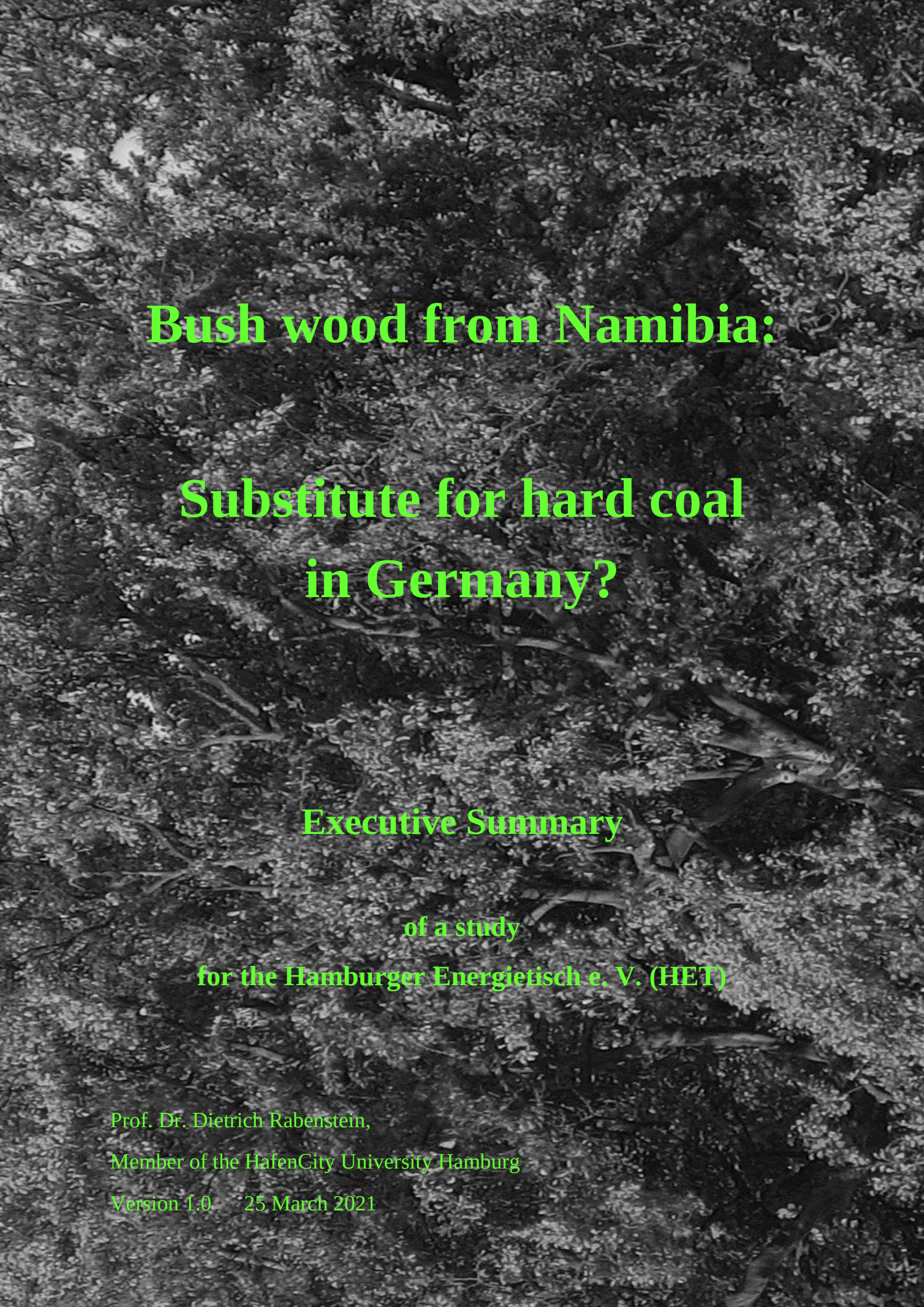

Bush wood from Namibia:

Substitute for hard coal in Germany?

Executive Summary

of a study

for the Hamburger Energietisch e. V. (HET)

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Version 1.0 25 March 2021

Bush wood from Namibia: Substitute for hard coal in Germany?

