are at least two ways in which an estimate of emissions of 271,300 tCO2e is likely to be unreasonably low.

**First,** the area of land disturbance in Table 5.2.2 is given as 844.46 hectares (= 8.44 km2). However, this amount of land disturbance does not conform with information elsewhere in the ESIA. For example, Tableau 3.1. (Occupation de Sols) [Table 3.1 Land Use] on page 3-5 of the EISA indicates disturbance of 37.2 km2 of land, including 23.6 km2 associated with “surface mining, mining industrial zones, main crushers, blast exclusion zone,” 1.5 km2 associated with “ore storage areas,” and 6.1 km2 for the “waste rock dump.”

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All of these land disturbances would occur in areas that are currently forested. Therefore, the estimate of CO2e emissions from land use changes presented in section 5.2.5.1 of the ESIA is likely at least four-fold lower (37.2 km2/8.44 km2 = 4.4) than had the entirety of expected land disturbances been included.

**Second**, the estimate of emissions of 271,300 tCO2e presented in Table 5.2.2 seems based on an unreasonably low estimate of carbon stocks in forests that would be disturbed. Estimates of CO2e emissions from clearing of forests takes into account both aboveground and below ground (carbon in soil) pools of carbon, according to the following equation:[[6]](#footnote-6)

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According to the Food and Agriculture Organization of the United Nations, aboveground carbon biomass of African forests is generally 99 tC/hectare and soil carbon densities are 120 tC/hectare.[[7]](#footnote-7) Table 5.2.2 on page 5-16 of the ESIA estimates that the 844.46 hectares of disturbed land contains 73,991 tons of carbon, which converts to a carbon density of 87.6 tons of carbon, well below the combined aboveground and soil carbon densities reported by the FAO of 219 tC/hectare.

**Third**, the estimate of emissions of 271,300 tCO2e presented in Table 5.2.2 *omits carbon sequestration* that would be lost when land is cleared for the iron ore mining project. Carbon sequestration rates for African forests reported in the peer-reviewed scientific literature center around 0.54 tC/hectare/year.[[8]](#footnote-8) Assuming land clearance of only 844 hectares, then the proposed mining project would result in an additional 36,800 tCO2 of lost CO2 sequestration.[[9]](#footnote-9)

However, assuming land clearance of 37200 hectares (Table 3.1), then the proposed mining project would result in an additional 162,200 tCO2 of lost CO2 sequestration.[[10]](#footnote-10) These losses of CO2 sequestration are mistakenly omitted from the ESIA.

**The ESIA Improperly Includes a Heavy Fuel Oil (HFO) Captive Power Plant That Would Be An Unnecessary Source of CO2e Emissions**

Page 5-22 of the ESIA states:

“On s'attend à ce que la demande en électricité provenant de la mine soit importante (environ 250 GWh), ce qui représenterait environ 1O%de la capacité de production annuelle de la Guinée. ll ne serait pas possible de faire peser ce niveau de charge supplémentaire sur le réseau national sans des améliorations importantes, un renforcement et une production supplémentaire. En conséquence, WCS a décidé de construire une centrale électrique de 40 MW distincte pour fournir de l'électricité au site minier. ll s'agit d'une stratégie sensée pour assurer la sécurité de l'alimentation eté-viter que le réseau national ne subisse des pressions excessives, mais la centrale électrique est prévue d'être alimentée au gazole, ce qui aura des impacts négatifs évidents sur le climat; en outre, l'intensité de carbone de cette électricité sera considérablement plus élevée que sielle étaitfournie par le mix du réseau national, du fait de l'absence d'hydroélectricité et d'autres sources renouvelables. ll est fortement recommandé que d'autres moyens de production soient envisagés et, si possible, adoptés pour contribuer à générer de l'électricité pour la mine. Toutes émissions associées à la production d'électricité appartenant au promoteur et exploitée par luisur le site minierferaient partie de ses émissions p rpaires plutôt que de ses émissions secondaires.”

TRANSLATION:

“Electricity demand from the mine is expected to be significant (around 250 GWh), which would represent around 10% of Guinea's annual generation capacity. It would not be possible to place this additional level of load on the national grid without significant upgrades, reinforcement and additional generation. As a result, WCS decided to build a separate 40 MW power plant to supply electricity to the mine site. This is a sensible strategy to ensure power security and avoid undue pressure on the national grid, but the power station is planned to be fueled by diesel oil, which will have obvious negative impacts. on the climate; moreover, the carbon intensity of this electricity will be considerably higher than if supplied by the national grid mix, due to the absence of hydroelectricity and other renewable sources. It is strongly recommended that other means of generation be considered and, if possible, adopted to help generate electricity for the mine. Any emissions associated with the proponent's own and operated electricity generation at the mine site would be part of its primary emissions rather than its secondary emissions.”

