

Dear Nathanael,

Dear Almuth,

Thank you for your email, in the interest of brevity, please find my answers listed below in blue:

After speaking to you I was very much hoping for a continued open and honest conversation. As was I, but I found it difficult to provide you with the documents you had asked me to prepare. You and members of your group chose not to meet with me despite daily attempts on my part to do so (see below emails to and from you). I found it stranger still that if Deepak came to the Bellona Biochar side event at COP15 why did he not pick up the documents I had prepared for BioFuelWatch at your request? I must say, however, that was deeply disappointed after waiting in vain for any corroboration about your statements regarding a positive CDM/Gold Standard project benefiting a women's shelter in Burkina Faso. Having received no further information from you despite several requests, I looked through the CDM and the Gold Standard website in detail. I could find no approved CDM project in Burkina Faso and no project which in any way resembles what you spoke about on the Gold Standard website. Yet you had told me that you were advising the US EPA about the social as well as environmental benefits of such a project. If you chose not to retrieve the documents you had asked me to bring to Copenhagen, despite my daily communication to you, it would be difficult for you to receive further information. Please forgive the terse tone of my reply but I made every effort to meet your every request for information and now find you implying that I did not follow up.

You refer to "information based on field work and lab tests that show that

the LuciaStove char produces no PAHs and that the LuciaStove uses

significantly less fuel than other stoves". The email which you had sent to us initially contained only most basic information about a comparison between LuciaStoves and "standard charcoal grills". I am aware that you promised much more detailed information - not scientifically validated but from your company – but despite follow-up requests did not send it, and an extensive websearch showed up nothing.

Regarding claims about stoves:

After the email discussions which we had, Teresa and I changed the reference to stoves in the Biochar in Africa briefing as you can see here: www.biofuelwatch.org.uk/docs/biochar_africa_briefing.pdf. We did so in expectation of receiving some evidence from you to back up the claims about Lucia Stoves being far more efficient than any other type of efficient clean biomass stove. I am grateful to both you and Teresa that *some* of the information in your article has been corrected but was distressed that BFW not only restated the same incorrect information the following day at the Econexus Biochar side event at COP15, but added several other pyrolytic stove related misconceptions and accusations during Deepak's presentation.

Unfortunately, we did not receive such evidence. Deepak attended your presentation at the Bellona side event before giving his own presentation

and he heard nothing at all to back such a claim up either. [Again all documents were ready for you and Deepak neither retrieved them nor did he choose to ask these questions during the panel discussion session.](#)

Clearly, modern pyrolytic stoves are far more efficient than open fires, furthermore, they make a major difference in terms of air pollution and can save a lot of lives - those are basic facts which none of us would dispute.

[I am much relieved that BFW acknowledges the advantages of pyrolytic stoves.](#)

The comparison which we have focussed on is between different types of efficient and clean biomass stoves - and there are many different ones which use non-charcoal biomass. I have looked carefully at the information you had sent us and at the WorldStove website – neither of those give any comparative information except with open fires or charcoal grill, and nobody would dispute that energy is lost if biomass is converted to charcoal before being used in a stove. Your website claims high improvements compared to 'other stoves' but does not indicate which other stoves those might be.

[WORLD BANK TECHNICAL PAPER NUMBER 242 Energy Series 1994
What Makes People Cook with Improved Biomass Stoves?
A Comparative International Review of Stove Programs
Douglas F. Barnes, Keith Openshaw, Kirk R. Smith, and Robert van der Plas](#)

[Is one of many such studies, updated studies are currently ongoing by both governmental and non governmental organizations.](#)

We have not been able to find any independent study which compares the biomass requirement for a wide range of such stoves, let alone a peer-reviewed one - if there is such a study, please let us know and we will read it and if necessary revise what we say based on new evidence. From our understanding, however, it goes against basic conservation of energy to suggest that one can maximise the energy/heat from a given amount of biomass by retaining a high percentage of the combustible fraction of that biomass. If that fraction, retained as charcoal is not burned for heat but applied to soil, then how can this process maximise heat gain from biomass? [70% of all energy in biomass and only half of the carbon is released as gas, this is because energy rich, but low carbon groups are liberated first. It is easier to burn gases efficiently than it is to burn solids, which is why modern pyrolytic stoves can burn more cleanly and can produce more energy with less material even while retaining 30% of the biomass and nutrients and 50% of the carbon for soil improvement. Furthermore, fully pyrolytic stoves use the carbon as a filter for the gases they produce thereby reducing emissions. To burn to ash, as do open fires and older stoves would therefore increase emissions and place lives at risk.](#)

Clearly, there would need to be a tangible benefit to rural families of using the biochar on their land in order to support charcoal-retention for this purpose. [The greatest tangible benefit, as stated by you above, is health, but even a small pyrolytic stove with minimal use would have important benefits for rural families in terms of soil improvement and subsequent crop increases.](#) I am afraid I cannot see the basis for such claims. Several short-term studies have shown an (initial) yield increase through

the application of 10-30 tonnes of biochar per hectare. Yesterday, I read one which showed a modest yield boost with 8 tonnes. I am grateful that you are well documented regarding the agricultural advantages of biochar but the concern you have regarding the 8-30 tonnes per hectare would seem to indicate that BFW advocates industrial scale agriculture. I know this is not the case, so let me use the numbers you have provided below as a way to explain the apparent incongruencies.