Hamburg evaluates an intercontinental biomass partnership with Namibia

On 12 May 2020, the Hamburg Environmental Protection Ministry (BUKEA) announced in a press release that a Memorandum of Understanding (MoU) had been signed, according to which Hamburg and Namibia would evaluate the sustainable use of bush wood from Namibia. The results of this evaluation process are to be announced in mid-2021.

This was preceded by a joint dossier of the Deutsche Gesellschaft für internationale Zusammenarbeit GmbH (GIZ) and the Institute for Applied Material Flow Management (IfaS) at Trier University of Applied Sciences in April 2019, which proposed using biomass from Namibia to replace hard coal at the Hamburg-owned Tiefstack cogeneration plant.

In a feasibility study conducted by IfaS in November 2020, the offer of a bush wood supply has meanwhile been extended to the cities of Berlin, Flensburg and Rostock, which would urgently need a new energy source to replace fossil coal. Reference was made to the international demand for wood pellets and wood chips by European power plant operators such as municipal utilities or companies like Vattenfall, Uniper, Drax and large traders like the Brüning Group, with which another Memorandum has already been signed. The production of biofuel from bush wood will also be investigated by Hamburg's Environmental ministry.

In the feasibility study commissioned by GIZ, IfaS calculated that 105 biomass industrial parks (BIPs) could be set up in Namibia to use the bush wood (video). Each of these BIPs could utilise 250,000 tonnes of biomass per year. For Hamburg, a supply of up to 1 million tonnes per year is under consideration. This would correspond to the operational capacity of only four BIPs.

Climate impact of the energetic utilisation of bush wood from Namibia

In its feasibility study and in a presentation on 1 December 2020, IfaS assessed the climate impact of Namibian bush wood that could be burned in Hamburg. The institute concluded from its calculations that burning Namibian bush wood would not only be climate-neutral, but would even remove CO_2 from the atmosphere (Figure 1 without the red corrections).

This CO_2 storage, IfaS explained, would be exactly the amount of greenhouse gas storage that Namibia committed to in its Nationally Determined Contributions to the Paris Agreement in 2015.

On their availability, the IfaS climate impact calculations were subjected to a thorough review on behalf of the Hamburger Energietisch e. V. (HET). About a dozen errors and inconsistencies were found, some of which were already contained in a study by the forestry consultancy UNIQUE, Freiburg, commissioned by GIZ and published in December 2019.

The most important objections to IfaS's "Scenario Hamburg":

- No baseline scenario was taken into account: If the bushes in Namibia are not cleared, they can continue to grow and store CO_2.
- IfaS and UNIQUE assumed that when bush land is converted into grassland (savannah), additional CO_2 is stored in the soil. However, the vast majority of empirical studies suggest the opposite. After clearing the bushes, CO_2 is released from the soil, as less organic carbon (SOC) is stored in the soil of the resulting grassland in a state of equilibrium than in the soil of scrubland.
- Methane emissions of the ruminants that are to graze on the recovered grassland should be referred to 20 years and not 100 years, since methane in the atmosphere only has a half-life of 12 years and it will already be decided in the next few decades whether global warming can be stopped before dangerous tipping points are passed.
- The UNIQUE and IfaS export-scenarios are based on too optimistic assumptions about the recoverability of a savannah landscape, which do not apply in a sparsely populated, drought-stricken country like Namibia.