Forty megawatts (MW) of power is not a very large amount of power considering that modern wind turbines have power outputs of more than 3 MW each.[[11]](#footnote-11) As shown in the Google Earth image below, the Simandou iron ore deposits sit along a ridge with an elevation of more than 1300 meters that is an ideal location for locating wind turbines:

A picture containing mountain, valley, canyon

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Pages 5-31 to 5-33 of the ESIA states:

“Comme on peut le voir à la Figure 5.2.5, la ressource éolienne est assez faible dans les plaines environnantes, mais augmente sensiblement sur la ligne de crête de Simandou. À condition que les éoliennes puissent être implantées de manière à ne pas être compromises par les excavations minières, en fonction de l'étendue des opérations minières et de la question de savoir si une partie de la crête sera laissée intacte, il pourrait être possible d'y installer des éoliennes à certains emplacements.

“La ressource éolienne varie jusqu'à environ 8 m/s à 100 m d'altitude à ceftains emplacements, ce qui représente une vitesse de vent très appropriée pour la production d'énergie éolienne. La quantité totale d'énergie éolienne qui pourrait être générée dépendrait de la quantité et de l'emplacement disponible sur la crête pour le déploiement des éoliennes. Une seule éolienne pourrait être évaluée à environ 8 MW, de sorte que plusieurs éoliennes permettraient une production d'électricité à plus grande échelle. En supposant un facteur de capacité de 35 %, une seule éolienne de cette taille pourrait produire environ 24,5 GWh par an. Même si le vent n'était considéré comme une option à court terme que pendant 10 ans, jusqu'à ce que l'exploitation minière atteigne la crête sur laquelle les éoliennes sont installées, il pourrait représenter une option utile et bon marché de production d'électricité à faible émission de carbone.

“Dans certaines circonstances, le développement eolien peut poser quelqupess défis. Des éoliennes lconçues et placées de mapière inappropriée peuvedt entrainer des problèmeS pour certaines espèces id'oiseaux et de chauves-souris. Si le développemerit éolien devait être poursuivi, des travaux supplémentaires seraient nécessaires pour comprendre exactement quelles espèces sont présentes dans les zones proposées pour le déploiement et si ces espèces sont menacées par les pales ou d'autres effets. Les éoliennes génèrent du bruit mécanique et aérodynamique, de sorte qu'il faudrait maintenir une séparation suffisante avec les récepteurs sensibles tels que les communautés et certaines espèces animales. L'intermittence du vent est également admise. Cependant, même si des combustibles fossiles étaient utilisés pour l'alimentation électrique de secours lorsque le vent ne souffle pas, le vent a un potentiel considérable pour réduire les émissions de carbone pendant les périodes où il souffle, et cela contribuerait donc à minimiser certains des impacts climatiques.

“ll est recommandé de mener une analyse plus détaillée une fois les zones d'extraction minière et de traitement déterminées et les projections de la demande d'énergie disponibles, afin d'indiquer la quantité d'énergie qui pourrait être nécessaire et la mesure dans laquelle l'énergie éolienne pourrait y contribuer.”

TRANSLATION:

“As can be seen in Figure 5.2.5, the wind resource is quite low in the surrounding plains, but increases significantly on the Simandou ridge line. Provided the turbines can be sited so as not to be compromised by mining excavations, depending on the extent of the mining operations and whether any part of the ridge will be left untouched, it may be possible to install wind turbines at certain locations.

“The wind resource varies up to about 8 m/s at 100 m altitude at some locations, which is a very suitable wind speed for wind power generation. The total amount of wind power that could be generated would depend on the amount and location available on the ridge for the deployment of wind turbines. A single wind turbine could be rated at around 8 MW, so multiple wind turbines would allow for larger scale power generation. Assuming a capacity factor of 35%, a single wind turbine of this size could produce around 24.5 GWh per year. Even if wind were only considered a short-term option for 10 years, until mining reaches the ridge on which the wind turbines are installed, it could represent a useful and cheap option for the production of low carbon electricity.