Commonly, nitrate fertilisers are also used in studies, but let's ignore this just now for the sake of the argument. Now, the WorldStove website suggests that 100g of biochar are retained after cooking one meal. If a family was to cook three meals per day for a year with a LuciaStove, they would produce 0.1095 tonnes of biochar. If you know of any study which shows yield improvements from the use of 0.1 tonnes of biochar for one hectare of land or even a smaller area of land on which a family in Africa might depend, please do let us know, we have not come across one. The smaller LuciaStove, as do most modern pyrolytic stoves, does produce 100g of biochar per hour. The average African household cooks for three to six hours a day (depending on country, food traditions, and cooking customs). To be conservative this would mean a daily production of 300g of biochar per day per household. The most common mistake with viewing the 8-30 tonnes per hectare as a requirement for crop increases, is neglecting the fact that these figures refer to concentrations of char. Since plants are spaced, the common agricultural practices of side dressing or top dressing, as is done with other soil enrichment practices, allows even small amounts of char to achieve even the high concentrations that you correctly acknowledge as being beneficial to both plants and soil.

If this sound agricultural practice is applied in arid regions, the char from a single pyrolytic stove can be used to plant as many as 6,083 corn plants per year. (Glaser, B. J. Lehmann, W. Zech, 2002. Ameliorating physical and chemical properties of highly weathered soils in the tropics with charcoal – a review. *Biology and Fertility of Soils* 219- 223. Clearly explains that soil water retention increased by 18% upon addition of 45% volume of* *charcoal to a sandy soil)

I would also like to emphasise that our main concerns relate to the evidence about biochar impacts as well as to the scale of biochar production being widely promoted. Stove efficiency is peripheral to the discussion as to whether biochar should be included into carbon trading mechanisms or otherwise be promoted. I appreciate BFW's concern about scale practices but by no means see why that makes stove efficiency peripheral to including biochar in carbon trading mechanisms, quite the contrary.

If BFW's concerns about biochar being included in carbon trading is for fear that large corporations would use the opportunities to further exploit rural communities in Africa and deprive them of chances to help themselves, then BFW should be endorsing biochar producing stoves for developing nations. Companies such as ours have pledged 100% of the carbon credits that are earned by our stoves to the communities that use them and use the char produced by the stoves to improve their own soils and increase their local crop yields.

Carbon credits help these rural communities to establish stove programs of their own without asking for aid or funding from anyone. This empowers groups such as the woman's shelter we support in Burkina Faso by allowing them to be 100% self-sufficient while promoting economic growth and reducing the need to cut trees (since pyrolytic stoves can use common fuels that are usually disposed of by burning in large heaps because they are too small to be used in other stoves and too plentiful to be composted safely). There are many ways of promoting

efficient biomass stoves – promoting the application of biochar to soils is quite a separate matter.

We would ask you to please refrain from accusing us or other critics of 'putting people's lives at risk'

If your statements based upon incorrect information create doubts which then reduce the chances that rural communities in developing nations have for improving their lives and reduce deforestation then BFW's publications and presentations **do** place both people's lives and the environment at risk.

It is for these reasons that I continue to provide you with peer review supported data, so that our shared goals of helping people and the environment can be met.

or making unfounded and unspecific insinuations regarding our funding - this is quite uncalled for in a debate about thermal efficiency of stoves, let alone in the context of a widely supported call for applying the precautionary principle to biochar. I appreciate that you encourage the cautionary use and application of biochar and for this reason we have developed simple procedures that allow anyone to test their char so that the right char is applied to the right soils and for the right crops. As Johannes Lehman wisely stated during the Bellona Foundation biochar side event at COP15, Christmas poinsettias are frequently killed by incorrectly watering them, but no one would suggest that water is therefore dangerous for plants.

Best regards,

Almuth Ernsting

In conclusion I am pleased that with this email to me BFW acknowledges:

- 1) That pyrolytic stoves (biochar producing stoves) “make a major difference in terms of air pollution and can save a lot of lives”
- 2) That there are “yield increases” to crops where biochar has been applied.

Clearly, as I have often stated, our goals do seem to be one and the same. It would seem to me that your concerns are not so much about biochar as they are that large corporations would take advantage of carbon offsets loopholes that might come from poorly conceived policies.

I would suggest then, that rather than dispute the advantages that you yourself admit biochar can have, that we join forces to help the delegates at COP15 come up with policies that do not have large corporate loopholes and thereby ensure that the developing nations and small rural communities and farmers throughout the world benefit from the ecological, environmental and economic opportunities that biochar could provide.

All the best,

Nathaniel Mulcahy.