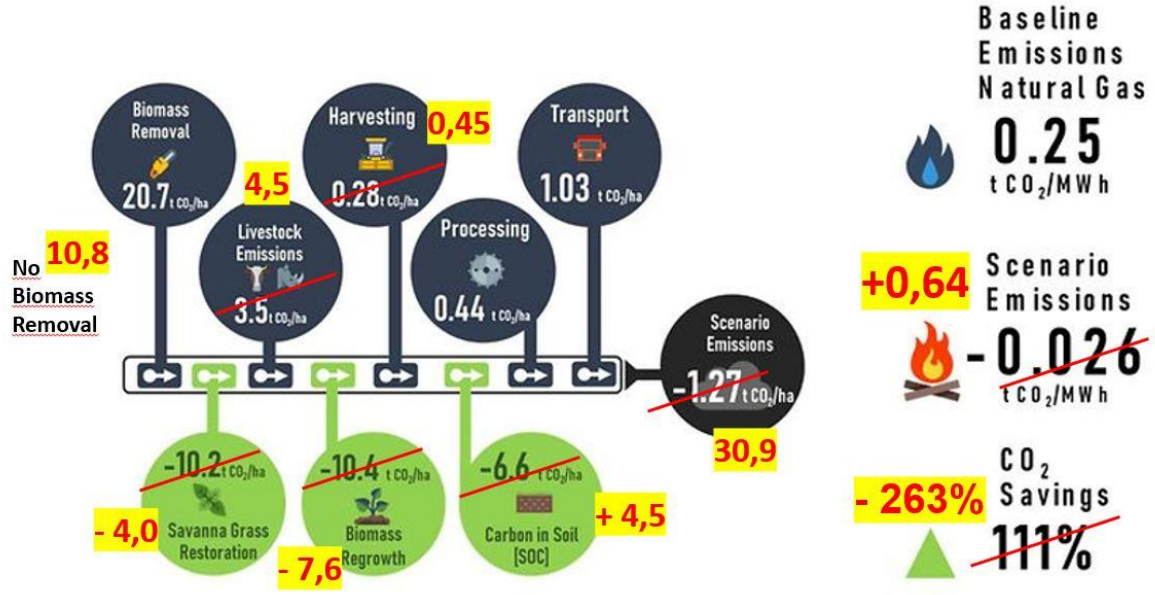

Figure 1: Corrections to the IfaS greenhouse gas calculation results for the "Hamburg scenario". Source of the uncorrected version: IfaS presentation of 1.12.2020. Units of the values given in the left part of the figure are tonnes of CO_2 per hectare of scrubland, which is "thinned out" by 30 percent. The timeframe under consideration is 20 years.

Figure 1 shows a diagram by IfaS belonging to the "Hamburg scenario". Without the red corrections, the diagram promised that if the wood were used in Hamburg for energy, in summary greenhouse gases would be removed from the atmosphere: 26 kg CO_2 per megawatt hour of the energy contained in the bush wood. However, after correcting all inconsistencies and errors, the result for the "corrected Hamburg scenario" was that the use of Namibian bush wood for

energy in Hamburg would release 644 kg of CO_2 equivalents per megawatt hour. Compared to hard coal, this is 47 percent more, and compared to natural gas, even 263 percent more.

Figure 2 shows a comparison of emissions with those of other energy sources.