“Under certain circumstances, wind development can pose some challenges. Improperly designed and placed wind turbines can cause problems for some species of birds and bats. If wind development were to proceed further work would be required to understand exactly which species are present in the areas proposed for deployment and whether these species are threatened by the blades or other effects. Wind turbines generate mechanical and aerodynamic noise, so sufficient separation should be maintained from sensitive receptors such as communities and certain animal species. The intermittence of the wind is also allowed. However, even if fossil fuels were used for emergency power supply when the wind is not blowing, the wind has considerable potential to reduce carbon emissions during times when it is blowing, and this would therefore help to minimize some of the climatic impacts.”

“It is recommended that a more detailed analysis be conducted once mining and processing areas are determined and energy demand projections are available, to indicate how much energy might be required and to what extent. wind energy could contribute to this.”

Siting wind turbines on the Simandou ridge line in a manner so that the turbines compromised by mining excavations *is a choice* that WCS can make considering that it has control over where to locate wind turbines and where to avoid mining excavations so as not to compromise such turbines. For the sake of avoiding emissions of 4.7 million tCO2e that would result by operating a 40 MW heavy fuel oil power plant, the choice of supplying power to the project with wind energy should be considered an environmental imperative.

1. Fadeyeva v. Russia 55723/00 [2005] ECHR 376 (9 June 2005) [↑](#footnote-ref-1)
2. Dubetska v. Ukraine 30499/03 [2011] ECHR (10 February 2011) [↑](#footnote-ref-2)
3. Mohamed Ali Baadi and Others v. Attorney General, Petition No. 22/2012 (High Court of Kenya at Nairobi) (judgment dated 30 April 2018); Save Lamu v. NEMA, Appeal No. 196 of 2016 (National Environment Tribunal (Judgment dated 26 June 2019) [↑](#footnote-ref-3)
4. Environmental Law Alliance Worldwide (2010) "Guidebook for Evaluating Mining Project EIAs" <https://www.elaw.org/mining-eia-guidebook> [↑](#footnote-ref-4)
5. The EISA explicitly states: “5.2.4.3 Exclusions et limites - Les émissions émanant de I'enlèvement de la végétation n'ont pas été prises en compte, bien que des estimations de haut niveau pour le déboisement aient été saisies. L'enlèvement des arbres préviendra les processus de piégeage du carbone existants, et toutes broussailles laissées se décomposer ou brûlées libéreront des émissions. Le bois massif doit être conservé et préservé, plutôt que brûlé ou abandonné au pourrissement, donc les émissions de GES associées seront limitées. D'autres travaux de quantification des émissions associées à l'enlèvement des arbres et de la végétation doivent être entrepris [à actualiser avec les données tirées du chapitre sur la biodiversité]. TRANSLATION: 5.2.4.3 Exclusions and limitations - Emissions from vegetation removal have not been taken into account, although high level estimates for deforestation have been entered. Tree removal will prevent existing carbon sequestration processes, and any brush left to decay or burnt will release emissions. Solid wood must be conserved and preserved, rather than burnt or left to rot, so the associated GHG emissions will be limited. Further work to quantify emissions associated with the removal of trees and vegetation needs to be undertaken [to be updated with data from the biodiversity chapter]. [↑](#footnote-ref-5)
6. Global Observation for Forest Cover and Land Dynamics: REDD+ training materials by GOFC-GOLD: Module 2.3 Estimating emission factors for forest cover change (deforestation & forest degradation). https://www.forestcarbonpartnership.org/system/files/documents/Module%202.3%20Lecture\_08\_05\_15\_final\_0.pdf [↑](#footnote-ref-6)
7. FAO “The State of the World’s Forests” 2000: <https://www.fao.org/3/y0900e/y0900e06.htm>, at Table 10. [↑](#footnote-ref-7)
8. Fisher, J. B., Sikka, M., Sitch, S., Ciais, P., Poulter, B., Galbraith, D., ... & Malhi, Y. (2013). African tropical rainforest net carbon dioxide fluxes in the twentieth century. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *368*(1625), 20120376. [↑](#footnote-ref-8)
9. 844.46 hectares x 0.54 tC/hectare/year x 22 years x 3.67 tCO2/tC = 36,800 tCO2 [↑](#footnote-ref-9)
10. 3720 hectares x 0.54 tC/hectare/year x 22 years x 3.67 tCO2/tC = 162,200 tCO2 [↑](#footnote-ref-10)
11. https://www.ge.com/renewableenergy/wind-onshore/sierra-platform/ [↑](#footnote-ref-11)