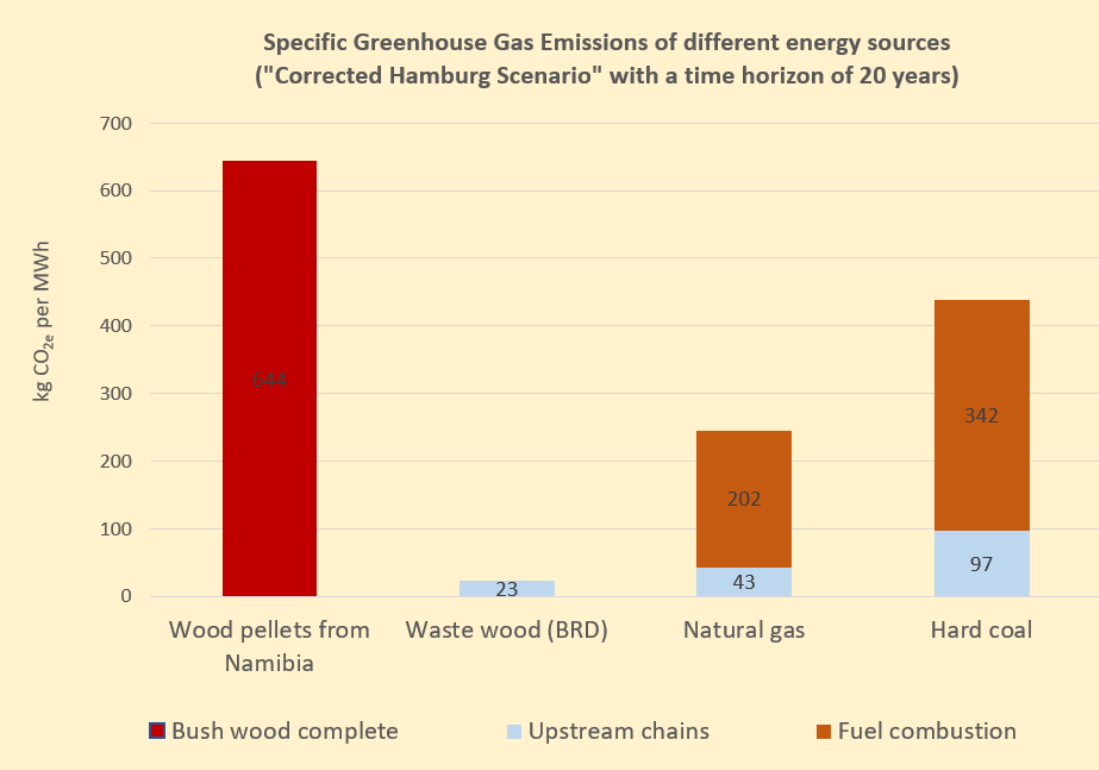

Figure 2: Specific greenhouse gas emissions in kg CO_{2e} per MWh energy content of bush wood from Namibia in the "corrected Hamburg scenario" with a time horizon of 20 years when assessing methane emissions (left). On the right, corresponding specific greenhouse gas emissions in kg CO_{2e} per MWh energy content for waste wood from the Federal Republic of Germany, natural gas and hard coal.

Figure 3 shows individual contributions to the specific greenhouse gas emissions in kg CO2e per MWh energy content of bush wood from Namibia. It can be seen that the regrowth of woody biomass in 14 out of 20 years and the growth of grass on the deforested area in 6 out of 20 years (assumptions in the "Hamburg scenario" of IfaS) cannot nearly offset the emissions. The often overestimated emission contribution of transporting the wood pellets produced in Namibia to Hamburg, on the other hand, plays only a minor role using the IfaS data.

In addition to the emissions from the wood burning itself, the omission of further CO_2 storage without biomass removal, the CO_2 emissions from the soils during the conversion of bushland into grassland and the methane emissions from additional ruminants play an important role. The value of the total balance in the red bar at the very bottom is therefore very high.

The burning of wood is often regarded as climate-neutral, specifically when the wood removed from a forest grows back again completely. The fact that there is a not insignificant time lag is easily neglected. However, the regrowth of bush wood in Namibia is precisely what is to be

prevented: in the "Hamburg Scenario" elaborated by IfaS, for about 6 years. It is known, however, that when regrowth occurs after a timber harvest, the previously existing wood stocks are no longer obtained.

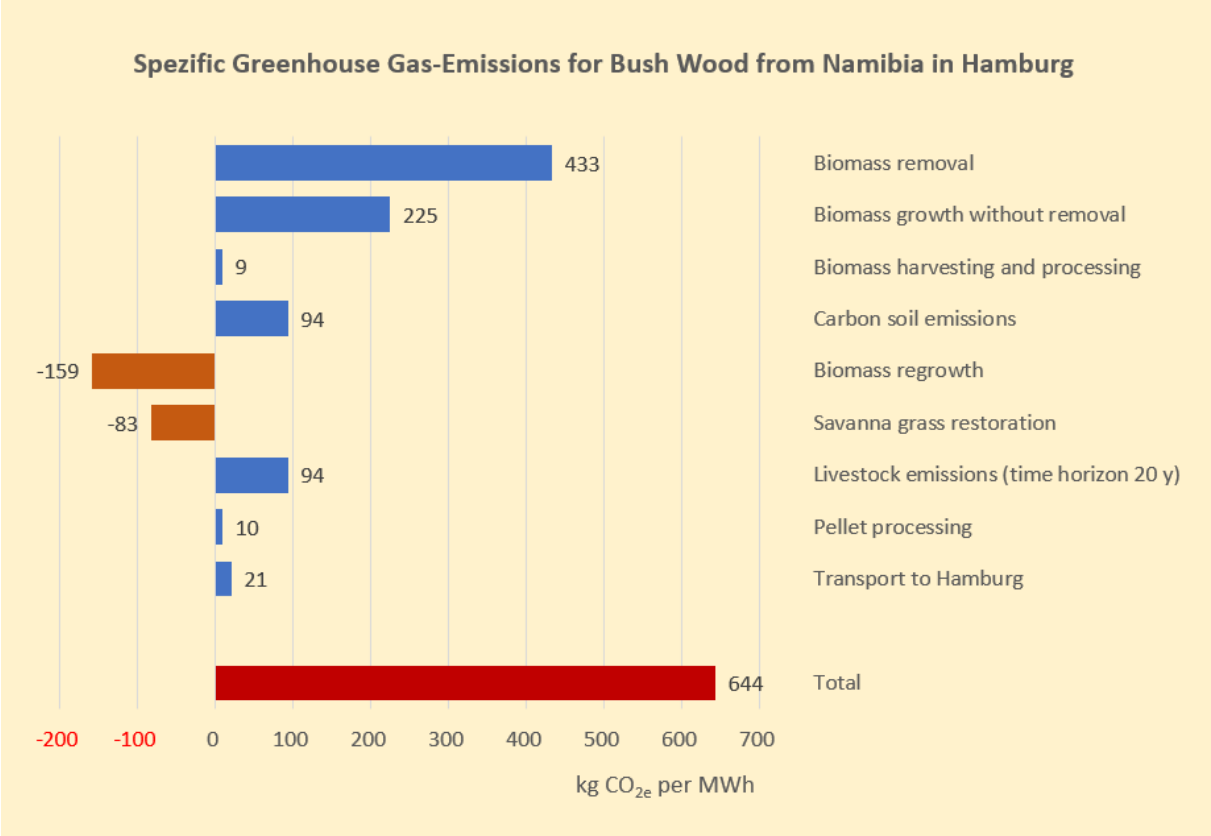

Figure 3: Individual contributions to the specific greenhouse gas emissions of the "corrected Hamburg scenario". Bars running to the right belong to greenhouse gas sources, bars running to the left (negative) belong to greenhouse gas sinks. The resulting specific greenhouse gas emissions are shown in the red bar below. The timeframe under consideration is 20 years.

Bushwood from Namibia - not an option for Hamburg district heating

In its 2019 climate plan, Hamburg has committed itself to reducing CO_2 emissions by no less than 95 % compared to the base year 1990 by 2050 at the latest. Due to the far too high climate impact of the energetic utilisation of bush wood from Namibia in Hamburg, the use of this energy source is urgently not recommended, even if it appears to be a renewable energy source at first glance.

The removed biomass (blue bar at the very top of Figure 3) would be delivered to Hamburg and burned there. In this process, the carbon contained in the wood would be released in the form of CO_2.

It should be noted that a significant proportion of the greenhouse gas emissions that would be caused by bush wood from Namibia would only be released after the energetic use. The

regrowth of woody biomass and grass (brown in Figure 3) would roughly compensate for the growth of bushes (green in Figure 3), which is prevented by clearing the bushes. However, the emissions from the deforested soil and the methane emissions from the stomachs of the ruminants (blue) would have the consequence that, with a continuous supply of bush wood to Hamburg, the greenhouse gas emissions produced would increase year after year. This behaviour does not fit at all with the German climate plans, according to which greenhouse gas emissions are to be successively reduced and ended by 2050.

Greenwashing for bush wood export compared to electricity generation from bush wood in Namibia

The IfaS assessment is based to a considerable extent on the greenhouse gas calculations of the aforementioned study by Seebauer et al. of the forestry consultancy UNIQUE.

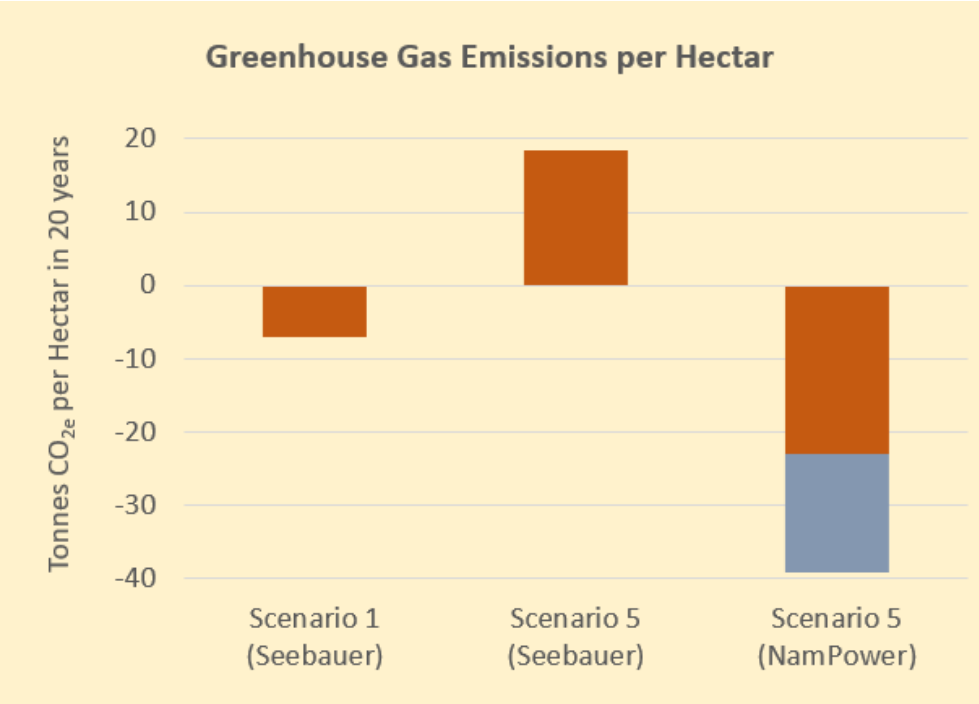

Figure 4: Greenhouse gas emissions in tonnes CO_{2e} per hectare in 20 years for scenarios 1 and 5 from [Seebauer 2019] (left and in the middle) and for scenario 5 with planning data from NamPower (right). Negative values signal greenhouse gas sinks. The calculations followed the calculation procedure of [Seebauer 2019] and did not take into account the errors and deficiencies identified in the calculation procedure of [Seebauer 2019]. The grey section on the right indicates a range between the smallest and the largest amount of the substituted electric current in Namibia.

The noticeable polemic on the part of representatives of UNIQUE, IfaS and lobby groups against the use of bush wood for power generation in Namibia itself gave rise to a more detailed comparison of two scenarios of the UNIQUE study, Scenario 1 for the restoration of grazing

land by thinning out bush cover and Scenario 5 for the extraction of bush wood for a 40-Megawatt power plant planned by the Namibian power utility NamPower.

While in the UNIQUE study, rangeland scenario 1 was a GHG sink in terms of calculations, scenario 5 (power generation with bush wood in Namibia - centre in Figure 4) was a considerable GHG source.

If the characterising parameters of NamPower are used for calculations according to the method used by UNIQUE, local electricity generation turns out to be a much stronger GHG sink than rangeland recovery, as the right side of Figure 4 shows.

After corrections for the errors in UNIQUE's calculation procedure, Scenario 1 becomes a considerable greenhouse gas source. Scenario 5 is less harmful to the climate, but only remains a greenhouse gas sink if the electricity generated with bush wood replaces coal-fired electricity, which is currently imported from South Africa.

Export of Namibian bush timber is not necessary for limiting bush encroachment

The supporters of the export of bush wood from Namibia to Europe spread the message that bush wood must be exported in large quantities so that bush encroachment in Namibia can at least be stopped.

A review of this claim shows that it cannot be justified. This is because a considerable proportion of the bushwood increment is lost to fires year after year, and 40 to 60 per cent of the bush encroached areas are not suitable for economically viable bush wood harvesting for various reasons.

The increment of bush wood still available after taking these facts into account can be used for local value creation in Namibia itself. Exporting the raw material wood to the global North is not necessary to stop bush encroachment.